Behind the Feed

a Learning Experience on Social Media Algorithms

Including the games:

-Enter-the-Bubble→

Guess the Data & Vide?

Social Media Battle
User V/S Company

DDPM220 Final Master Project
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Prologue

This document is a design report describing the development of Behind the Feed as part of the Final Master design project by Yorn Thijssen for the master Industrial Design at Eindhoven University of Technology. The project shows the application of what he has learned in the master Industrial Design combined with his experience in, and elements from education through applying a learning experience design approach.

Motivated by his professional identity, vision, the desire to combine Industrial Design with the master Science Education, and building upon a prior and related project, Yorn aimed to create a coherent learning experience on social media algorithm in his final design project. It aims to address the lack of digital literacy, focusing specifically on the lack of algorithmic literacy regarding social media algorithms in students aged 12 to 16 years old.

Summary

In an increasingly algorithm-driven world, understanding how algorithms shape our digital experiences becomes more essential. Social Media algorithms have profound impact on society, particularly on young people, by providing personalized content for every user. This can lead to so called filter bubbles, potentially closing a user off to new ideas, subjects and important information which reinforces existing beliefs and biases or contain negative and potential harmful content. Given the intense social media use by younger generations, their lack of understanding of these algorithms, and the lack of educational material, it is essential to empower younger generations with so called algorithmic literacy through education, helping them navigate and understand their digital environments and their effects so that they can use social media more critically and responsibly.

By taking a learning experience design approach and designing within an existing business context, Behind the Feed was developed. Behind the feed is a learning experience on social media algorithms for students aged 12 to 16, featuring three educational games: Enter the Bubble, Guess the Data & Video and Social Media Battle: User vs. Company. Through a gamified custom series of lessons, it aims to empower students to explore how social media algorithms work, evaluate their impact, and develop the skills to use social media more critically and responsibly, enhancing their overall algorithmic literacy.

Table of Contents

Prologue 2
Summary 3
1. Introduction 5
    1.1 Approach 6
    1.2 Reading Guide 6
2. Background & Related Work 7
    2.1 Social Media Battle 7
    2.2 Learning Experience Design 8
    2.3 Social Media Algorithms 9
    2.4 Algorithmic Literacy (AL) 9
    2.5 Algorithmic Literacy in Education 10
3. Design Process 11
    3.1 Step 1: Question 11
    3.2 Developing the Learning Experience 12
        3.2.1 Step 2: Research 12
        3.2.2 Step 3: Design 15
        3.2.3 Step 4: Develop 18
        3.2.4 Step 5: Test 20
    3.3 Developing Educational Design 21
        3.3.1 Step 2: Research (& Question) 21
        3.3.2 Step 3: Design 22
        3.3.3 Step 4: Develop 24
        3.3.4 Step 5: Test 26
        3.3.5 Iteration step 2: Research 27
        3.3.6 Iteration step 3: Design 28
        3.3.7 Iteration step 4: Develop 29
        3.3.8 Iteration step 5: Test 32
    3.4 Step 6: Launch 34
4. Final Design 35
    4.1 Behind the Feed: a Learning Experience on Social Media Algorithms 35
    4.2 Educational Games 37
        4.2.1 Enter the Bubble 38
        4.2.2 Guess the Data & Video 39
        4.2.3 Social Media Battle: User vs. Company 40
    4.3 Physical Design 42
    4.4 Application 43
    4.5 Business Model 44
5. Discussion 45
    5.1 Design Decisions & Final Design 45
        5.1.1 Experiential Learning 45
        5.1.2 Emotion 45
        5.1.3 Gamification 45
        5.1.4 Business 45
    5.2 Impact on Emotion & Learning 46
    5.3 Evaluation 46
6. Conclusion 47
Acknowledgements 48
References 49
Appendices A-V 53

1. Introduction

In an increasingly algorithm-driven world, understanding how algorithms shape our digital experiences becomes more essential. One of the domains in which algorithms are integrated is in social media. These digital platforms have appeared in the news a lot recently, since countries are banning or thinking about prohibiting social media use for children under 16 (NOS, 2024). These actions and considerations underscore the profound impact social media has on society, particularly on young people.

One of the key drivers of this impact are these integrated algorithms, that work as powerful recommendation systems and provide personalized content for every user (Fayyaz et al., 2020). To do so, these systems gather user data, like demographics, user preferences and user behaviour, to provide each individual user with personalized content. This personalization can improve the user experience but can also lead to so called filter bubbles that are potentially harmful to individuals and society. The individually selected content can close a user off to new ideas, subjects and important information which reinforces existing beliefs and biases (Pariser, 2011b), or contain negative and potential harmful content. These algorithms shape our online experience and in doing so also shape our experience of the real world (Wilson, 2016). Younger generations are prone to the potential impact these powerful algorithms can have for several reasons.

First, social media is particularly popular among these generations. Over one-third of Gen Z (ages 12 to 27) reports daily usage of more than two hours (Coe et al. 2023). Among 12- to 16-year-olds, 87,2% use social media almost daily (Rombouts et al. 2024). As a result, these adolescents are constantly exposed to personalized recommended content, including information, images, and videos.

Second, despite their frequent social media use, research shows that this does not automatically lead to awareness and understanding of how these algorithms work (Powers, 2017). In fact, 12-to 16-year-olds lack *algorithmic literacy* (AL) (de Groot, de Haan & van Dijken, 2023), which is the awareness and understanding of the use of algorithms and how they work, the ability to critically evaluate their decision making and the ability to cope with or even influence these algorithms (Dogruel et al., 2021). Moreover, neither do they critically evaluate how these algorithms can impact them and society (de Groot, de Haan & van Dijken, 2023).

Third, while education on media literacy (ML) covers topics like privacy and fake news, there is little educational material on AL, even less regarding social media algorithms. This gap in education leaves children without the necessary AL and consequently, vulnerable to the influence of social media algorithms.

Given these reasons and the potential harmful impact of these algorithms, it is essential to empower younger generations with AL through education, helping them navigate and understand their digital environments and their effects so that they can use social media more critically and responsibly.

This has led to the design goal of this project, which is to develop a complete and coherent learning experience that (1) aims to enhance algorithmic literacy of social media algorithms in students aged 12- to 16- years-old, (2) enables them to apply this in daily life and that (3) makes use of Social Media Battle, an educational game developed in a design project as preparation for this graduation project.

1.1 Approach

In this project a Learning Experience Design (LXD) approach was taken. Coined by Dutch LXD Pioneer Niels Floor, Learning Experience Design is a principle that bridges the gap between fields of design and learning (Learning Experience Design, 2023). The principle offers a new view upon shaping the way we learn by using the perspective, methods, skills and tools of a designer. The approach will be further explained in the following chapter of this report.

1.2 Reading Guide

This report describes the development of Behind the Feed, a learning experience on social media algorithms. It continues with a chapter including background information and related work in which information will be provided on Social Media Battle, the design approach, social media algorithms, and AL. Related work on AL in education will be discussed and a design gap will be identified. The third chapter describes the design process that led to the creation of Behind the Feed. The final design will be described in more detail in the eponymous chapter four, including a section describing the business model. The process and final design are discussed in chapter five, including limitations and future work, after which the project is concluded in the final chapter.

2. Background & Related Work

This chapter provides background on related subjects and discusses related work on algorithmic literacy (AL) in education. It covers the Social Media Battle game developed in the preparation project, details the design approach, explains algorithms in social media and their impact, and concludes with related work on AL, identifying a design gap.

2.1 Social Media Battle

In preparation to this graduation project, Social Media Battle: User vs. Company was developed (figure 1). Social Media Battle is an educational game that aims to enhance algorithmic literacy in students aged 12- to 16-years-old. The game aims to do so by helping students become aware of and understand how social media algorithms work, teaching them to critically evaluate algorithmic decision-making and developing the skills to manage or even influence these operations (Thijssen, 2024).

While the game showed potential in enhancing AL, a coherent learning experience in which it is integrated would better achieve learning outcomes and allow students to apply this in daily life for several reasons.

First, playtesting sessions showed the game increases awareness and understanding of algorithms in social media but increase in critical evaluation or the skills to cope these algorithms was merely noticeable. Neither does the game support the transfer of learning to real-world situations after playing the game.

Second, as the game requires pre-existing knowledge, playing it without this knowledge makes progression and achieving the learning outcomes harder.

Third, there is little education or learning material focussing specifically on AL or algorithms in social media. While the game does so, teachers mentioned they lack the confidence to use the game in class and

Figure 1: Social Media Battle: User vs. Company (Thijssen, 2024)

suggested the game to be used in a workshop context led by external experts. It highlights an educational design gap and opens business opportunities that are explored in this project.

To conclude, a coherent learning experience enhancing algorithmic literacy, which integrates Social Media Battle, will likely empower students to reach the learning outcomes and allows them to apply this in daily life.

2.2 Learning Experience Design

Learning Experience Design (LXD) is an upcoming design principle bridging the gap between design and education. While there is no common or shared definition of LXD, within the academic domain the use of terms and concepts associated with LXD is increasing (Tawfik et al., 2021; Schmidt & Huang, 2021). As a result, there is a call for better understanding of LXD and attempts have been made (Jahnke et al., 2022; Schmidt & Huang, 2021). Within this project LXD has been applied as an approach with the definition as coined by Niels Floor:

"Learning experience design is the process of creating learning experiences that enable the learner to achieve the desired learning outcome in a human centered and goal-oriented way " (2023).

The key design principles in Floor his approach to LXD are drawn from fields like interaction design, user experience design, graphic design, and game design. Combined with principles from educational domains like instructional design, cognitive psychology, and educational sciences forms the foundations of LXD (Learning Experience Design, 2023).

LXD its emphasis on the learner and their overall experience makes it unique. While an experience consists of the situation, time, and overall impression, a learning experience refers to any situation from which learning occurs. It is a *"holistic experience that is intentionally designed and carefully crafted to help the learner to achieve a meaningful learning outcome that is (mostly) predefined"* (Learning Experience Design, 2023).

LXD requires understanding learning from experience. Experiential learning has been shaped by, and various theoretical models have been developed by names like John Dewey, Jean Piaget, Kurt Lewin and David A. Kolb. Based on the universal steps in their models, explaining how all experiences go through cycles, Floor created his own model (figure 2), keeping the learner at the centre (2024) . This four-step cycle shows how people experience: by being, seeing, knowing and doing. Four types of learning objectives for a learning experience are connected to the quadrants in this cycle: insight, knowledge, skill and behavior. Additionally, while learning is influenced by emotion, the emotions of a learner in a learning experience should be considered and used to benefit the learner and achieve greater results. The model of experiential learning and considering emotion have been thoroughly applied in the development of the learning experience.

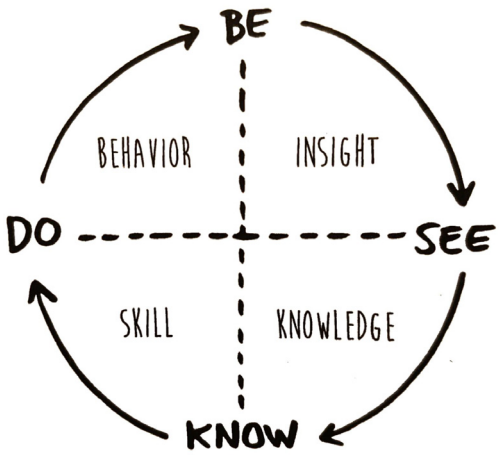

Figure 2: Experiential learning model by Floor (2023)

LXD consist of a six-step process towards creating learning experiences, which has been applied in this project (figure 3).

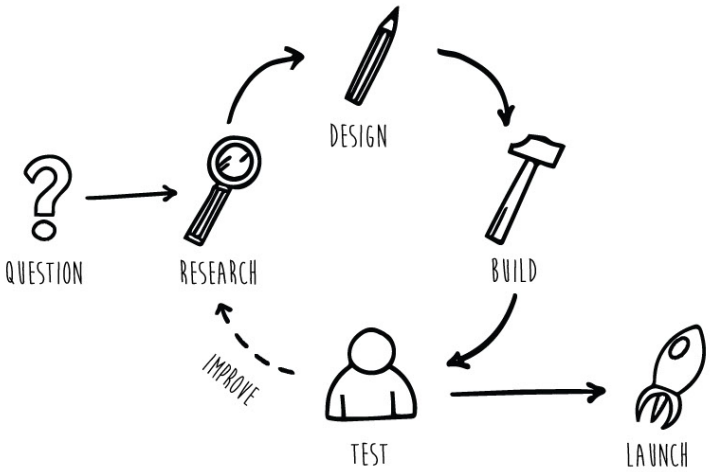

Figure 3: LXD process (Learning Experience Design, 2024)

In essence, LXD is a design principle and approach that combines design and learning to create instructive, engaging and learner centered educational experiences, making it an appropriate approach to apply in this project.

2.3 Social Media Algorithms

Algorithms are inseparable from social media platforms, playing a crucial role in their functionality and more importantly their success. They generate personalized results for every user by curating content deemed most relevant to each individual (Gillespie, 2014). The primary aim of this personalization is to keep users engaged such that they keep using the platform. Among many platforms and various algorithms, TikTok's algorithm is one of the strongest and therefore probably also the most known social media algorithm. It creates an endless stream of content that perfectly matches users their interests, called the For You page, by analysing user interactions such as likes, shared videos, and watch time (TikTok, 2020). This recommendation system is so effective that 90-95% of the content displayed on the personalized feed for each user is recommended by this algorithm (The Wall Street Journal, 2021). It is one of the features that can make a user become addicted to TikTok in under 35 minutes (Allyn, 2024).

Besides possibly causing social media addiction, these algorithms can have impact by contributing to the phenomenon known as 'filter bubbles,' a concept introduced by Eli Pariser in 2011:

"your own personal, unique universe of information that you live in online. And what's in your filter bubble depends on who you are, and it depends on what you do. But the thing is that you don't decide what gets in. And more importantly, you don't actually see what gets edited out." (Pariser, 2011).

Pariser warned filter bubbles can be harmful to individuals and society, limiting exposure to diverse ideas, topics, and important information while reinforcing preexisting beliefs and biases (Pariser, 2011b). They close off exposer to opposing opinions, alternative perspectives or new ideas, potentially distorting worldviews or intensifying polarization within society. While empirical studies reveal mixed findings on their effects, evidence suggests filter bubbles are present in recommendation systems (Kramer et al., 2014; Haroon et al., 2022; Ross Arguedas et al., 2022; Areeb et al., 2023). Supporting this notion, the Wall Street Journal found that TikTok's algorithm could generate a For You page with up to 93% personalized content related to depression and sadness (2021). With TikTok estimating 95% of smartphone users under 17 use TikTok, it highlights the vulnerability of younger generations to the potential influence of algorithms (Allyn, 2024).

Other social media platforms have replicated and adopted own version of the For You page, like Instagram with Reels, increasing the likelihood users may be present in multiple filter bubbles across various platforms (Murray, 2023). It highlights the importance of the need for users to be aware of these algorithms and their effects, to understand how they work and to develop the skills to cope with or even influence these algorithms. In other words, to become algorithmic literate.

2.4 Algorithmic Literacy (AL)

Although there is a growing search interest in social media algorithms, their functionality and in the term media literacy (ML), algorithmic literacy has not been searched enough to be registered in Google Trends in the past five years (Boots et al., 2024). The term is relatively unknown and has been defined in various ways (Oeldorf-Hirsch & Neubaum, 2023). An encompassing definition of the term used in this project is formuletd by Dogruel et al., describing AL as:

"being aware of the use of algorithms in online applications, platforms, and services, knowing how algorithms work, being able to critically evaluate algorithmic decision-making as well as having the skills to cope with or even influence algorithmic operations" (2021).

Not many studies have investigated AL of people as there are no defined measurements yet. Attempts have been made to create AL scales involving individuals' awareness and understanding of algorithms or self-report measurements, but studies often involved focus groups and interviews (Powers, 2017; Swart, 2021; Malcorps et al., 2023). Boots et al.

(2024) have found that there is a gap in AL among social media users. In general, studies reveal that people do lack AL. One study in particular found that 12-to 16-year-olds in the Netherlands lack AL, which highlights the importance of education on social media algorithms, how they can impact individuals and society, and in turn how these students can influence these algorithms (de Groot, de Haan & van Dijken, 2023).

2.5 Algorithmic Literacy in Education

AL is a new term and an unfamiliar concept. It is therefore not widely recognized within education in the Netherlands, nor is it a distinct domain in the educational curriculum. Education and learning material on algorithms and social media focus on related topics such as privacy and fake news, part of a distinct domain called media literacy (Leermaterialen, n.d.; De InternetHelden, n.d.). Limited educational resources and learning materials focus specifically on algorithms in social media (The Filter Bubble App, n.d.; TikTok - the Hmm, 2023). Given the evident influence of algorithms in our daily lives, there is a growing global call for AL education (Knack, 2021; Rusanen, 2021; Morris, 2022; Anderson & Rainie, 2024; Boots et al., 2024).

Boots et al. (2024) specifically, call for a pedagogical framework of AL that includes recognizing, understanding, developing skills to interact with, and critically evaluating algorithms and their recommendations. Although their definition of AL slightly differs, their framework and including elements have high resemblance with, even almost identical to the definition used in this project.

Boots et al. (2024) also placed AL in the context of media literacy (ML) and digital literacy (DL) (figure 4). They argue that collectively, these three literacies contribute to a comprehensive understanding of digital media, with AL encompassing the ability to recognize and counteract the effects of algorithmic manipulation. As the curriculum in the Netherlands only involves ML and DL, their findings underscore the existing gap of and high need for AL education next these two domains.

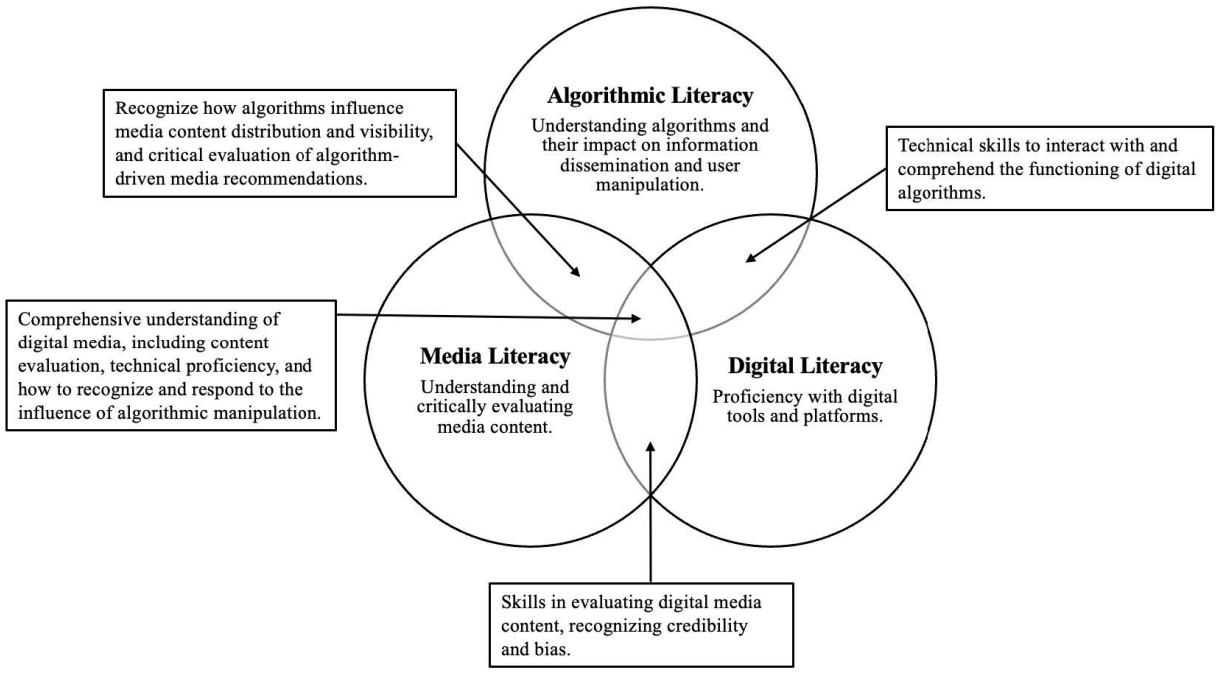

Figure 4: The relationship between AL, ML and DL (Boots et al., 2024)

3. Design Process

This chapter describes the design process using the design phases of LXD (FIGURE). The project progressed through the iterative cycle three times: the first focused on conceptualizing the learning experience, while the next two developed educational design within.

Early on, an existing business context was chosen, leading to parallel development of a business strategy besides the learning experience. It shaped the design process and produced a business model. The chapter concludes with the launch phase, summarizing final steps to the business model discussed in Final Design.

3.1 Step 1: Question

The process starts with formulating a question or problem, which was formulated in preparation to this project:

How can a coherent learning experience be created that makes use of the educational game Social Media Battle, enhances algorithmic literacy of social media algorithms in students aged 12 to 16 years old and enables them to apply this in daily life?

Additional questions upon various aspects were formulated to aid the development of the learning experience:

Questions for the learning experience:

- What are potentially effective activities, methods and instructional strategies to create a learning experience that can enhance AL?
- How can the learning experience be structured to ensure that students can transfer the gained AL to their daily interactions with social media?
- How can feedback from teachers and students be integrated into the iterative design process to improve the learning experience?

Question related to impact:

- What are the measurable impacts of the learning experience on students their AL regarding algorithms in social media and how can they be measured?

Question related to Social Media Battle:

- To what extent does playing Social Media Battle achieve the desired learning outcome related to AL?

Question regarding the facilitator role:

- What is the role of the facilitator in the effectiveness of the learning experience?

A benchmark analysis of related learning materials informed the learning methods and activities, while participatory and co-design was used to investigate the structure of the learning experience and incorporating feedback from teachers and students. Studying the impact of Social Media Battle, the learning experience, and the facilitator's role was planned after further developing the learning experience.

3.2 Developing the Learning Experience

3.2.1 Step 2: Research

Benchmark

In a benchmark analysis, related educational experiences, learning material and various businesses were compared on multiple aspects such as type of learning material, teaching method, learning goals, location and costs. This benchmark would provide insights upon these aspects, uncovered business opportunities and aided in choosing the business context. Creating a mind map, including nine types of teaching methods and examples of learning material, activities or elements, aided the analysis (figure 5).

The full benchmark and written conclusions can be found in appendix B. Table 1 shows results, which led to initial design directions for the learning experience (table 2), aiming to use group learning, kinaesthetic learning and game-based learning as teaching methods and activities.

Because of their relevance to the project goals or vision, the workshop 'Baas in eigen Bubbel' and 'digicoaches in de klas' from Digiwijzer were explored to incorporate as existing business context, which eventually led to choosing Digiwijzer as existing business context to design in (Workshop Baas in Eigen Bubbel Vo | Beeld & Geluid, n.d.; Digicoach in De Klas | Lessen Digitale Geletterdheid, 2024).

Digiwijzer (2023) their mission to promote digital literacy aligns closely with the focus of promoting AL. Their current offerings involve 'digicoaches in the klas', which entails custom series of lessons on a variety of topics given by a teacher from Digiwijzer. As this seems to lack depth on AL, there is potential for expansion. The alignment of their vision and mission with the vision of the designer makes it the chosen business context to shape strategy and development of the learning experience. It is important to clarify that there has been no formal collaboration between Digiwijzer and the designer in which was asked to create a design for their business. It was chosen and applied throughout the project as if such a collaboration were in place.

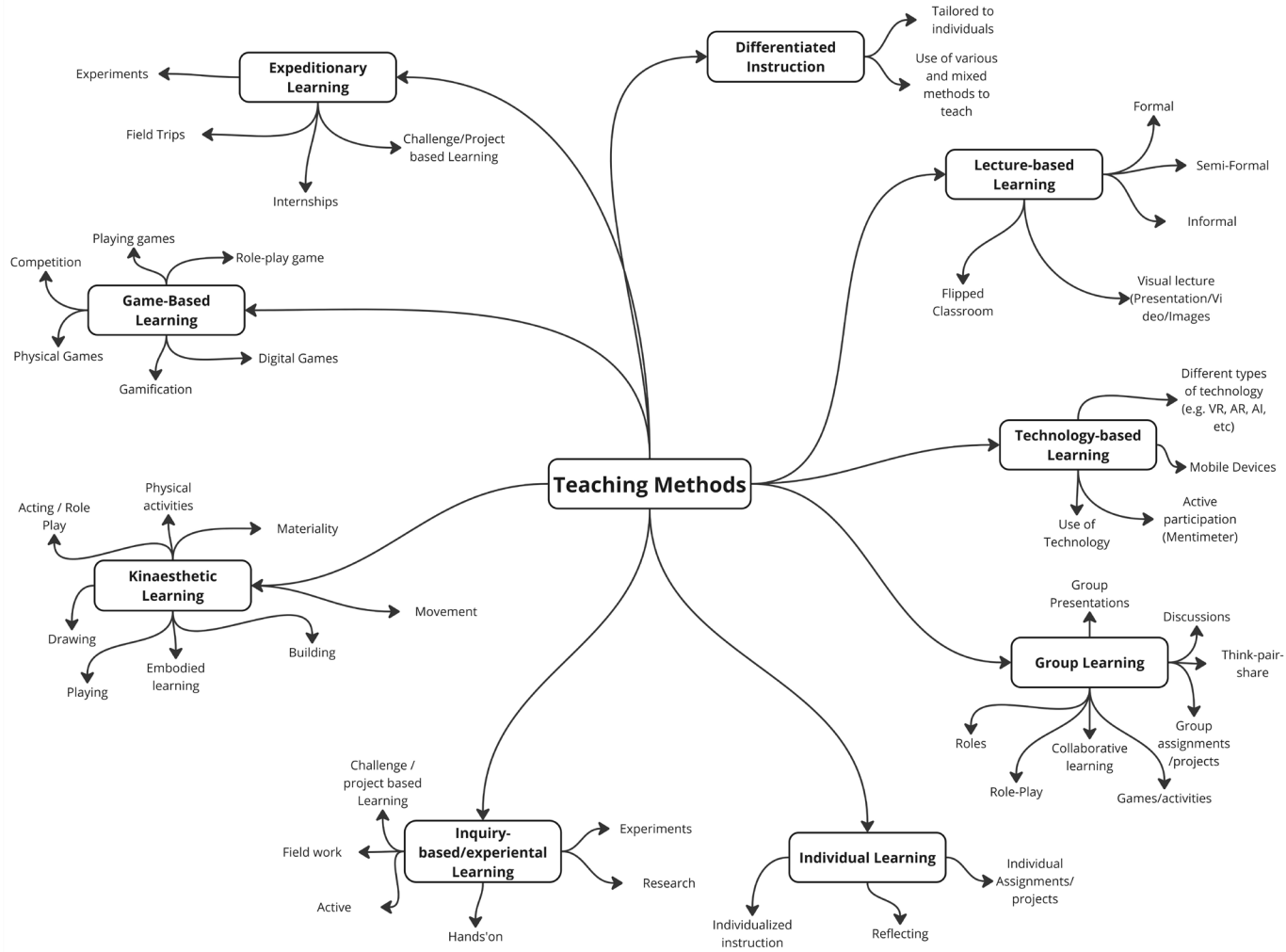

Figure 5: Mind map on teaching methods

Table 1: Benchmark analysis results

	Most related on Topic	Most related on Learning goals or vision	Most used Learning Material	Most used teaching method	Least used teaching method	Most used location
1	Workshop 'Baas in eigen bubbel'	Workshop 'Baas in eigen bubbel'	Presentations and/or video	Group Learning	Differentiated / Kinaesthetic	Classroom
2	The Filter Bubble App	Edux / De Baas op Internet	Group/Class Discussion	Lecture based	Expeditionary	Web/Online
3	TikTok Workshop	The Filter Bubble App	Group assignment	Game Based	Individual Based	Home

Table 2: Learning Experience directions

Topic	Learning outcome	Learning goals	Learning material	Teaching method	Location
Algorithmic Literacy (Social Media)	Become AL and use it in daily life'	AL learning goals	• Social Media Battle • [Additional to be designed]	• Group Learning (discussions) • Kinesthetic learning • Game -based (gamification)	Classroom/ School

Participatory Design

A review of participatory design literature was done to explore integration of feedback from children and teachers (appendix C). This highlighted to foster collaboration among peers and adults, to create informal settings, set expectations, and use team reflection through discussion or debriefing (Druin, 1994; Druin, 2002; Guha et al., 2004; Iverson et al., 2013). The FACIT PD framework, designed to analyze and create intergenerational participatory design techniques (Walsh et al., 2013), was later applied to develop design activities for co-design sessions with students and teachers.

Learning goals

Four overarching learning goals were formulated from the definition of algorithmic literacy:

1. being **aware** of the use of algorithms in online applications, platforms, and services (social media);
2. **knowing** how algorithms (in social media) work;
3. being able to **critically evaluate** algorithmic decision-making;
4. having the **skills** to cope with or influence algorithmic operations.

AL is no distinct domain in the educational curriculum in the Netherlands. These learning goals, involving awareness, knowing, critical evaluation and skills, were compared and aligned with new core concept learning goals of digital literacy (DL) highlighting the relevance of a learning experience on AL regarding social media algorithms in this domain. These goals consist of nine overarching learning goals (SLO, 2024).

The AL learning goals align with six core learning goals of DL, particularly learning goal two, eight and nine: ‘digital media and information’, ‘digital technology, yourself and the other’ and ‘digital technology, society and the world’. The full comparison can be viewed in appendix D.

Hypothetically, addressing the AL learning goals in a learning experience would contribute to the related learning goals of DL. The resemblance and relevance were later verified with a member of the development team of the concept DL core learning goals.

3.2.2 Step 3: Design

Co-Design Sessions

In co-design sessions, teachers and students brainstormed about learning activities that support the AL learning goals and combined them to create a coherent learning experience on algorithms in social media. The sessions further involved an introduction explaining AL, its goals, and Social Media Battle, pre-interviews that explored AL in participants and discussed learning activities they like, and post-interviews reflecting on the outcomes of co-designing. Two participatory design methods, Stickies and Mixing Ideas, were chosen and combined for these sessions by considering the domains in the FACIT PD framework. Co-designing involved idea generation, written on sticky notes (Stickies), of activities that could address AL learning goals, and placing them on timelines (figure 7). This was done individually, in separate groups and collaboratively (Mixing Ideas), discussing ideas and generated learning experiences in between rounds. The protocol and presentation used can be found in appendix E.

Fourteen participants participated across two sessions: five students and one teacher in the first session, and six students and two teachers in the second. Due to ethical considerations, high school students aged 16 and above participated.

Pre-interview results

Thematic analysis of collected quotes resulted in six themes (FIGURE). While students showed awareness of algorithms and their impact, they indicated younger generations to be less informed:

"My little brother is twelve now, he has no clue how that works."

Teachers added with mentioning differences in AL based on educational levels. Regarding learning activities, students highlighted the importance of interactivity and suggested gamification and simulation games as effective methods.

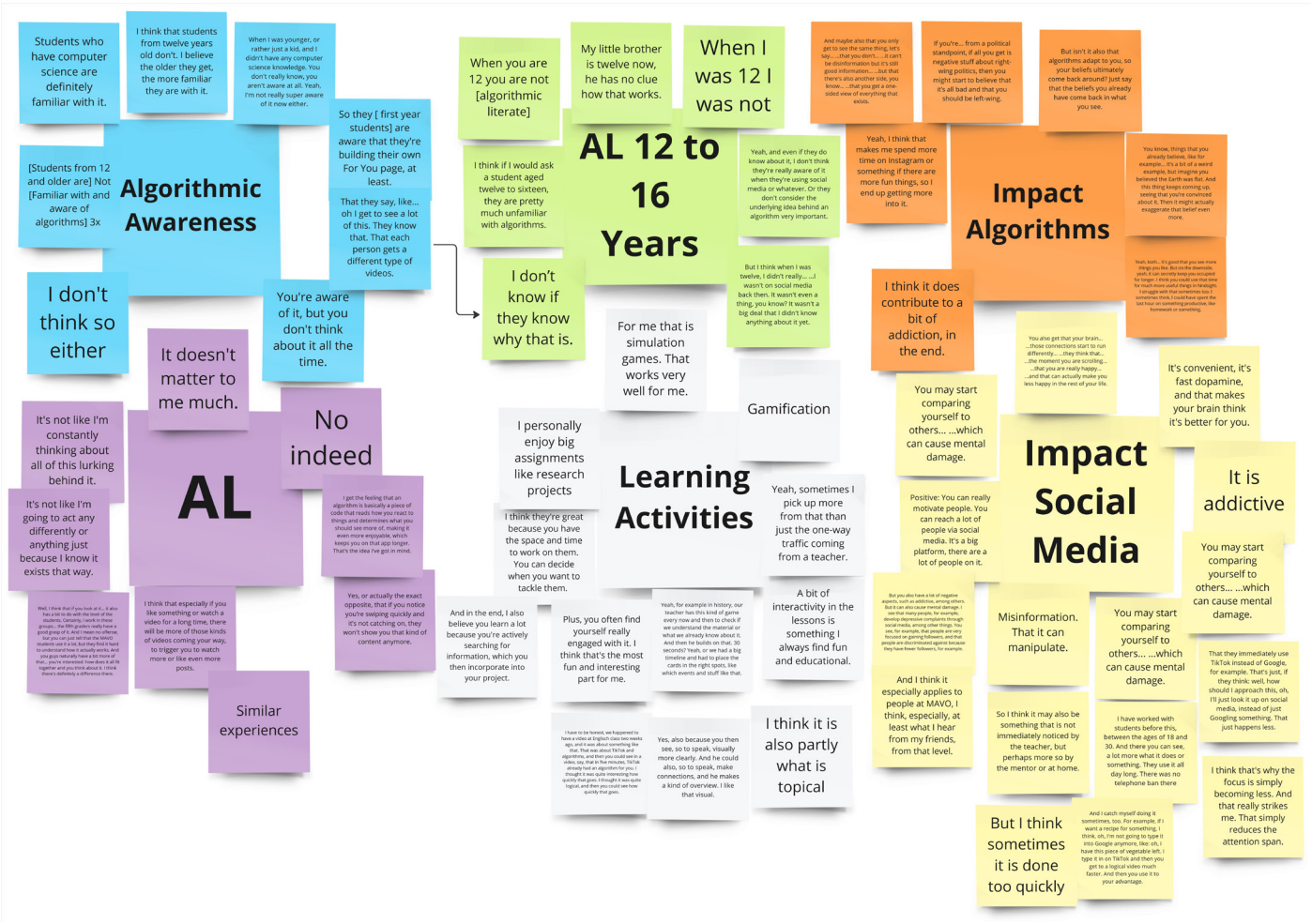

Figure 6: Thematic analysis pre-interviews. Zoom to read individual quotes or see Appendix F

Co-Design Results

The sessions produced five learning experiences, one by each group and one collaboratively finalized during the sessions. Results were digitized, and ideas were categorized by type of activity and by learning goal (appendix F). Analysis shows by what kind of activities each learning goal is addressed, and their placement within the learning experience (table 3).

Several insights were found. First, the learning goal on awareness was placed at the start of each learning experience, often by using visuals. Second, activities that explore the use of an algorithm by creating a new account, algorithms use, and viewing or comparing social media feeds were commonly included. Third, Social Media Battle was frequently positioned at the end of the experience as a testing activity, as the game involves questions and requires existing knowledge.

Figure 7: Co-design session

Table 3: Co-design analysis

Learning Goal	Learning activity	Times used in Learning Experiences	Position
Awareness	Visuals	4	Begin (Start)
	Discussion	2	
	Creating new account	1	
	Comparing Algorithms	1	
	Using an Algorithm	1	
Knowledge	Using an Algorithm	5	Middle
	Visuals	4	
	Creating new account	3	
	Gamification	3	
Critical Evaluation	Using an Algorithm	3	Begin or towards end
	Reflection	2	
Skils	Gamification	3	Middle
	Using an Algorithm	2	

Post-interviews

Thematic analysis of post-interviews resulted in eight themes (figure). Students believed the learning experiences would support AL learning goals, particularly awareness, because of the hands-on activities:

"I think doing it yourself really helps you remember it better."

Some considered it would fade away over time, but suggestions were made to include shocking elements to aid in retention.

"It's important, the things that are really shocking. For example, at the end of a reflection at which it is shocking. I think that really sticks."

These findings shaped the next design phase, providing crucial direction for the development of the learning experience.

Business Context & Strategy

The chosen business context was explored further, and a business-related document was created, involving a description of the context, a business strategy and evolving business model. This document was created with the help of slides from the 'creating real world impact' presentation from hybrid-coach Mitchell Jacobs. By applying tools like stakeholder mapping, journey mapping, and a SWOT analysis, guiding a strategy in parallel with the development of the learning experience, they mutually enhanced development. This document can be found in appendix A.

Figure 8: Thematic analysis post-interviews. Zoom to read individual quotes or see Appendix F

3.2.3 Step 4: Develop

Learner Experience Mapping

Key insights from the co-design sessions led to an abstract design of a learning experience, visualizing the learning goals addressed in each activity (figure 9).

Using learner experience mapping and incorporating the experiential learning model, learning objectives, emotions, and other aspects in detailed versions of the experience revealed two issues of the abstract design. First, the placement of the activity 'Comparing Algorithms,' that addresses the learning goals on awareness and critical evaluation, did not align with the experiential learning cycle. Second, the learning experience did not involve evaluation methods and therefore lacked constructive alignment, required for optimal educational design (FIGURE, Biggs, 1996).

'Comparing algorithms' was swapped with 'Exploring Algorithms', named after the activities involving the use of an algorithm. This activity addressed knowledge, following the experiential learning cycle. Additionally, the use of learning material to evaluate learning was added after these activities to improve constructive alignment (figure 11).

Through several iterations, a final concept of the learning experience was developed. Learning objectives that align with the experiential learning model were defined for each learning goal (figure 10). These objectives and related DL learning goals were placed in correct phases. Emotions that the activities should evoke, including emotions related to shocking elements suggested in co-design sessions, were also integrated. This concept is shown in appendix G and will be described in more detail in chapter 4: Final Design.

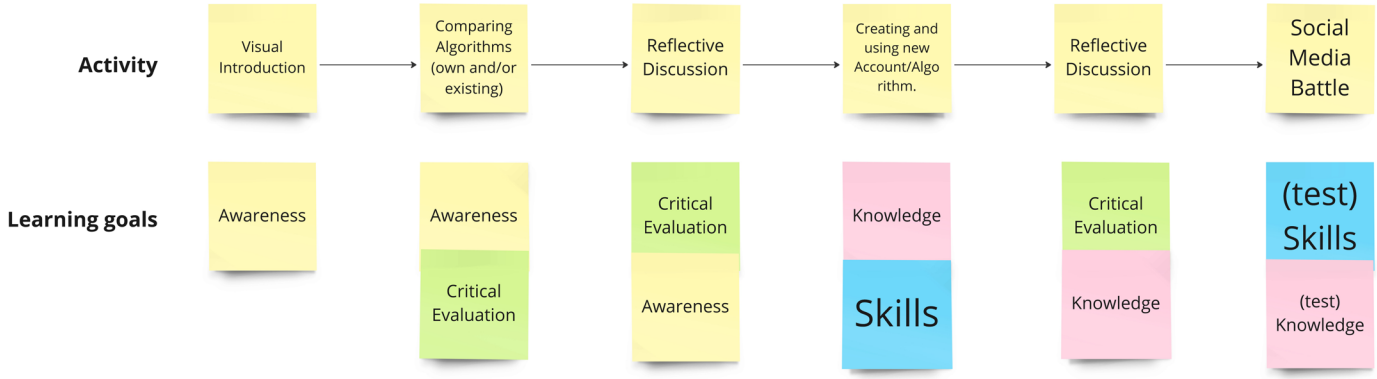

Figure 9: Abstract learning experience

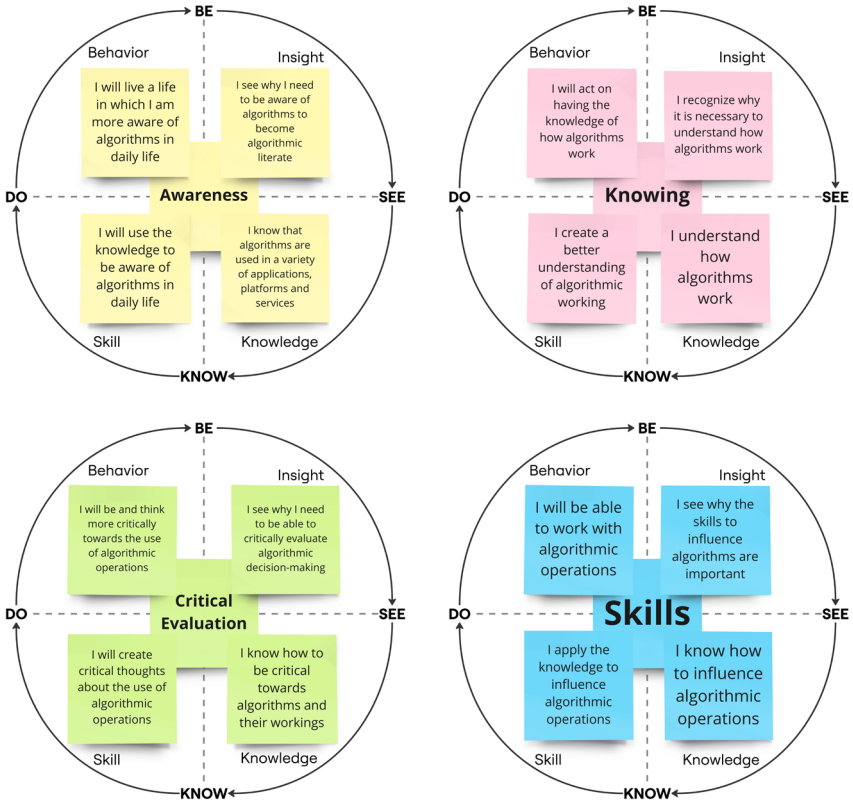

Figure 10: Learning objectives for each learning goal

Path	Before Learning Experience		During Learning Experience								After Learning Experience
Activities	Social Media Use The learner is using social media in daily life	Introduced The learner is introduced a Learning Experience on Algorithmic Literacy in Social Media will take place.	Introduction Listen, look and participate in an interactive introduction on algorithms in social media	Exploring Algorithm Explore the use of an algorithm, see how fast and which behaviour gets one into a filter bubble.	Use of Learning Material Use the learning material to delve deeper into the subject	Discussion Reflective discussion with the class about what was experienced and learned	Comparing Algorithms Compare algorithms/feeds with that of classmates or other people	Use of Learning Material Use the learning material to delve deeper into the subject	Discussion Reflective discussion with the class about what was experienced and learned	Social Media Battle Play Social Media Battle to test the knowledge and skills learned throughout the experience	Informed Social Media Use The learner is using social media in daily life while being algorithmic literate
Learning objectives	Knowledge Through using Social Media, practical knowledge is gained, but no algorithmic literacy.	Behavior Learners are not looking forward to it. They need to participate because school thinks it is important.	Insight Becoming algorithmic literate is important while using social media extensively. Algorithms can be helpful but also harmful.	Knowledge Learners understand how an algorithm on social media works; what data is collected and how this leads to personalized content.	Skills Learners are able to apply the knowledge about algorithms when using social media.	Behavior Learners will be more conscious of the use of algorithms in social media in relation to themselves.	Inisght & Knowledge Learners see and learn that other people see completely different things.	Skills Learners are able to think critically about algorithmic decision making and content they see.	Behavior Learners will be more conscious of the use of algorithms in social media in relation with others.	All Learners test the insight, knowledge, skills and behavior they learned about algorithms in social media	Behavior Learners act on social media with the use of their algorithmic literacy.
Emotions	Neutral / Mixed	Unexcited	Shocked repulsed Eagerness	Explorative Excited Curious	Content	Confidence Safety	Amazed Surprised Compassion	Content	Belonging Confidence	Excited Joyful Happy	Satisfied
Tools / Resources	Smartphone (social media)		Smartphone Interactive Whiteboard (IWB)	Design Smartphone	Working sheets Personal device/laptop		Design Smartphone	Working sheets Personal device/laptop		Social Media Battle Smartphone	Smartphone (social media)
People	Learner Classmates/Friends Parents Teacher	Learner Classmates Teacher									
Location	Home School	School	School								Home School

Figure 11: Iteration of the learning experience using learning experience mapping

3.2.4 Step 5: Test

Learning goals

The alignment of AL learning goals with the DL concept core goals was verified through a discussion with Sanne van der Velden, policy advisor on DL and a member of the core goals development team (Sanne van der Velden, n.d.).

In a brief interview, Sanne introduced herself and explained the development process of the DL concept core goals. The nine learning goals and their relation to the AL learning goals were then discussed one by one.

Sanne agreed with, and confirmed the relations between the identified goals, validating the comparison and emphasizing the relevance of a learning experience addressing AL. Additionally, new connections were identified, such as the link between the core goal “Digital Systems,” which covers functional use of digital systems, requiring an understanding of algorithms.

An updated version of the comparison, which incorporates insights from this discussion, is provided in appendix H.

3.3 Developing Educational Design

3.3.1 Step 2: Research (& Question)

While reviewing the gathered information and the created learning experience, a concern emerged. Developing the learning experience to further to align with "Digicoaches in de klas" would likely evolve in designing instructional and learning materials, which Digiwijzer produce themselves.

The critical question at this point in the process was:

How can industrial design (expertise) enhance the learning experience on social media algorithms?

Consequently, the project's scope was reframed to focus on creating educational design(s) within this learning experience. The refined design challenge was formulated as:

Develop educational design(s) that complement a coherent learning experience which (1) aims to enhance algorithmic literacy of social media algorithms in students aged 12- to 16- years-old, (2) enables them to apply this in daily life and that (3) makes use of Social Media Battle.

Prior research questions related to the impact of the learning experience, Social Media Battle and the role of the facilitator were revised to align with the new focus:

- What are the measurable impacts of the educational design(s) upon the AL learning goals and how can they be measured?
- What is the impact of the educational design(s) within the overall learning experience and how can this be evaluated?
- How can the educational design(s) incorporate (the design of) Social Media Battle to ensure coherence in the learning experience?

In addition to designing educational design(s), it was decided to improve Social Media Battle based on prior results of the preparation project, posing an additional design question:

- How can Social Media Battle be improved to align with and complement the educational designs, to ensure coherence in the learning experience?

3.3.2 Step 3: Design

Two phases were selected for the development of the educational design(s): 'Exploring Algorithms' and 'Comparing Algorithms'.

In 'Exploring Algorithm', students explore using a social media algorithm and see how fast and what behavior can lead to a filter bubble. They learn to understand how those algorithms work, the data they collect and how they personalize content. In 'Comparing Algorithm' students compare different algorithms or social media feeds from classmates or other people, through which they see and learn that personalization can lead to totally different content for others.

Drawing from insights from the benchmark analysis and co-design sessions, ideas evolved into using gamification and a distinction was made between physical and digital designs, while also considering the design of Social Media Battle as coherence between designs was sought (figure 12, appendix I).

Physical design

A Physical design idea focused on creating an additional design and incorporating Social Media Battle. It involved a phone stand to hold four phones, enabling students that eventually play social media battle to put down their phone for the game in 'Exploring Algorithm', and view different feeds by rotating the stand in 'Comparing Algorithms'

Digital Design

Digital design ideas included six games in an application simulating social media feeds, three for each phase (figure 14). Game ideas for 'Exploring Algorithms' focused on creating filter bubbles, while those for 'Comparing Algorithms' logically focused on comparing diverse feeds, both via a simulated social media feed. The games were designed to evoke the intended emotions for these phases. Desire and happiness in 'Exploring Algorithms' and disgust, desire, and happiness in 'Comparing Algorithms', aiming students should feel the desire to learn AL, experience happiness through gameplay, and feel disgust from the shocking elements the games intend to use.

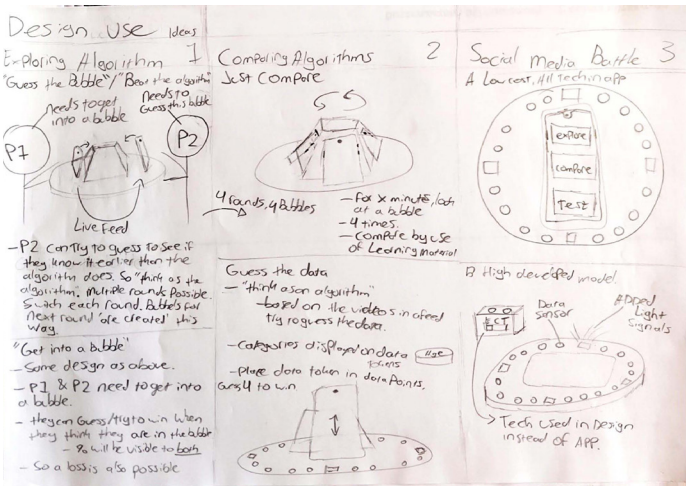

Figure 12: Ideation educational design

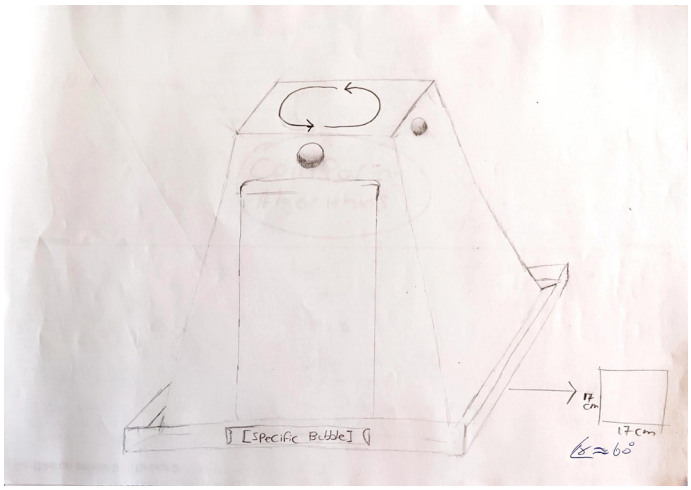

Figure 12: Physical design idea

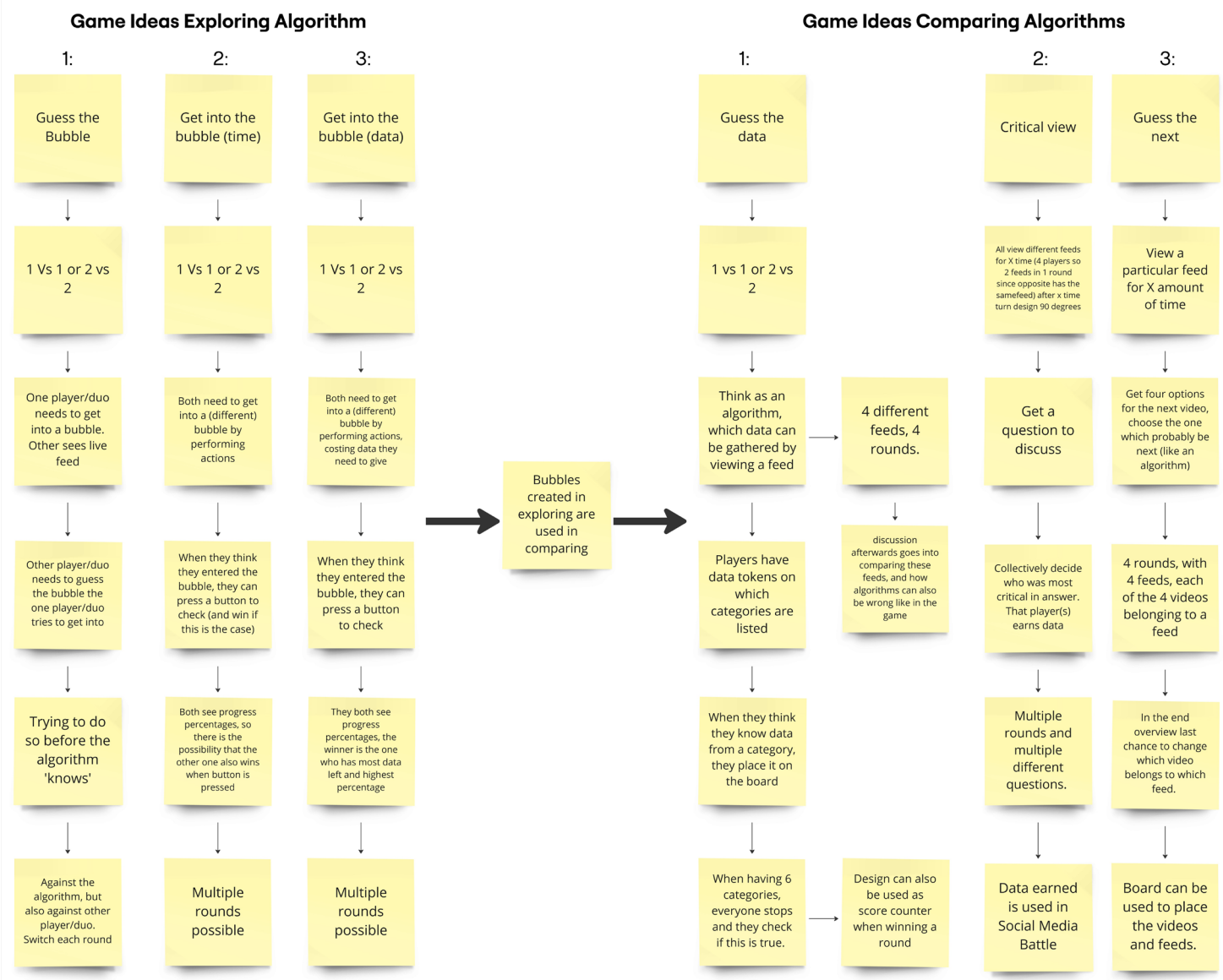

Figure 14: Game ideas 'Exploring Algorithm' and 'Comparing Algorithm'

Stakeholder Experience journey

To explore the learning experience within the business context, two stakeholder experience journeys were created (appendix J), resulting in two possible implementation pathways:

Option A: Design as product for schools

This option positions the learning experience and design as a product Digiwijzer sells, enabling schools to integrate it into their curriculum using an app with a license required for playing the games. Digiwijzer would offer an introductory workshop to explain the design, games, and inspire teachers to integrate it into the curriculum. Considering affordability for schools as multiple designs and licenses would be required, interaction and technology usage would be integrated within the app, resulting in lower costs of the physical design. This approach aligns with Digiwijzer their vision of empowering schools to independently teach DL.

Option B: Design as part of a lesson series

The second option involves the learning experience and design as part of a custom lesson series offered by digicoaches, aligning with 'digicoaches in de klas', in which schools can tailor learning materials and discussion methods to their preferences. As the educational designs in this option are retained by Digiwijzer, the physical design can be made with higher-quality materials and interaction using integrated technology.

For both options, Digiwijzer would regularly need to update application content with new videos, trends, and filter bubbles from social media platforms, as well as game questions and answers.

Option B was considered more realistic, as teachers noted in earlier interviews that a product on this topic would remain unused after a while.

3.3.3 Step 4: Develop

Prototypes of the physical and digital designs were made for user-testing.

Physical Design prototypes

Several lo-fi prototypes were made with slight measurement adjustments to find a universal fit for a phone stand as well as a correct fit on the Social Media Battle game board (figure 15). A refined laser-cut version included magnets for stability during gameplay while allowing students to lift and twist the design as needed (figure 16).

Digital Design prototypes

Prototypes for all six games were developed in Figma, simulating a social media feed (figure 17). While the games also aim to use shocking or provocative content to demonstrate filter bubble effects, ethical considerations led to using less harmful topics, such as cars, sports, or mildly provocative subjects like the U.S. elections, relevant topic during time of testing.

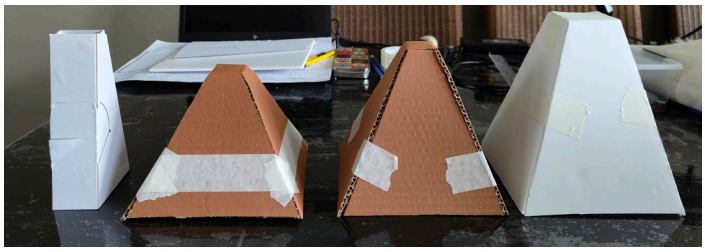

Figure 15: Lo-fi prototypes physical design

Figure 16: Laser-cut prototype physical design

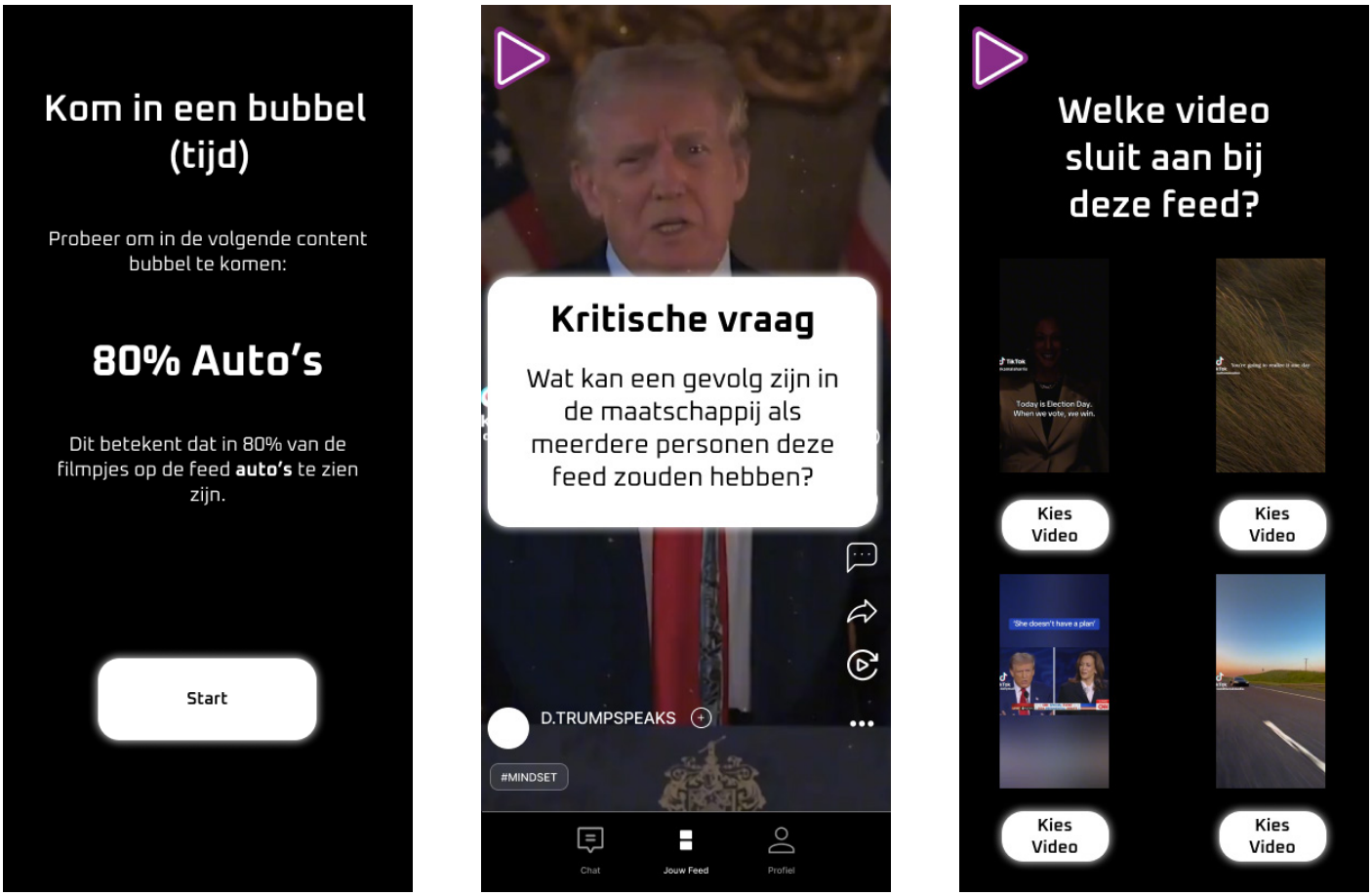

Figure 17: Example screens of game prototypes (Games: Enter the Bubble (time), Critical View and Guess the Next)
Figma Prototype

3.3.4 Step 5: Test

Testing consisted of user testing the designs and a meeting with Digiwijzer discussing the business options.

User-testing

Testing the designs aimed to study the practicality of the physical design and assess the emotional impact of all games, providing insights for design improvements and selecting one game for each phase for further development.

Testing the physical design from a first-person perspective revealed impracticalities. The weight of phones combined with their angle caused them to fall when the design was lifted and twisted. Due to these issues, the physical design was excluded from user testing and needed to be redesigned.

All six games were tested on emotional impact with Industrial Design students. Participants completed the Discrete Emotion Questionnaire (DEQ) after playing each game, indicating their experience of eight discrete emotions on a 7 points likert scale (Harmon-Jones et al., 2016).

Semi-structured interviews were conducted after gameplay, discussing design opportunities and improvements. The user-testing protocol, including game descriptions can be found in appendix K.

Results

Three user-testing sessions were conducted with two participants per session. Averages of the DEQ scores were calculated for each emotion per participant per game, resulting in overall scores for each game (table 4). Although all scores were low, likely due to the minimalistic prototypes and very short playtime, results were analyzed compared to each other. Analysis was done by including observations and interview insights. Full analysis can be found in appendix L.

For the 'Exploring Algorithms' phase, game one scored highest on happiness and desire but was reviewed as simple, unfair, and lacking interaction and tactics. The time-based element in game two was considered as an engaging element. While game three, similar to game two, scored lower on happiness and desire, the use of physical data was reviewed to add more to the game and enrich the information.

For the 'Comparing Algorithms' phase, game five, focused on discussing the impacts of filter bubbles, elicited disgust the most and was reviewed to promote critical evaluation. However, it was considered redundant because of the planned discussions in the learning experience after gameplay. Games four and six were seen as enjoyable as they require reverse-thinking of an algorithm and scored relatively well on disgust, desire, and happiness.

Participants also suggested the games to be played in a 2 vs. 2 format, which could enhance discussion, competition, and strategic thinking.

Table 4: Average results of DEQ per game

Emotion/ Game	Game 1 Guess the Bubble	Game 2 Enter the Bubble (time)	Game 3 Enter the Bubble (data)	Game 4 Guess the Data	Game 5 Critical View	Game 6 Guess the Next
Anger	1.50	1.13	1.13	1.75	2.25	1.50
Disgust	1.00	1.00	1.00	1.33	1.42	1.21
Fear	1.13	1.25	1.04	1.08	1.42	1.17
Anxiety	1.67	1.75	1.54	1.71	2.04	1.71
Sadness	1.29	1.25	1.17	1.21	1.50	1.17
Desire	2.08	2.13	1.96	1.71	1.54	1.33
Relaxation	4.08	3.21	3.42	3.38	2.38	3.13
Happiness	3.08	3.08	2.79	2.75	2.29	3.13

Business options

A brief business meeting with Digiwijzer was held that involved discussing the project, algorithmic literacy in their offerings and 'digicoaches in de klas'. In addition, the two possible pathways for the design and learning experience were discussed.

As identified earlier, it was clarified Digiwijzer currently addresses AL only within broader training on ML. 'digicoaches in de klas' involves a team offering custom lesson series tailored to schools' needs that typically cover multiple topics and are delivered during project weeks.

Regarding the business option for the learning experience and corresponding design, Option B, custom lessons provided by digicoaches, was deemed the most realistic and aligning with Digiwijzer, confirming this choice as the preferred pathway for further development.

3.3.5 Iteration step 2: Research

The gathered information and data were reviewed, this time revealing a clear development path allowing design decisions to be made.

For 'Exploring Algorithm' it was decided to develop game 3: Enter the Bubble (data), while considering a time element from game 2. For 'Comparing Algorithms' it was decided to combine game 4: Guess the data and game 6: Guess the Next into a single game.

Both games will use a 2 vs 2 format, allowing the same duos to play all three games, influencing the physical design and enabling adding rewards as an overarching game-element to create coherence throughout all games.

With business option B chosen, further development of the design included consideration of higher-quality materials and interaction using integrated technology, allowing connections between the physical design and the games.

3.3.6 Iteration step 3: Design

New designs were made based on the design decisions.

Physical Design

An idea was generated of a removable design that uses the design of Social Media Battle to secure the phones during interaction. This design included a storage box with two compartments, one for each duo, to store physical data used in the game (figure 18 & 19).

Games:

Detailed descriptions for the selected games were written (appendix M). These descriptions inspired ideas for interactive connections with the physical design and coherence between the games.

Connections & Coherence

In Enter the Bubble, players hand in physical data when taking actions on the simulated social media feed. The storage box was designed into a 'black box', which algorithms are mentioned to be. Visuals were designed to show data streams flowing to the storage point of each duo (figure 18).

Guess the Data involves guessing data types. The Social Media Battle gameboard could be used to keep track of this by using physical data. Additionally, lights in the Social Media Battle design could be incorporated for interaction, leading to a new design idea for transparent, yellow-tinted physical data.

Overarching rewards for victories were added, providing advantages in the final game and enhancing coherence. All games were made accessible through designing a single application that uses the simulated social media feed. A story based on the fictional platform BeYou from Social Media Battle was developed to create coherence and build-up in the games.

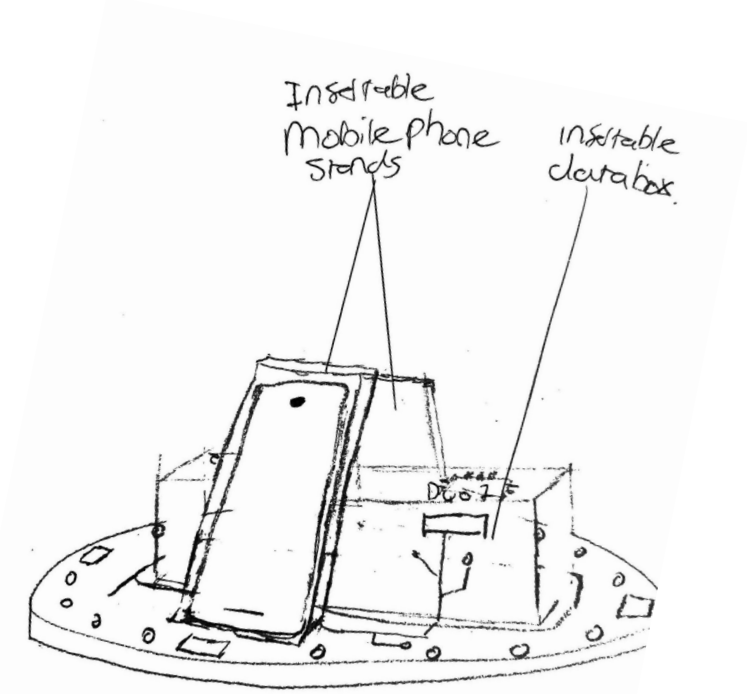

Figure 18: Physical design sketch 1

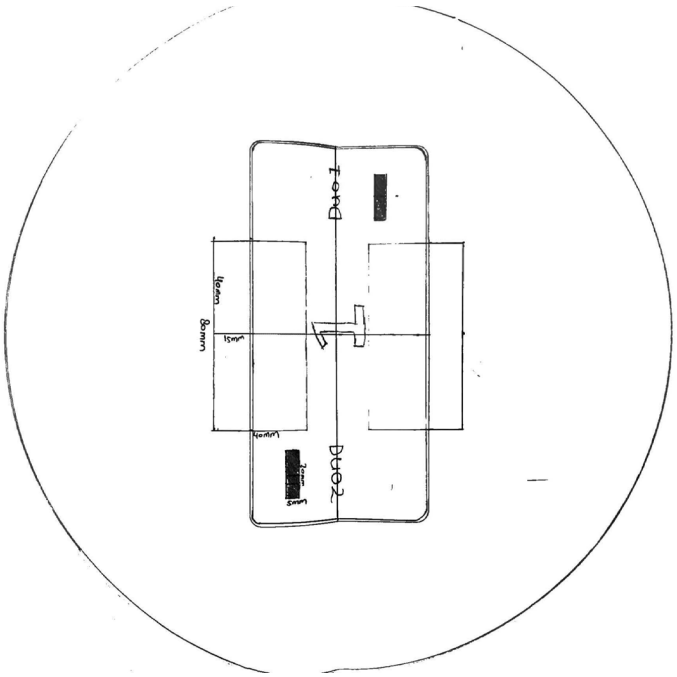

Figure 19: Physical design sketch, top view

3.3.7 Iteration step 4: Develop

Development included prototyping the physical design, the application for the games, and guidelines for the learning experience.

Physical Design

Several prototypes were developed, leading to the creation of the 'black box', featuring newly designed visuals (figure 22). New physical data tokens made from yellow-tinted plexiglass and new visuals for the game board were also developed (figure 21 & 23).

The light interaction for Guess the Data & Video was programmed in Arduino and written to the ESP8266 already used for Social Media Battle. The game board uses white lights to signal data placement, green lights to confirm placement, and blinking lights to indicate a duo is ready to guess (figure 23). This is done by Wizard of Oz prototyping. Using Blynk, an IoT cloud platform, individual lights could be controlled through the designer his personal phone via an internet connection (figure 20). Additionally, code was written to switch between games using the buttons (appendix N).

Elaborate playing rules, including the storyline, were written and printed (appendix O).

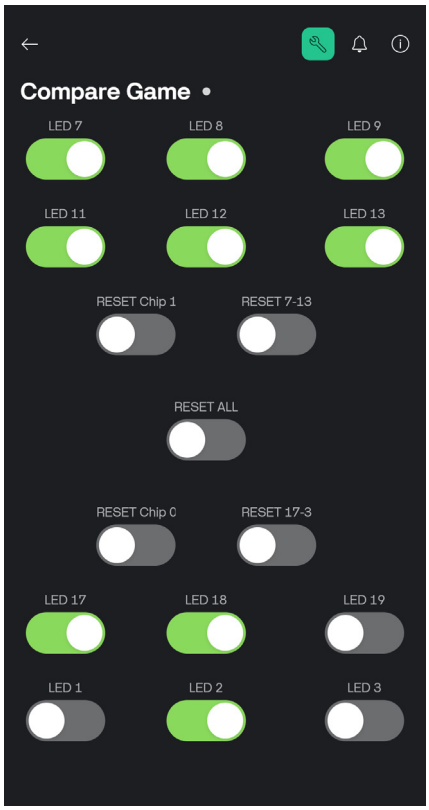

Figure 20: Contol of lights using Blynk, showing situation of figure 23

Figure 21: Physical data tokens

Figure 22: Black Box

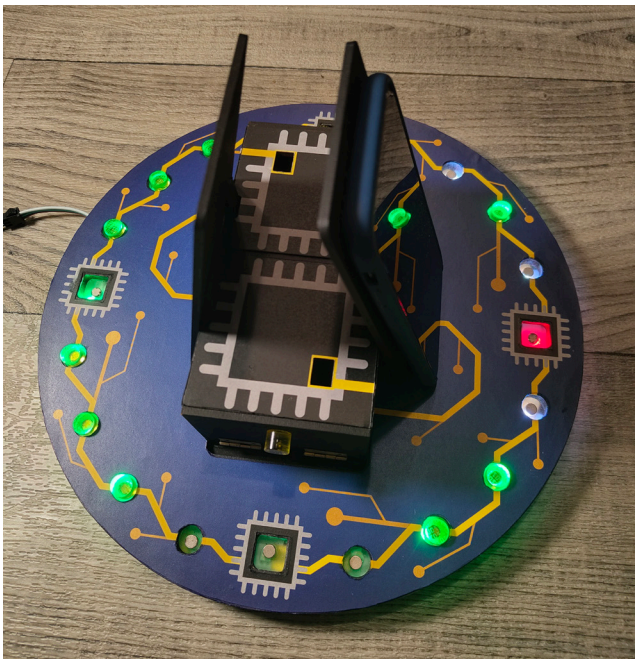

Figure 23: New game board visuals and light interactions

Application

A Figma prototype was developed for the application, providing access to the digital part of all games. Enter the Bubble and Social Media Battle use an abstract simulation of a social media feed, where players perform actions to enter and exit a filter bubble. This influences the 'bubble percentage' based on the action and content. An algorithm was created with use of variables and conditionals determining the impact of each action (table 5 & figure 24).

Table 5: Available actions and influence on 'bubbel percentage'

Action	Video on required topic	Other videos
Like	+ 5 %	- 2 %
Mark as 'not inerested'	- 2 %	+ 5 %
Comment	+ 5 %	- 2 %
Share	+ 10 %	- 4 %
Follow	+ 10 %	- 4 %
Hashtag	+ 10 %	- 4 %
Watch Again	+ 15 %	- 6 %

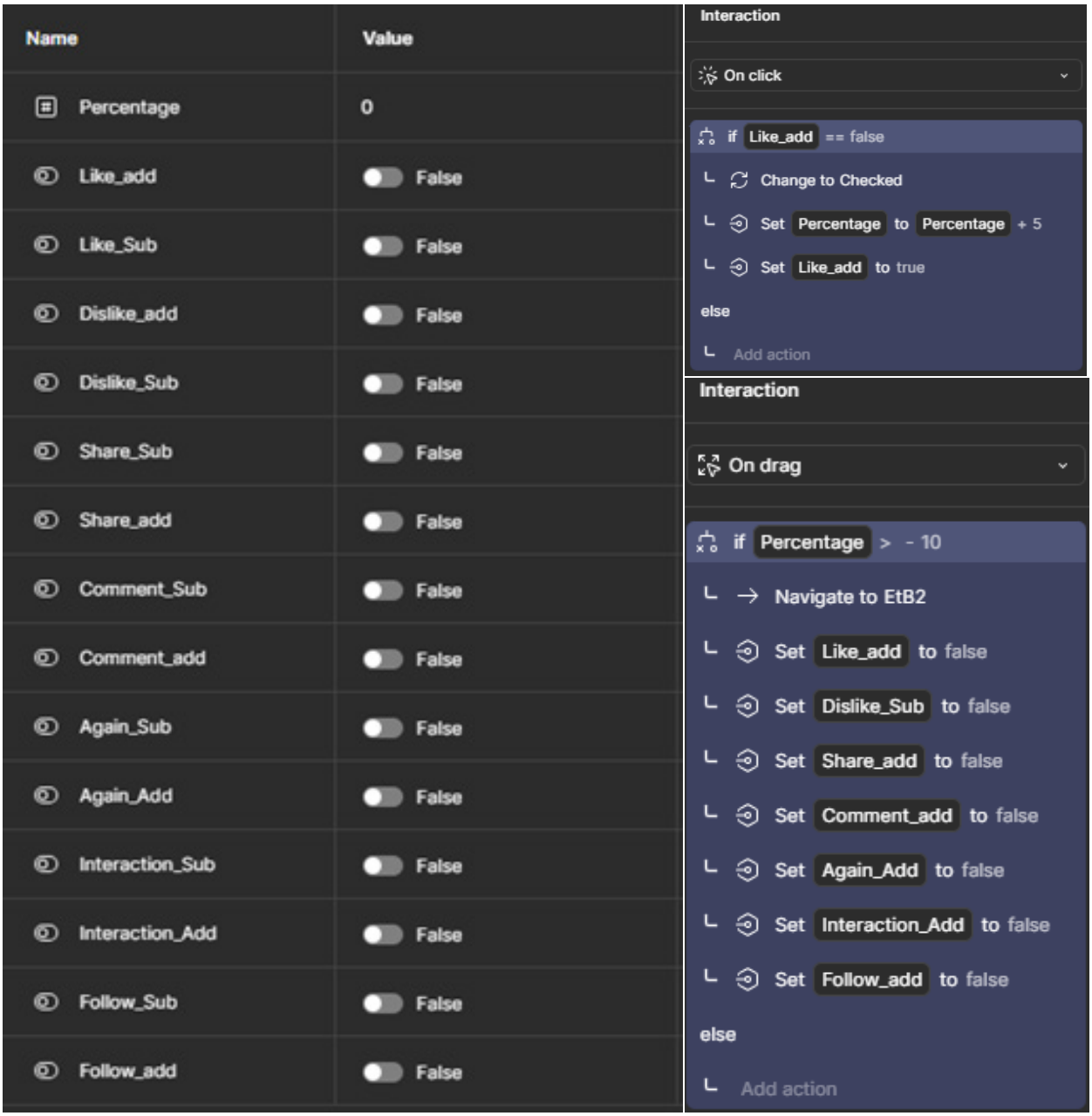

Figure 24: variables & conditionals (left: variables for all possible actions, top right: conditional for liking a video, bottom right: conditional to reset all variables when scrolled)

Social Media Battle

Improvements for Social Media battle were developed based on the results of the preparation project. Existing questions were simplified, and questions were added aligning with the content of the learning experience (appendix P). Answers were removed from question cards and compiled into an answer booklet (appendix Q). A physical slider was developed for the company duo to track their update percentage with use of 3D-printing (figure 25).

Guidelines

Guidelines were created for Digiwijzer to support further development of the learning experience, covering required topics in the introduction, game play, example learning material, discussion prompts and questions, and concluding questions. These ensure all phases will be well-connected and constructively aligned (Biggs, 1996). Complete guidelines are available in appendix R.

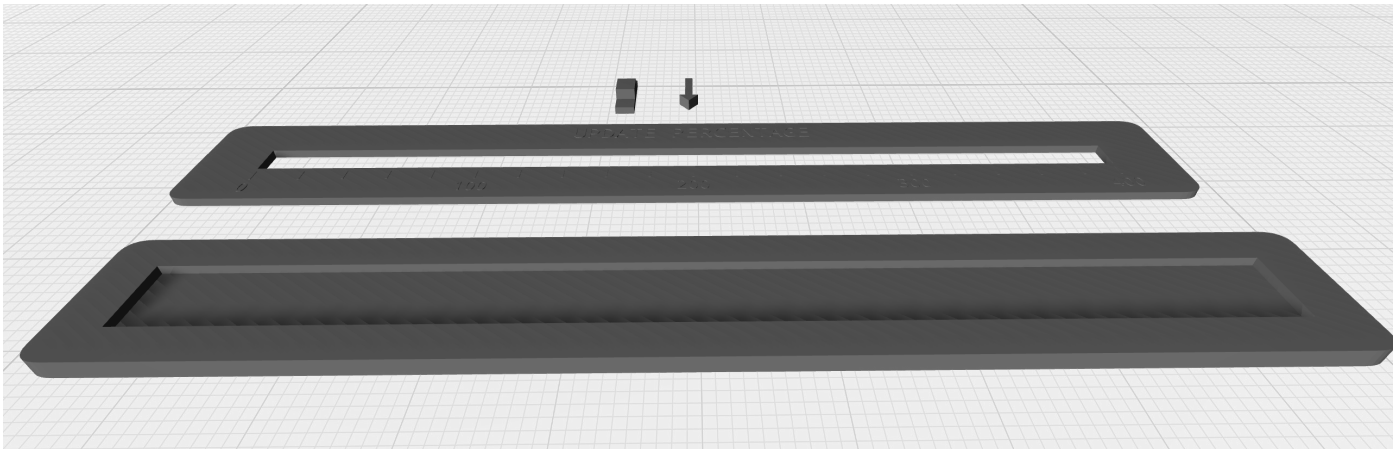

Figure 25: 3D model for the percentage slider

3.3.8 Iteration step 5: Test

User-testing involved playtesting the games with experts and students aged 12 to 16.

Playtesting with experts

A group of professors, researchers and PhD candidates from Movezlab, a research group from the Erasmus school of social and behavioral sciences that aims to empower youth with digital resilience, participated in playtesting Guess the Data & Video and Social Media Battle. This was followed by a semi structured interview on the learning experience, gameplay, design, coherence and impact.

Figure 26: Playtesting

Results

Key insights were drawn from the interview analysis, covering gameplay, impact and coherence, and feedback. Protocol and elaborate conclusions can be found in appendix S.

Gameplay

Experts praised the games for being appealing to students by using their interests:

"Because you actually go through that feed. I think students really like that."

The data-guessing activity in Guess the Data & Video and the use of roles, filter bubble dynamics, and reflective questions in Social Media Battle were well-received, mentioning it encourages reflection. Experts believed students will understand the games quicky as

"they are very intuitive with scrolling and liking".

Some complexity was observed, but one expert noted:

"because there is a bit of complexity, it can be very triggering. They [students aged 12-16] do need that too. A bit of a challenge."

Impact & Coherence

Experts deemed the learning experience and games to be highly valuable for students as

"you really get to understand what is behind it" and "it also fits in nicely with their own desire to gain control over their algorithm",

agreeing it can support AL.

The use of the filter bubble percentage in the games was seen as key element as it provides direct feedback. Also reflecting on typically overlooked actions contribute:

"I think because it involves that stop-and-think moment, so to speak, that you actually transfer that data to the company, that you indeed make them very aware of the process behind it."

Lasting impact was questioned since students do not use their own feeds:

"You still have some kind of 'transfer of learning' element. You have to transform the acquired knowledge and attitude from the game context to their own personal context, and that is often complicated".

Regarding coherence, experts noted that the games do nicely follow up.

Feedback

Additional feedback was given upon the game instructions, suggesting the use of verbal explanations, visuals or slides, and including class challenges or action plans in the learning experience to create lasting impact. Also, finding the right balance between sustainability and targeting the user group was concluded to be essential, as concerns were raised that the games make use of existing platforms in questions and the content.

Playtesting with students

Playtesting was also done with students aged 12 to 16 years old. Testing involved a questionnaire beforehand, introduction of the story and games, partly playing each game, a questionnaire after each game about learning and emotion, and a semi-structured interview on aspects like the design, difficulty and coherence throughout the games. The protocol can be found in appendix T.

Results

Two sessions were conducted including four participants. Participants demographics are shown in table 6. Students prior AL was explored using the questionnaire prior to playtesting. While only three students could partly describe what a social media algorithm is, their answers were divided upon the impact of algorithms on their experience, emotion, opinions and decisions. Testing results are summarized for each game, full results are in appendix U.

Enter the Bubble

This game targets the learning goals awareness, knowledge and skills, and aims to elicit the emotions desire and happiness.

All students reported learning from the game, with six confirming it supports the learning goals and two noting partial contribution. Additional learning materials and class discussions in a learning experience were seen as valuable: "It gives a different perspective" and "It can help in forming an opinion." Emotions felt included relaxation (n=5), happiness (n=4), and anxiety (n=3).

Guess the Data & Video

This game targets the learning goals awareness, and critical evaluation, and aims to elicit the emotions disgust, desire and happiness.

Seven students noted learning and contribution to the learning goals:" it teaches you how to be critical". Six students would value additional learning material and class discussions. Emotions experienced were anxiety (n=6), happiness (n=4), relaxation (n=3), and desire (n=1).

Social Media Battle

This game targets the learning goals knowledge and skills, and aims to elicit the emotions desire and happiness.

Six students acknowledged learning, and all agreed the game supports the learning goals: "You learn how to apply it yourself." Three students highlighted the value of class discussions, as others mentioned discussion would take place anyway. Emotions experienced included happiness (n=5), relaxation and anxiety (n=4), desire (n=2), and anger (n=1).

Observations showed students quickly understood gameplay and additional designs like the answer booklet and percentage slider were used intuitively. In interviews afterwards students indicated the games to be fun, engaging and educational, their answers on learning suggesting improved AL. The design was well-received and details such as the data streams and data tokens were explicitly mentioned.

Table 6: Participant demographics

Partici-pant	Gender	Age	Education (grade)	Social Media Use	Used platforms
1	Male	14	Vwo (2)	Often (every day)	TikTok, Snapchat
2	Male	13	Vwo (2)	Often (every day)	YouTube
3	Female	12	Vwo (2)	Very Often (Multiple times a day)	TikTok, Snapchat
4	Female	13	Vwo (2)	Very Often (Multiple times a day)	Snapchat
5	Male	13	Havo (2)	Very Often (Multiple times a day)	TikTok, Instagram, Snapchat, Youtube
6	Male	14	Havo (2)	Often (every day)	TikTok, Snapchat
7	Male	14	Havo (2)	Very Often (Multiple times a day)	TikTok, Snapchat, Youtube
8	Male	13	Havo (2)	Very Often (Multiple times a day)	TikTok, Instagram, Snapchat

3.4 Step 6: Launch

The final step of the design process includes launching the experience. While actually launching is out of scope of this project, an action plan was written for further development of the learning experience and games, which can be found in the business document (appendix A). The business strategy was further developed with help of multiple contact moments with hybrid coach Mitchell Jacobs, and a business model was created.

Calculations were done on the required investment for development, the estimated average revenue of offering the learning experience, and the break-even point. These calculations use estimations on both development costs and the fees schools need to pay when hiring Digiwijzer for the learning experience, estimated with help from Mitchell's experience and expertise.

4. Final Design

This chapter provides a detailed description of the final design, which entails the concept of a learning experience on social media algorithms and three educational games, consisting of a physical design and an application.

4.1 Behind the Feed: a Learning Experience on Social Media Algorithms

Behind the feed is a learning experience on social media algorithms for students aged 12 to 16 years old. Through a gamified custom series of lessons, it empowers students to explore how social media algorithms work, evaluate their impact, and develop the skills to use social media more critically and responsibly, contributing to their algorithmic literacy. It features three games that are connected by an overarching storyline which students play in duos in various phases of the experience: Enter the Bubble, Guess the Data & Video and Social Media Battle.

The learning experience consists of five phases (figure 27):

Introduction
Through an interactive lesson, students are introduced to the history and basic principles of social media algorithms, the potential consequences and influences of personalization, and the importance of developing algorithmic literacy. Additionally, they are introduced to the accompanying games and overarching narrative.

Explore
In the Explore phase, students play Enter the Bubble, dive deeper into the topic using learning material, and reflect on their experiences and learning in a class discussion. In Enter the Bubble, students need to enter filter bubbles by interacting on a platform while managing the data they share. It enables them to explore the mechanisms of a social media algorithm, which behavior leads to personalized results and what data they share.

Compare
In the compare phase, students play Guess the Data & Video and use learning material and participate in a class discussion, similar to Explore. In the game, students analyze the created feeds in Explore by thinking like an algorithm. They need to determine what data corresponds to a user with such a personalized feed and predict which video an algorithm would recommend to this user. It uncovers how algorithms create profiles based on data and shows the impact personalized feeds can have.

Test
In this phase students are challenged to apply their knowledge and skills by playing Social Media Battle. In this game students play as critical users aiming to retain their data while they need to enter a filter bubble, or as a social media company working to update their algorithms to gather this user data.

Conclusion
In this last and concluding part students discuss their experience in Social Media Battle and of the whole learning experience, allowing them to reflect on their future social media use.

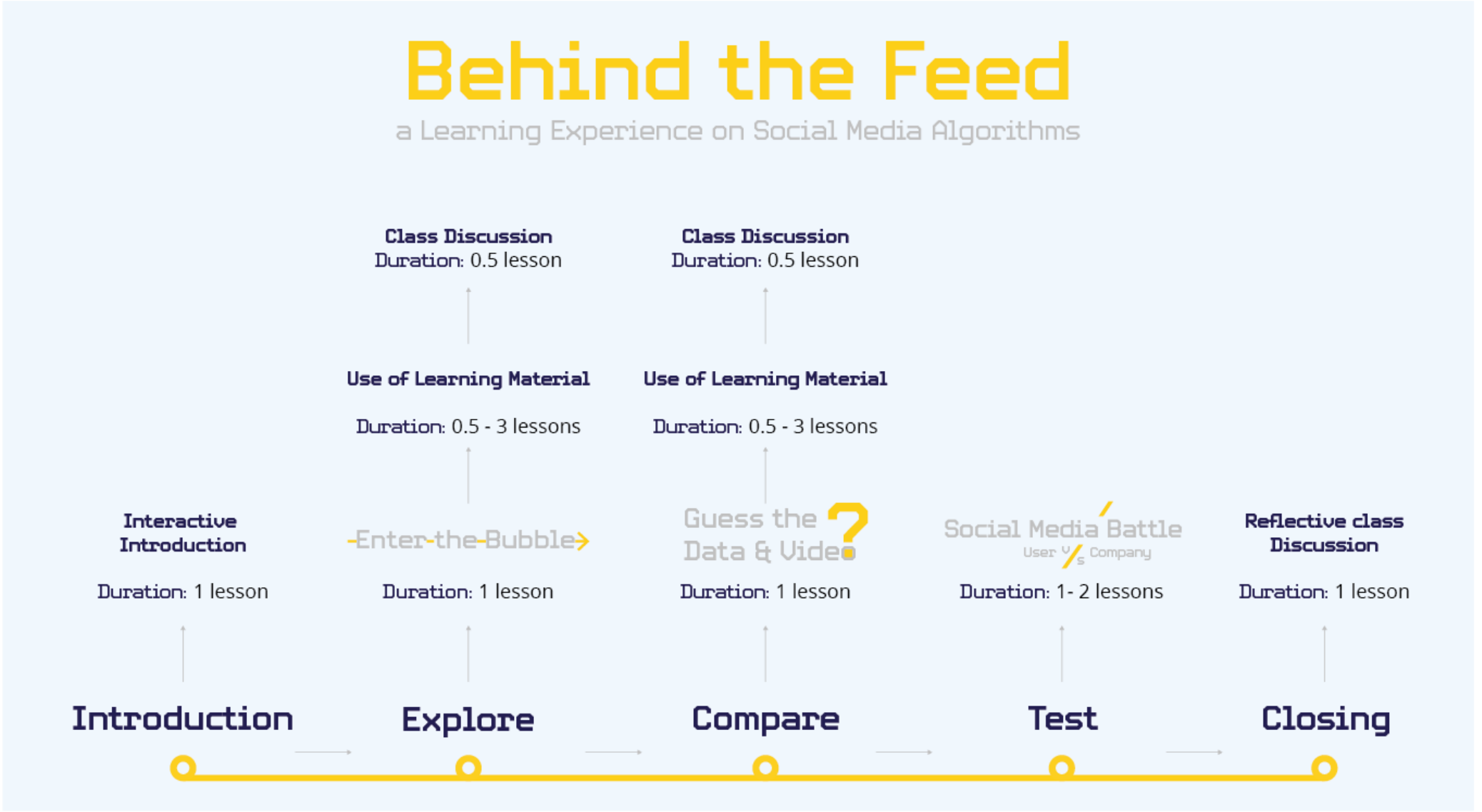

Figure 27: Behind the Feed

4.2 Educational Games

Behind the feed includes three games, ***Enter the Bubble, Guess the Data & Video*** and ***Social Media Battle: User vs. Company***, connected by an overall narrative. Full game descriptions and playing rules can be found in appendix O.

The narrative centers around BeYou, a fictional new social media platform aiming to create the best personalized feeds by developing the optimal algorithm. However, the creators face a challenge because they lack the expertise to do so. In Enter the bubble, students gather the knowledge to contribute to the development of this algorithm, while in Guess the Data & Video, students learn to become a critical user of BeYou. Finally, in Social Media Battle, students apply their knowledge and skills to either develop BeYou's algorithm or play as this critical user.

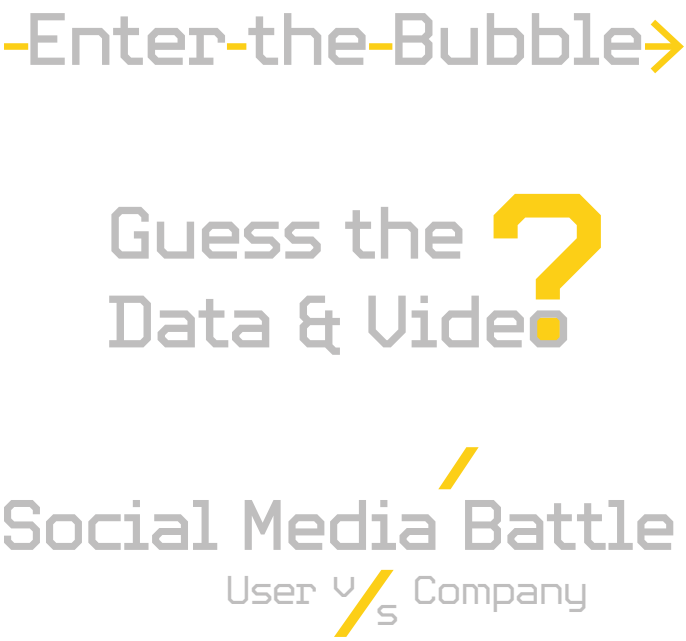

Figure 28: Game logo's

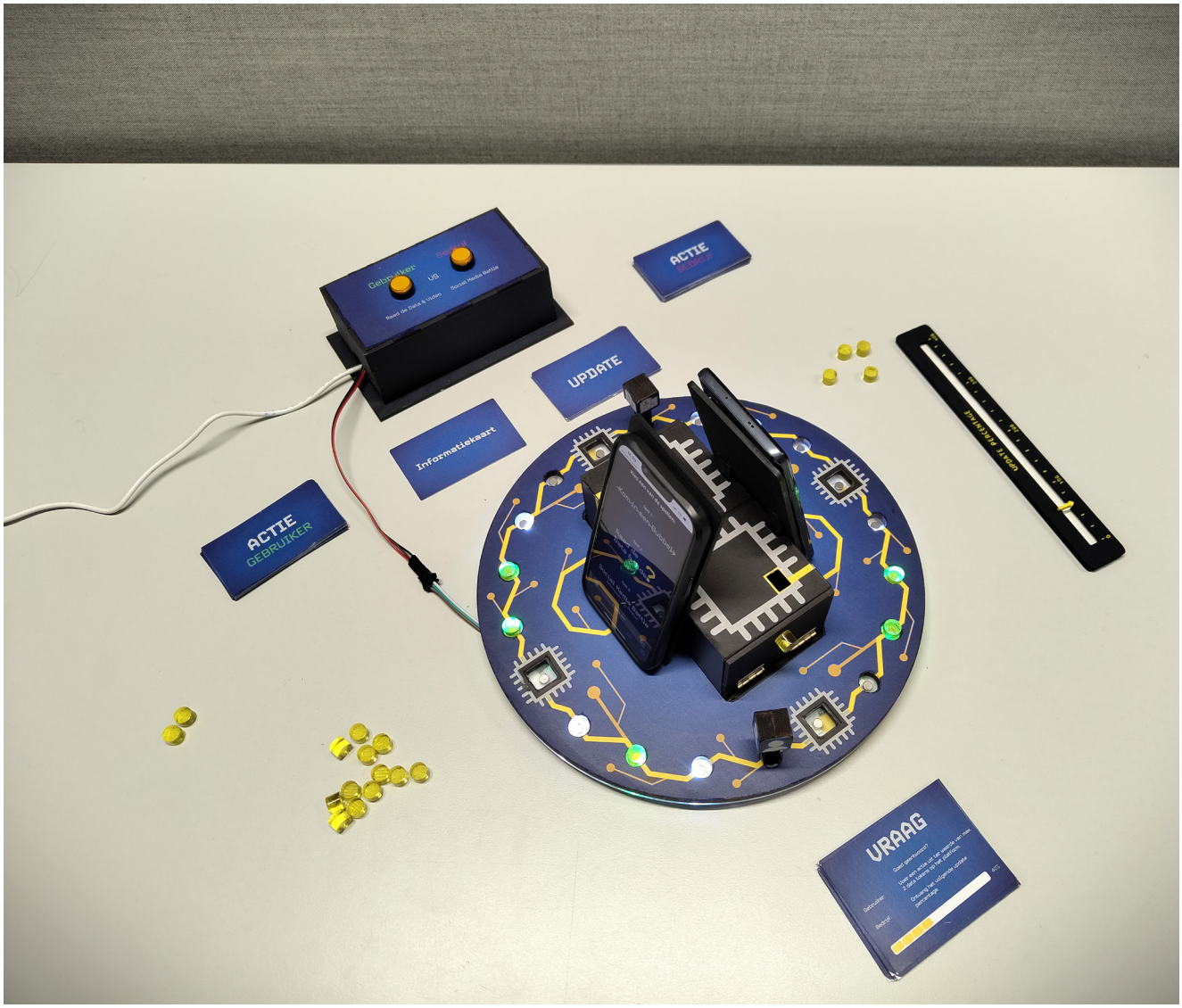

Figure 28: Educational Games design

4.2.1 Enter the Bubble

In Enter the Bubble students create personalized feeds while strategically managing the data they share. The goal is to get into a filter bubble on the simulated social media feed within the available time, while retaining as much data as possible.

Gameplay

Before playing, each duo determines starting roles, switching each round. One player is the Data Keeper, who monitors the available data and puts data in the Black Box, while the Interaction Executor performs actions on the feed to reach the filter bubble (table 7). The game is played four rounds of a given time limit, in which each duo aims to enter a new filter bubble for 90%, building four personalized feeds. During gameplay, duos may check their percentage twice to unravel strategy (figure 29), but the other duo sees theirs as well.

Each round concludes with either a winner or a draw. The winning duo is the duo to reach the filter bubble within the given time limit. If both duos reach the bubble, the duo with the most data wins. If both duos enter the bubble with equal data, the round results in a draw.

After four rounds, the final score is calculated. The duo with the most rounds won is the winner. The losing team carries the data from the Black Box of the final round as reward on to the next games. In case of a tie, both teams carry on this data.

Table 7: Available actions and their costs

Action	Costs (Data token)
Scroll	0
Like	1
Mark as 'not interesting'	1
Comment	1
Share	2
(Un)Follow	2
Interact (Hashtag)	2
Rewatch	3

Learning

The game contributes to the following knowledge learning objectives:

- I know that algorithms are used in a variety of applications, platforms and services. (Awareness)
- I understand how (social media) algorithms work. (Knowing)
- I know how to influence algorithmic operations. (Skills)

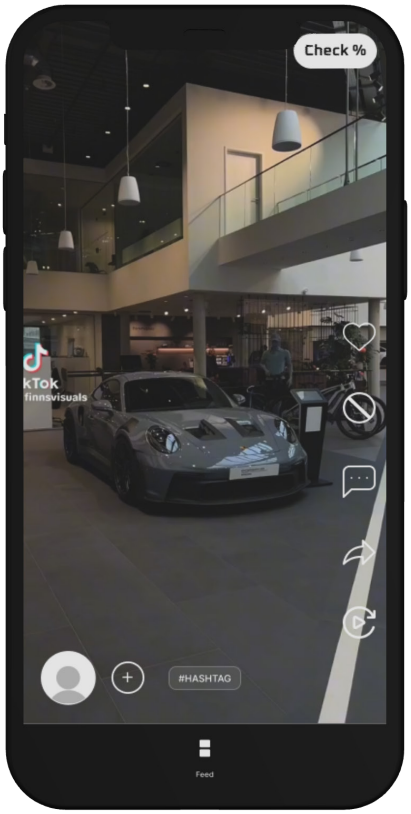

Figure 29: Enter the Bubble

4.2.2 Guess the Data & Video

In Guess the Data & Video, students analyze the four created feeds by guessing what data corresponds to a user with one of the personalized feeds and predict which video an algorithm would recommend.

Gameplay

The game consists of four rounds, in which each duo attempts to correctly guess six data types associated with the user from one of the created personalized feeds by scrolling through it. Duos place data tokens on the gameboard when they believe they have identified data within a category (table 8). Once six tokens are placed, the game pauses, and their guesses are checked. A duo wins the round by correctly guessing at least five data types. After each round, both duos recommend one of the four shown videos for this feed (figure 30).

The duo with the most rounds won is declared the winner. The winning duo places their correct guesses (5 or 6) from the last round into the Black Box as a reward for the final game. In case of a tie, the winner is determined by the correct video recommendations. If a duo correctly recommends all videos, they place 3 data tokens in the Black Box for the next game. A complete tie results in no data being carried over, but both duos can still earn 3 extra tokens for their correct video recommendations.

Table 8: Data Categories

Data Categories
Gender
Age
Location
Nationality
Personality
Interests
Political preference/view
Relationship status
Education / Career
Emotion / Feeling

Learning

The game contributes to the following knowledge learning objectives:

- I know that algorithms are used in a variety of applications, platforms and services. (Awareness)
- I know how to be critical towards algorithms and their workings. (Critical Evaluation)

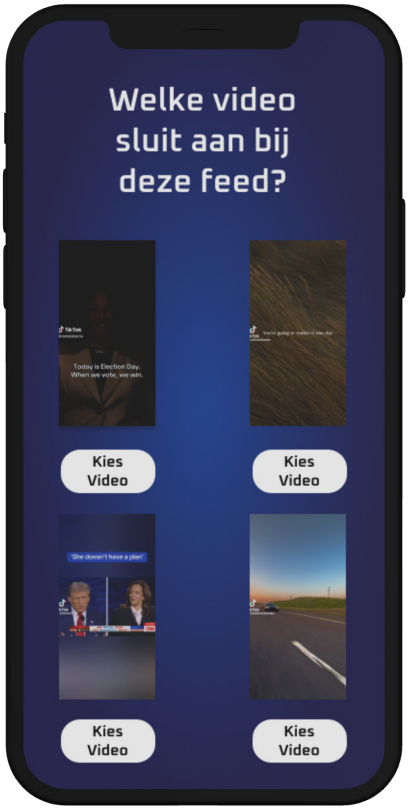

Figure 30: Guess the Data & Video

4.2.3 Social Media Battle: User vs. Company

In Social Media Battle, students test their knowledge and skills by playing as critical users of BeYou, aiming to enter a filter bubble while retaining their data, or as the company aiming to update their algorithms to gather this user data.

Gameplay

The user duo navigates BeYou's personal feed, performing actions like liking, commenting, and sharing, each costing data tokens. Their goal is to reach a 90% filter bubble in round 1 and reduce it to 10% in round 2. The company duo starts with the 'Like Algorithm' and updates it to collect user data, aiming to gather all data by the end of round 2, winning round 1 by acquiring half the updates (table 9). Both duos take turns pressing a button, moving their pawns on the game board, and landing on positions to draw question or action cards (table 10). Correct answers allow the user duo to act on the platform or the company duo to earn updates for their algorithm to collect more user data. A duo wins by achieving their goals in both rounds. If each duo wins one round, the game ends in a draw.

Learning

The game contributes to all learning objectives of the goals knowledge and skills:

Knowledge:

- I know that algorithms are used in a variety of applications, platforms and services.
- I understand how algorithms work.
- I know how to be critical towards algorithms and their workings.
- I know how to influence algorithmic operations.

Skill:

- I will use the knowledge to be aware of algorithms in daily life.
- I create a better understanding of algorithmic working.
- I will create critical thoughts about the use of algorithmic operations.
- I apply the knowledge to influence algorithmic operations.

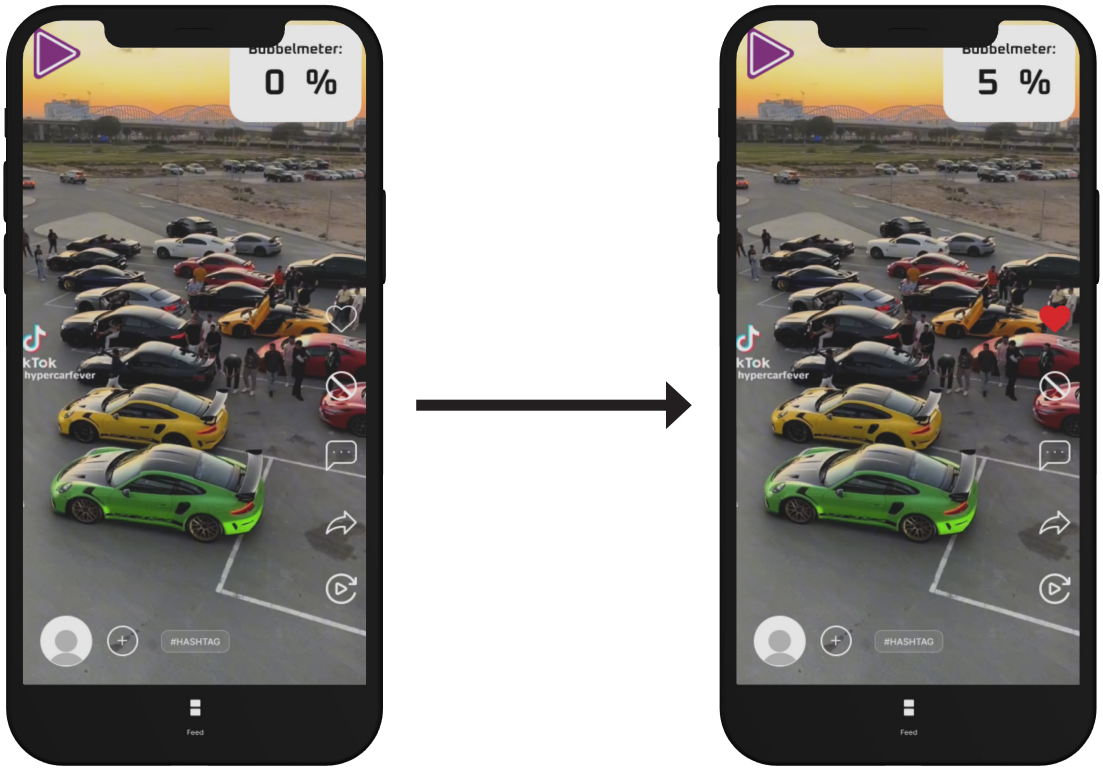

Figure 31: Liking a video on BeYou

Table 9: Available updates

Update	Earnings & Requirement
Watch time algorithm	earn 3 data tokens if user perform this action, requires 300%
Interactions algorithm	earn 2 data tokens if user perform this action, requires 200%
Comments algorithm	earn 1 data token if user performs this action, requires 100%
Share algorithm	earn 1 data token if user performs this action, requires 100%
Follow algorithm:	earn 2 data tokens if user performs this action, requires 200%
Not interesting algorithm	earn 1 data token if user performs this action, requires 100%)
Like Algorithm	earn 1 data token if user performs this action, requires 0%

Table 10: Questions, update and actions

Question type	Update / Action
True / False (20)	20% update, action of max 1 data token
Multiple choice (20)	20% update, action of max 1 data tokens
Connections (5)	40% update, action of max 2 data tokens
Sequencing (5)	40% update, action of max 2 data tokens
Scenario based (5)	50 % update, action of max 3 data tokens
Algorithmic analysis (5)	50 % update, action of max 3 data tokens
Critical thinking (5)	50 % update, action of max 3 data tokens

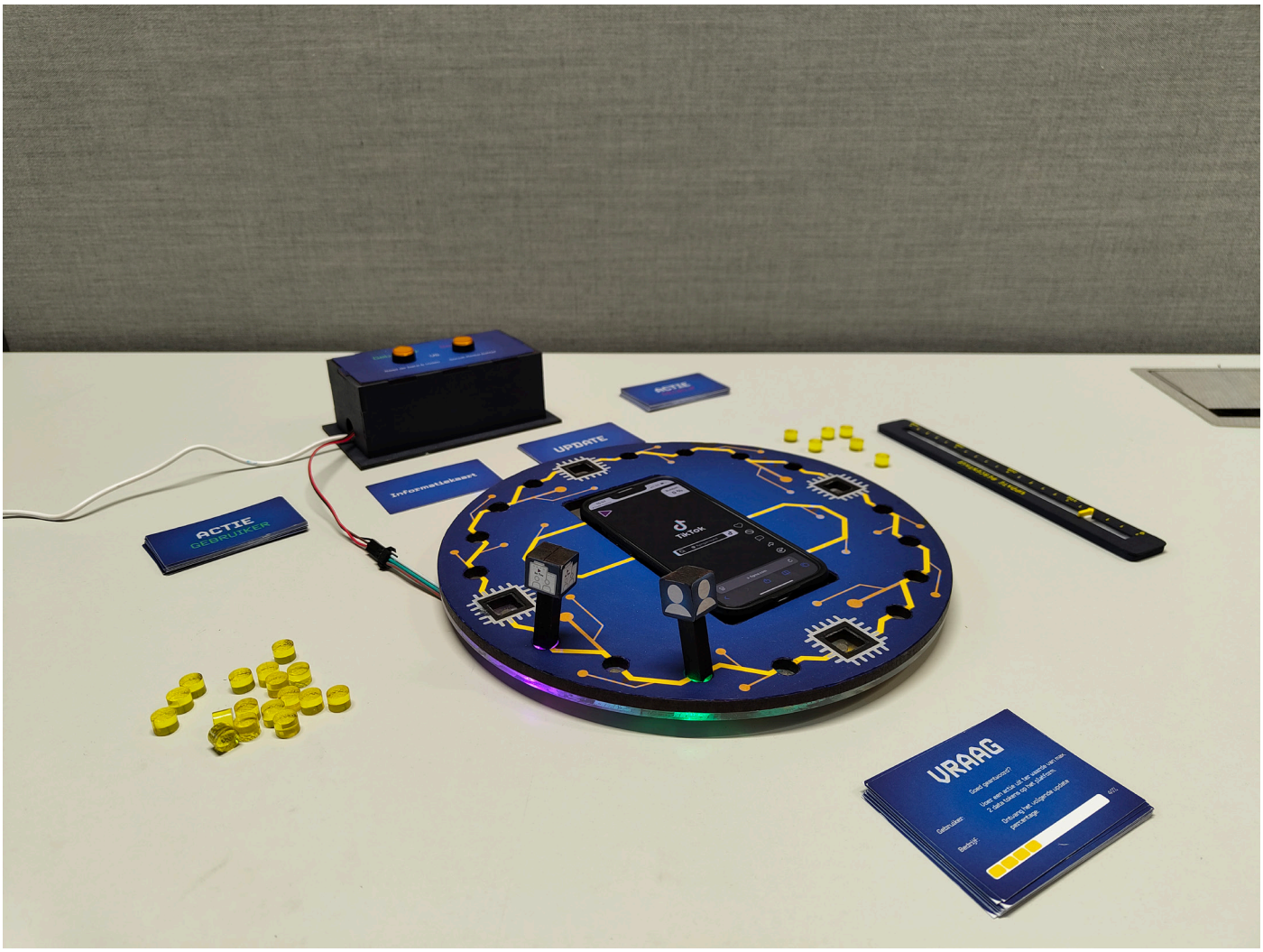

Figure 32: Social Media Battle

4.3 Physical Design

The physical design of the games consists of the gameboard, the Black Box with the phone stands and additional game content.

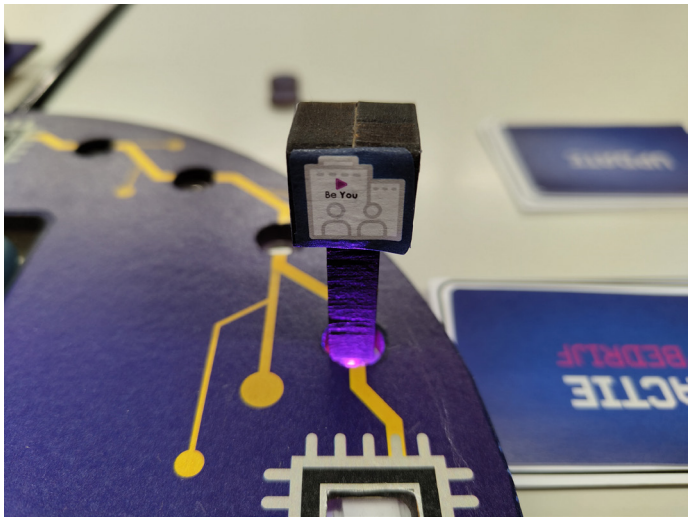

Figure 33: Company Pawn on gameboard

Game board

The interactive game board is used in every game (figure 32). It allows placement for the Black Box for Enter the Bubble and Guess the Data & Video, and a phone for Social Media Battle. For the latter game, pawns can be magnetically placed on question and action locations, indicated by lights. Lights are used for interaction in Guess the Data & Video by inviting data to be placed with white lights and green lights confirming it, while flashing lights signal a duo is ready to guess six data types (figure 23).

Black Box

The Black Box, referring to the black box algorithms social media platforms use, is a removable design with two compartments for storing physical data, one for each duo, and includes two phone stands (figure 34). It features data stream visuals and can be opened from the sides to access stored physical data.The Black Box is removed for playing Social Media Battle.

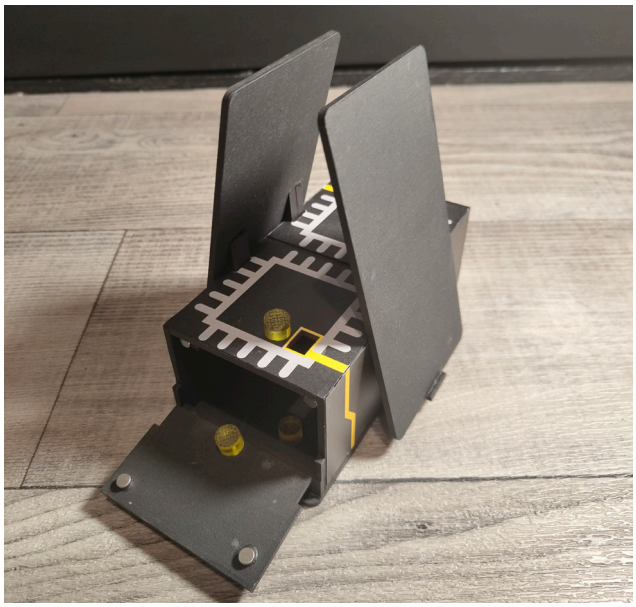

Figure 34: Opened Black Box with data tokens

Additional Game content

The game rules explain the games and narrative and a separate booklet includes answers to the questions in Social Media Battle (appendix O & Q). Data, represented by physical tokens including binary code, is used across all games (figure 21). Game cards include question, action, update, and information cards (appendix Q). The Button Box determines the position of a duo, and a 3D-printed slider tracks the company duo's update percentage (figure 35).

Figure 35: Percentage slide

4.4 Application

The application, downloaded by one student in each duo, provides access to the digital part of the games. After selecting one of the three games, players view a summary of the instructions and start the game, placing their phone on the stand. The games use an abstract simulation of a social media feed, allowing actions to be taken in Enter the Bubble and Social Media Battle. An algorithm determines whether actions taken at each video add to the development of a filter bubble by using probabilities, resulting in an increasing or decreasing 'bubble percentage' for a specific topic (Figure).

Figure 36: Application landing page

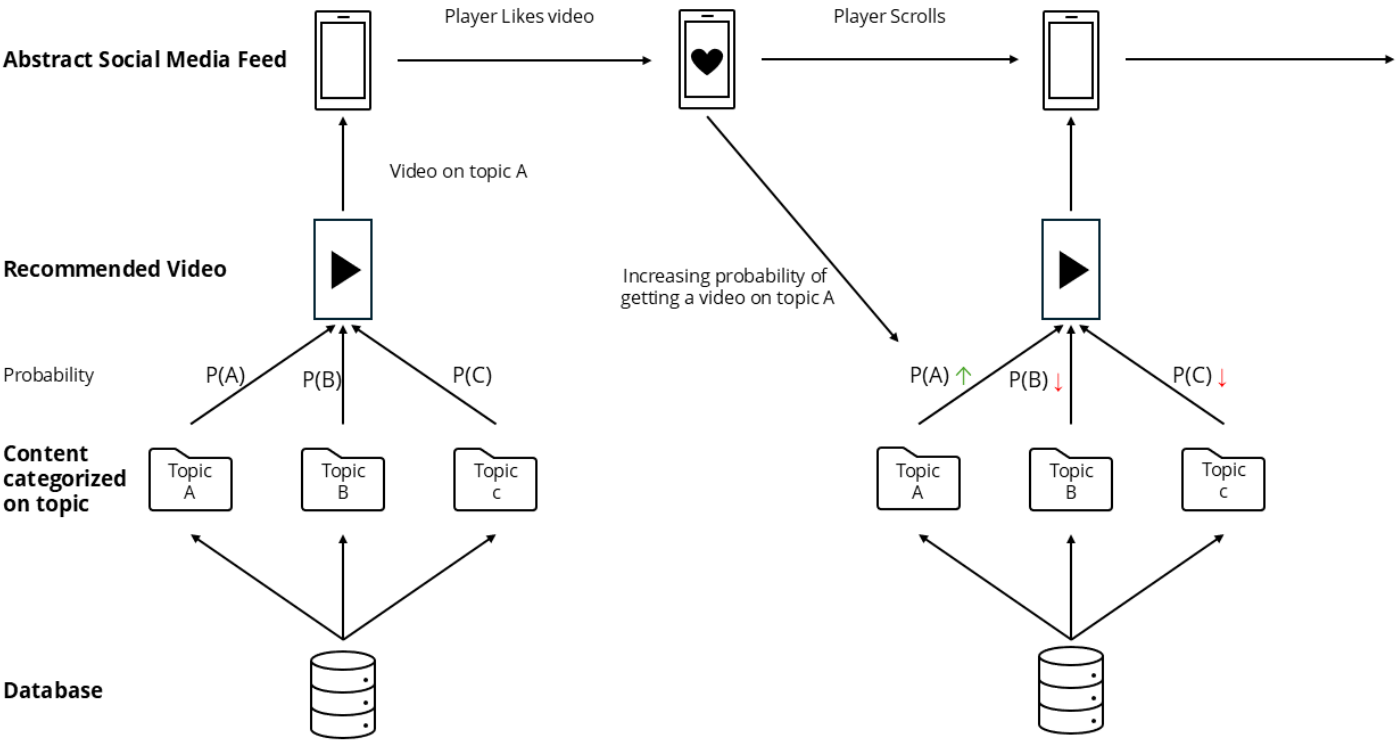

Figure 37: Application back-end

4.5 Business Model

Behind the Feed is a learning experience consisting of a custom series of lessons designed for, and to be provided by Digiwijzer, aligning with their current offerings of 'digicoaches in de klas'. Behind the Feed is provided by digicoaches from digiwijzer as a service to teach algorithmic literacy at schools, charging a fee directly related to this service. It therefore employs a Fee-For-Service structure.

Investments

Investments are required to develop learning experience and games. These costs include material costs and development of the physical designs, development of the application, and professional training to familiarize the Digiwijzer team with the learning experience and games. Initial investments are estimated to total approximately €65.000, - (table 10).

Revenue

Revenue is generated by providing the learning experience. Estimating an average of 8,5 provided lesson(hours) for the learning experience, costing €500, - per hour, and considering employee wages (€400, - a day) including time for preparations, results in an estimated revenue of €2650 ,- per learning experience.

Break-even point

Dividing the total estimated investments by the estimated revenue generated by providing one learning experience, results in a break-even point after delivering 25 learning experiences. Assuming one learning experience per week on average, there is potential for profitability within six to nine months, considering availability at schools due to curricula and holidays.

The business model, including explanations on estimations and calculations, can be found in appendix A.

Table 11: Estimations on investments

Investments	Costs	Number	Total
Hardware	€ 500.00	10	€ 5,000.00
Software (application)	€ 50,000.00	1	€ 50,000.00
Technology Development	€ 60.00	160 h (4 weeks of 40 hours)	€ 9,600.00
Profesionalizing Digiwijzer	€ 60.00	8 h (1 day)	€ 480.00
Total Investment			€ 65,080.00

5. Discussion

This chapter discusses key design decisions and the final design, the impact based on testing results, and evaluation methods used, aiming to draw conclusions while also addressing limitations and future work.

5.1 Design Decisions & Final Design

The final design has been developed by taking a Learning Experience Design (LXD) approach, heavily influenced by the use of experiential learning, emotion, gamification and existing business context.

5.1.1 Experiential Learning

Experiential learning is a core element of LXD and has significantly shaped the development of Behind the Feed. Formulating learning objectives and aligning them to the experiential learning model of Floor influenced the order of phases and activities, and the aim of each game in the learning experience (2023a).

While this resulted in a coherent and comprehensive learning experience, viewing it through other experiential learning models highlights a limitation. Other models, like the model from Kolb (1984), often include a reflective phase. Reflection is deemed to be crucial to experiential learning (Denton, 2011), and Dewey (1933) even argued we do not learn from experience, but by reflecting on experience. Despite including reflection moments through class discussions, and the games being praised for including reflection-in-action moments, reflection has received little attention in the process. Future development should incorporate more reflection-in-action and reflection-on-action activities to enhance learning (Schön, 1983).

5.1.2 Emotion

Learning is influenced by emotion. It is one of nine LXD rules and supported by literature (Tyng et al., 2017). Considerations of the emotions of a learner are integrated in many LXD tools, especially in mapping the learning experience.

The learning experience is designed to elicit various emotions in each phase to enhance learning. The games, as part of these phases, are also designed to evoke emotions and were therefore evaluated on emotional impact. The Discrete Emotion Questionnaire was used to test game ideas, leading to the choice of games for the final design (Harmon-Jones et al., 2016). Limitations in studying emotion are discussed later.

5.1.3 Gamification

The aim to use the design of Social Media Battle in the educational design has influenced ideation, leading to the use of gamification, supported by the outcomes of the benchmark and co-design sessions. Gamification, using game design elements in non-game contexts, is also used as it enhances learning engagement and outcomes, as testing results show too (Deterding et al., 2011; Majuri et. al., 2018; Mohamad et. al., 2018; Kalogiannakis et al., 2021). Since Social Media Battle was introduced, not fully explained and not played, and students were not required to include it in their learning experience in co-design sessions, its impact on these outcomes was limited.

5.1.4 Business

Developing within an existing business context led to key design decisions, particularly choosing high-end development of the physical prototype. It also resulted in a detailed review of the business context, a business strategy and a business model. However, practicality of the outcomes can be questioned as calculations rely on estimations.

5.2 Impact on Emotion & Learning

Behind the feed is designed to support AL in students aged 12 to 16 by addressing AL learning goals and eliciting emotions through various phases. Testing focused on its impact on both learning and emotion.

The expert meeting produced promising results on the impact on learning, with experts agreeing on the value of the learning experience and games, expecting them to contribute to students their AL.

User testing with students aged 12 to 16 evaluated emotional and learning impacts. Due to time constraints, the DEQ was not used and students only indicated discrete emotions felt during gameplay. while all games elicit the intended happiness, desire and disgust were underrepresented, possibly duo to the brief playing time and the general content in the prototype. Future work should explore the effect of more provocative and shocking content on emotional impact. Notably, anxiety was often mentioned, but indicated as excitement as result of translating the discrete emotions to Dutch, confirmed by the students.

Despite limited playtime, students reported learning from playing the games and contributing to the learning objectives, indicating extended gameplay and supporting learning material and class discussions to potentially contribute even more.

Overall, the learning experience and its three educational games show strong potential to contribute to enhance AL. However, with only eight participants in testing, future work should evaluate true impact on a larger scale. Additionally, using self-reported learning highlights limitations of evaluation.

5.3 Evaluation

While testing shows potential, a key limitation is the lack of formal evaluation of the learning experience and games their impact on learning. This is due to the lack of established AL evaluation methods as AL is a new domain. Existing AL scales only evaluate general algorithmic awareness and knowledge (Dogruel et al., 2021; Zarouali et al., 2021) but do evaluate critical evaluation and skills. As this learning experience also specifically addresses algorithms in social media, these scales have not been used. Future work should develop formal assessment aligned with the content and learning goals of the learning experience to study true impact on learning.

Additionally, the lasting impact of the learning experience on the students their ability to apply their learning in daily life has not been tested. The learning experience does include starting points for teachers to regularly sustain discussions in class. However, a longitudinal study should investigate whether the learning experience allows students to apply the AL learned in daily life.

6. Conclusion

This report has outlined the design process and final outcome of Behind the Feed, a learning experience on social media algorithms for students aged 12 to 16, featuring three educational games: Enter the Bubble, Guess the Data & Video and Social Media Battle: User vs. Company. Through this gamified custom series of lessons, it aims to empower students to explore how social media algorithms work, evaluate their impact, and develop the skills to use social media more critically and responsibly, enhancing their overall algorithmic literacy.

Initially, the project aimed to develop a comprehensive and coherent learning experience that enhances algorithmic literacy of social media algorithms in students aged 12- to 16- years-old, enables them to apply this in daily life and incorporates Social Media Battle. By taking a learning experience design approach and designing within an existing business context, a learning experience was developed: Behind the Feed. Midway, the project shifted to focus on creating educational designs that address similar aims within this learning experience, leading to the development of the three games: Enter the Bubble, Guess the Data & Video and Social Media Battle: User vs. Company.

Both the learning experience and games are valued and show potential to contribute to the AL learning goals and enhancing overall algorithmic literacy. However, future work should explore integration of reflection activities and evaluate true impact on (lasting) learning outcomes through formal assessment on a larger scale.

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References

Allyn, B. (2024, October 11). TikTok executives know about app's effect on teens, lawsuit documents allege. NPR. https://www.npr.org/2024/10/11/g-s1-27676/tiktok-redacted-documents-in-teen-safety-lawsuit-revealed

Anderson, J. & Rainie, L. (2024, April 14). Theme 7: The need grows for algorithmic literacy, transparency and oversight. Pew Research Center. https://www.pewresearch.org/internet/2017/02/08/theme-7-the-need-grows-for-algorithmic-literacy-transparency-and-oversight/

Areeb, Q. M., Nadeem, M., Sohail, S. S., Imam, R., Doctor, F., Himeur, Y., Hussain, A., & Amira, A. (2023). Filter bubbles in recommender systems: Fact or fallacy—A systematic review. WIREs Data Mining and Knowledge Discovery, 13(6). https://doi.org/10.1002/widm.1512

Biggs, J. (1996). Enhancing teaching through constructive alignment. Higher Education, 32(3), 347–364. https://doi.org/10.1007/bf00138871

Boots, B. C., Matlack, A. K., & Richardson-Gool, T. S. (2024). A call for promoting algorithmic literacy. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.4912427

Coe, E., Doy, A., Enomoto, K., & Healy, C. (2023, April 28). Gen Z mental health: The impact of tech and social media. McKinsey & Company. https://www.mckinsey.com/mhi/our-insights/gen-z-mental-health-the-impact-of-tech-and-social-media#/

de Groot, T. de Haan, M. & van Dijken, M. (2023) Learning in and about a filtered universe: young people's awareness and control of algorithms in social media, Learning, Media and Technology, 48:4, 701-713, DOI: 10.1080/17439884.2023.2253730

De InternetHelden. (n.d.). De InternetHelden. https://beinternetawesome.withgoogle.com/nl_nl

Denton, D. (2009). Reflection and Learning: Characteristics, obstacles, and implications. Educational Philosophy and Theory, 43(8), 838–852. https://doi.org/10.1111/j.1469-5812.2009.00600.x

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness. In Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments (MindTrek '11). https://doi.org/10.1145/2181037.2181040

Dewey, J. (1933). How We Think. A Restatement of the Relation of Reflective Thinking to the Educative Process, Boston etc. (D.C. Heath and Company) 1933. https://opus4.kobv.de/opus4-Fromm/frontdoor/index/index/docId/7969

Digicoach in de klas | Lessen Digitale Geletterdheid. (2024, August 30). Digiwijzer. https://digiwijzer.nl/oplossingen/digicoach/

Dogruel, L., Masur, P., & Joeckel, S. (2021). Development and Validation of an Algorithm Literacy Scale for Internet Users. Communication Methods and Measures, 16(2), 115–133. https://doi.org/10.1080/19312458.2021.1968361

Druin A. (1999). Cooperative inquiry: developing new technologies for children with children. In Proceedings of the SIGCHI conference on Human Factors in Computing Systems (CHI '99). Association for Computing Machinery, New York, NY, USA, 1999, 592–599. https://doi.org/10.1145/302979.303166

Druin, A. (2002). The role of children in the design of new technology. Behaviour and information technology, 21(1), 1-25.

Fayyaz, Z., Ebrahimian, M., Nawara, D., Ibrahim, A., & Kashef, R. (2020). Recommendation Systems: Algorithms, Challenges, Metrics, and Business Opportunities. Applied Sciences, 10(21), 7748. https://doi.org/10.3390/app10217748

Floor, N. (2023). This is learning experience design: What It Is, How It Works and Why It Matters. New Riders Publishing.

Gillespie, T. (2014). The Relevance of Algorithms. In The MIT Press eBooks (pp. 167–194). https://doi.org/10.7551/mitpress/9780262525374.003.0009

Guha ML, Druin A, Chipman G, et al. (2004) Mixing ideas: A new technique for working with young children as design partners. In: IDC '04: Proceedings of the 2004 conference on interaction design and children: Building a community, MD,1–3 June 2004, pp. 35–42. New York: Association for Computing Machinery. https://doi.org/10.1145/1017833.1017838

Harmon-Jones, C., Bastian, B., & Harmon-Jones, E. (2016). The Discrete Emotions Questionnaire: A New Tool for Measuring State Self-Reported Emotions. PloS one, 11(8), e0159915. https://doi.org/10.1371/journal.pone.0159915

Haroon, M., Chhabra, A., Liu, X., Mohapatra, P., Shafiq, Z., & Wojcieszak, M. (2022). YouTube, the Great Radicalizer? Auditing and Mitigating ideological biases in YouTube recommendations. arXiv (Cornell University). https://doi.org/10.48550/arxiv.2203.10666

Iversen, O. S., Dindler, C., & Hansen, E. I. K. (2013). Understanding teenagers' motivation in participatory design. International Journal of Child-Computer Interaction, 1(3–4), 82–87. https://doi.org/10.1016/j.ijcci.2014.02.002

Jahnke, I., Schmidt, M., Earnshaw, Y., & Tawfik, A. A. (n.d.). Theoretical Considerations of Learning Experience Design. https://edtechbooks.org/eme_6606/toward_theory_of_LXD_jahnke_earnshaw_schmidt_tawfik

Learning Experience Design. (2023, November 27). What is a learning experience? - Learning Experience Design. https://lxd.org/fundamentals-of-learning-experience-design/what-is-a-learning-experience/

Learning Experience Design. (2024, January 15). Learning experience design process - Learning Experience Design. https://lxd.org/fundamentals-of-learning-experience-design/learning-experience-design-process/

leermaterialen. (n.d.). SLO. https://www.slo.nl/sectoren/vmbo/digitale-geletterdheid-vmbo/digitale-geletterdheid-vo/leermaterialen/mediawijsheid/

Kalogiannakis, M., Papadakis, S., & Zourmpakis, A. (2021). Gamification in Science Education. A Systematic Review of the literature. Education Sciences, 11(1), 22. https://doi.org/10.3390/educsci11010022

Knack. (2021, December 9). 'Een pleidooi voor meer algoritmische geletterdheid' https://www.knack.be/nieuws/een-pleidooi-voor-meer-algoritmische-geletterdheid/

Kolb, D. A. (1984). Experiential learning: Experience as the source of learning and development. Englewood Cliffs, NJ: Prentice-Hall.

Kramer, A. D. I., Guillory, J., & Hancock, J. T. (2014). Experimental evidence of massive-scale emotional contagion through social networks. Proceedings of the National Academy of Sciences of the United States of America, 111(24), 8788–8790. https://doi.org/10.1073/pnas.1320040111

Majuri, J., Koivisto, J., & Hamari, J. (2018). Gamification of education and learning: A review of empirical literature. GamiFIN Conference.

Malcorps, S., Claes, A., Philippette, T., & Dufrasne, M. (2023). Algorithmic literacy and media practices among young people in Brussels. Brussels Studies. https://doi.org/10.4000/brussels.6901

Mohamad, S. N. M., Sazali, N. S. S., & Salleh, M. A. M. (2018). Gamification approach in education to increase learning engagement. International Journal of Humanities, Arts and Social Sciences, 4(1), 22.

Morris, P. (2022). Teaching Algorithmic Literacy within a Media Literacy Program. International Council for Media Literacy. https://ic4ml.org/journal-article/teaching-algorithmic-literacy-within-a-media-literacy-program/

Murray, C. (2023, March 14). TikTok Clones: How Spotify, Instagram, Twitter And More Are Copying Features Like The 'For You' Page. Forbes. https://www.forbes.com/sites/conormurray/2023/03/13/tiktok-clones-how-spotify-instagram-twitter-and-more-are-copying-features-like-the-for-you-page/

NOS. (2024, 29 november). Verbod sociale media voor jongeren komt eraan in Australië, "maar haalt weinig uit". https://nos.nl/artikel/2546344-verbod-sociale-media-voor-jongeren-komt-eraan-in-australie-maar-haalt-weinig-uit

Oeldorf-Hirsch, A., & Neubaum, G. (2023). What do we know about algorithmic literacy? The status quo and a research agenda for a growing field. New Media & Society, 0(0). https://doi.org/10.1177/14614448231182662

Over Digiwijzer Nederland | Onze visie in Digitale Geletterdheid. (2023, October 18). Digiwijzer. https://digiwijzer.nl/visie-digitale-geletterdheid/

Pariser, E. (2011b). The filter bubble: What the Internet is Hiding from You. Penguin Press HC.

Powers, E. (2017). My News Feed is Filtered? Awareness of news personalization among college students. Digital Journalism, 5(10), 1315–1335. https://doi.org/10.1080/21670811.2017.1286943

Rombouts, M., Morren, K., van Dorsselaer, S., Tuithof, M., Monshouwer, K. Peilstationsonderzoek Scholieren 2023. Digitale media en gokken Cijfers in tabellen. https://cijfers.trimbos.nl/scholierenmonitor/digitale-media-en-gokken/cijfers-2023-12-16-jaar-digitale-media-gokken/.

Ross Arguedas, A., Robertson, C., Fletcher, R., & Nielsen, R. (2022). Echo chambers, filter bubbles, and polarisation: a literature review . Reuters Institute for the Study of Journalism.

Rusanen, P. A. (2021, December 10). Learning the basics of Algorithmic Literacy | University of Helsinki. University of Helsinki. https://www.helsinki.fi/en/news/artificial-intelligence/learning-basics-algorithmic-literacy

Sanne van der Velden. (n.d.). Actualisatie Kerndoelen Digitale Geletterdheid | SLO. https://www.actualisatiekerndoelen.nl/digitalegeletterdheid/profielen/sanne-van-der-velden

SLO (2024). Conceptkerndoelen digitale geletterdheid en toelichtingsdocument. Amersfoort: SLO. https://www.slo.nl/publish/pages/21532/slo_conceptkerndoelen_en_toelichtingsdocument_digitale_geletterdheid_opleverversie_dd-29-2-2024-.pdf

Schmidt, M., Huang, R. Defining Learning Experience Design: Voices from the Field of Learning Design & Technology. TechTrends (2021). https://doi.org/10.1007/s11528-021-00656-y

Schön, D.A. (1983). The Reflective Practitioner: How Professionals Think in action. London: Temple Smith

.

Swart, J. (2021). Experiencing Algorithms: How Young People Understand, Feel About, and Engage With Algorithmic News Selection on Social Media. Social Media + Society, 7(2). https://doi.org/10.1177/20563051211008828

Tawfik, A. A., Gatewood, J., Gish-Lieberman, J. J., & Hampton, A. J. (2021). Toward a Definition of Learning Experience Design. Technology, Knowledge and Learning, 27(1), 309–334. https://doi.org/10.1007/s10758-020-09482-2

The Filter Bubble app. (n.d.). Universiteit Utrecht. https://www.uu.nl/organisatie/pedagogiek-in-diverse-samenlevingen/the-filter-bubble-app

The Wall Street Journal. (2021, July 21). How TikTok's algorithm figures you out | WSJ [Video]. YouTube. https://www.youtube.com/watch?v=nfczi2cI6Cs

Thijssen, Y. J. (2024). Social Media Battle: User vs. Company.

TikTok. (2020, November 4). How TikTok recommends videos #ForYou. Newsroom | TikTok. https://newsroom.tiktok.com/en-us/how-tiktok-recommends-videos-for-you

TikTok - the Hmm. (2023, May 22). The Hmm. https://thehmm.nl/education/tiktok/

Tyng, C. M., Amin, H. U., Saad, M. N. M., & Malik, A. S. (2017). The influences of emotion on learning and memory. Frontiers in Psychology, 8. https://doi.org/10.3389/fpsyg.2017.01454

Walsh, G., Foss, E., Yip, J., & Druin, A. (2013, April). FACIT PD: a framework for analysis and creation of intergenerational techniques for participatory design. In proceedings of the SIGCHI Conference on Human Factors in Computing Systems (pp. 2893-2902).

Workshop baas in eigen bubbel vo | Beeld & Geluid. (n.d.). https://www.beeldengeluid.nl/onderwijs/workshops/vo/baas-in-eigen-bubbel

Zarouali, B., Boerman, S. C., & De Vreese, C. H. (2021). Is this recommended by an algorithm? The development and validation of the algorithmic media content awareness scale (AMCA-scale). Telematics and Informatics, 62, 101607. https://doi.org/10.1016/j.tele.2021.101607

Appendices

Appendices start on the next page.

Appendix A
Business Context, Strategy & Model

This document is a document containing the business aspects of my Final Master Project at the faculty of Industrial Design at University of Technology Eindhoven. It includes an overview of the business context and strategy, involving the vision, mission, strategy, tactic and action plan and the final ongoing business model. It was created to involve business in parallel throughout the design process. The business strategy is formed with help of the slides and a presentation 'creating real world impact' by Mitchell Jacobs, in which business strategy meets design strategy.

Business Context & Strategy

Often in a project, industrial design students focus on the design as a process and design as form giving. Design as strategy is thought about after the design is finished. Real world impact is created through starting with design as strategy, in which business strategy meets design strategy. For this business strategy, the business context needs to be determined. With use of a benchmark on related learning material, designs and educational interventions, as well as the designer his professional identity and vision, a business context was chosen, after which a design strategy was made.

Professional Identity and Vision

Vision

I see a future where technology seamlessly integrates with daily life, enhancing our experiences and positively impacting society. However, the rapid pace of technological development and a lack of awareness pose challenges. It hinders people in making an informed and conscious decision regarding technology adoption nor allowed people in doing so for technology already in use, and it causes people, especially youth, to lack a critical attitude towards technology use and adoption. I aim to address these challenges by creating educational designs that enhance digital literacy and stimulate a critical attitude towards technology adoption. By combining user-centered design, learning experience design, and clear communication, I strive to empower individuals to make informed decisions about their use of digital technologies which supports meaningful technology integration, use and possibly an improvement of our daily life.

Professional Identity

I embrace a passion for diving deeply into new concepts, driven by my curiosity in technology, design, and education. As an early adopter, I explore how new technologies can improve lives, while also educating others about their benefits and challenges. My experience in Industrial Design and Science Education allows me to create user-centered, innovative solutions that aim to enhance digital literacy, which enables meaningful technology use and adoption as stated in my vision. I prioritize collaboration and user input, striving to design educational innovations. In my aspiration to combine design and education, I am learning to use Learning Experience Design (LXD), an approach through which useful educational designs and experiences can be created for learners, the 'users' of a learning experience.

Benchmark

A benchmark analysis was done that involved comparing various related educational interventions on digital and media literacy on several key aspects such as learning materials, teaching methods, costs, target audience, and learning goals or vision. An analysis was done to create valuable insights from this comparison, highlighting trends in teaching methods to find gaps in how algorithmic literacy of social media algorithms can be taught. Specific work, like the workshop Baas in Eigen Bubbel and Digiwijzer, are noted for their relevance to the topic or for their vision on educating the topic. Next to identifying teaching method gaps, the analysis provided insights to choose a specific business context to which the business and design strategy will be formed. Only the latter will be discussed in this document.

Conclusions and business context

The Workshop Baas in Eigen Bubbel is most closely related to the topic and learning goals of algorithmic literacy of social media algorithms, as it engages students in understanding data trails, filter bubbles, and algorithms through interactive activities like building algorithms and playing a game on data. The workshop's is given in and by the Dutch Institute Beeld en Geluid. As a museum-based initiative, their focus on media use and societal impact ties into a larger mission of preserving media heritage and promoting critical media awareness, making their overall vision less narrowly focused on algorithmic literacy compared to other educational tools.

On the other hand, Digiwijzer their vision aligns closely with the vision and learning outcomes of the FMP, particularly in aiming to make every student digitally literate by the time they graduate—a goal that in my opinion encompasses becoming algorithmic literate as well. While Digiwijzer offers a broad range of solutions for digital literacy, there appears to be a gap in how deeply it addresses algorithmic literacy of social media algorithms specifically. Given the growing importance of being able to understand these algorithms, there may be an opportunity for Digiwijzer to enhance its offerings in this area. Next to Digiwijzer their vision being related to this project, it also related to my personal vision and identity regarding the aim to support digital literacy. Because of these reasons, Digwijzer has been chosen as a business context that will underscore the business & design strategy in this project, which will directly influence the creation of the learning experience and corresponding designs.

Additionally, while taking Digiwijzer as a business context to the design the learning experience on algorithmic literacy in, the Workshop Baas in Eigen Bubbel could be seen as a competitor given its strong focus on hands-on learning and algorithms, making it a more direct match for seeking a deeper and unique learning experience on algorithms in social media.

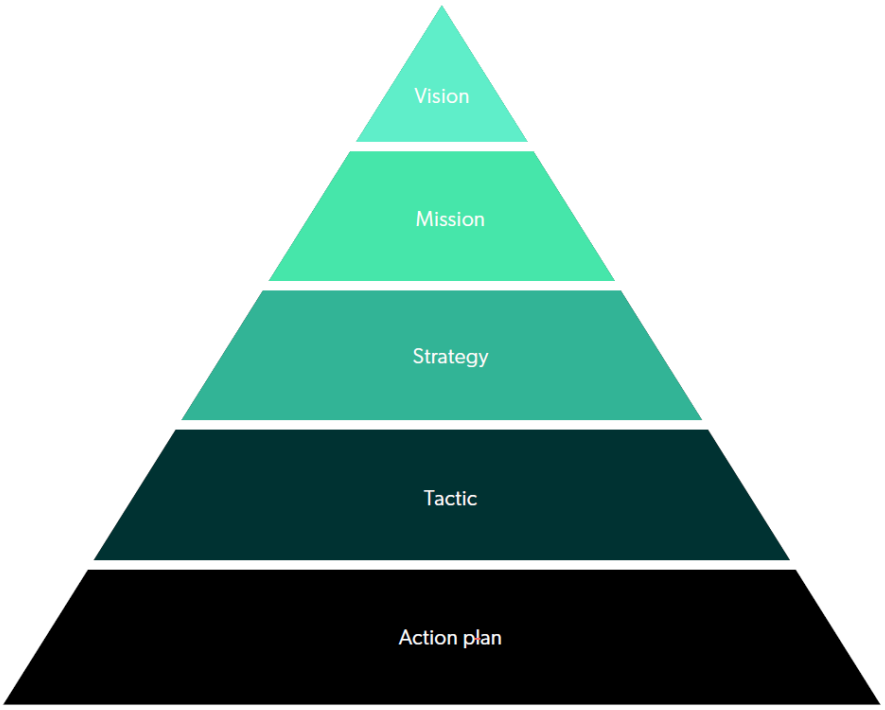
Digiwijzer

Digiwijzer is a company dedicated to enhancing digital literacy in schools throughout the Netherlands. They aim to ensure that every student is digitally literate by the time they graduate, addressing skills like media literacy, computational thinking, and practical ICT competencies. Digiwijzer works closely with schools to implement customized learning pathways that meet the specific needs of their curriculum. Their offerings include an online learning environment, workshops for students and teachers, and e-learning tools. A key feature is their focus on training teachers to independently guide digital literacy education, ensuring that schools don't become reliant on external providers. Digiwijzer also extends its expertise to topics like artificial intelligence (AI) and digital safety, aiming to help students navigate the digital world with confidence. They provide a structured but flexible approach, with tools like Digicoaches in the classroom, team trainings, and parent engagement sessions. These offerings ensure that schools can integrate digital literacy into their curriculum effectively. However, while they cover various aspects of

digital literacy, there may be a gap in their deeper engagement with algorithmic literacy, which is increasingly important in today's technology-driven world.

Business Strategy

The creation of this business strategy includes a description of the vision and mission of Digiwijzer, along with where the learning experience on algorithmic literacy fits in, a combined vision and mission, a strategy, tactic and action plan.



Vision

Digiwijzer their vision is that ultimately every student can step into society being digitally literate. They are well-prepared for the digital world, thanks to strong guidance from teachers and the right involvement from parents. They don't exclude any students in this process. In the context of digital inclusion and equal opportunities, Digiwijzer believes that every child matters.

“Digital literacy is in our DNA. That's exactly why we want to make a difference.”

Digiwijzer has six core values they stand for that shape our vision of digital literacy. They describe who they are and what they stand for, what connects them, and how they interact with each other.

- Sincere: Digiwijzer is always honest, open, and direct. Within their team and with clients.
- Unique: Everything is always just a little bit different. Digiwijzer believes in their way of working.
- Flexible: Digiwijzer always does what needs to be done, and that's why they continuously adapt.
- Amazement: Surpassing expectations. Digiwijzer always take that extra step.
- Friendship: Only arises from equality. Digiwijzer helps and appreciates each other.
- Action: Ideas are nothing without execution. Making mistakes is okay as long as you learn.

Mission:

Digiwijzer their mission is to support every school on their journey towards structure and independence in Digital Literacy. They want to avoid the educational system becoming completely dependent on an external party. We always focus on connecting the child, parent, and teacher.

Learning Experience on social media algorithms

Digital literacy, as outlined by SLO, is about equipping students with the ability to use, understand, and critically engage with digital technologies. Algorithmic literacy, with its focus on (1) awareness of algorithms, (2) understanding how they work, (3) critically evaluating algorithmic decision-making, and (4) being able to cope with or influence algorithms, is essential in enhancing these broader digital literacy goals, and can be viewed as a component of digital literacy.

It is crucial to understand the underlying processes that shape digital experiences, especially on platforms that use algorithms to curate content such as social media. It helps students grasp how algorithms collect data, shape content recommendations, and influence opinions, decisions, and behaviors. For example, students learn to recognize the role of filter bubbles, the impact of personalized feeds, and how these can limit or shape their worldview. In a broader digital literacy context, this understanding is key to stimulate critical thinking about technology use and the ethical implications of algorithmic decision-making.

In essence, while digital literacy equips students with the ability to use digital tools safely and effectively, algorithmic literacy deepens this by encouraging awareness and critical reflection on the mechanics of digital platforms and the ways in which they impact everyday life. This makes algorithmic literacy a vital subcomponent for ensuring that students not only consume digital content but also understand and critically engage with the systems that shape their online experiences.

A learning experience that enhances algorithmic literacy of social media algorithms in students aged 12 to 16 years old and which enables them to apply this in daily life aligns well with Digiwijzer's educational goals on digital literacy. It aligns particularly well with their 'Digicoaches in de klas' solution.

This solution includes a custom series of interactive lessons on one or on multiple topics. Given by a 'digicoach', a teacher from Digiwijzer, the custom series of lessons will be put together based on the school's preferences, including the number of lessons, topics and time period. In these lessons, the teachers will be inspired to eventually be able to give these lessons themselves, contributing to Digiwijzer their mission.

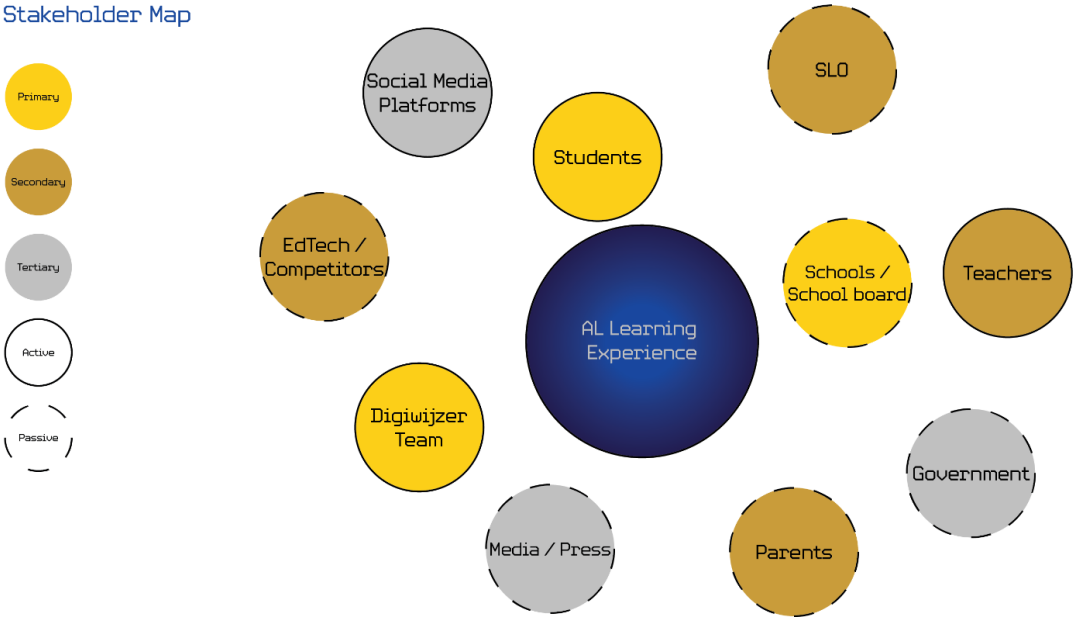
Introducing the topic algorithmic literacy of social media algorithms would enrich Digiwijzer their available lessons and possible lesson packages that can be put together with schools. The topic ensures students gain a deep understanding of social media algorithms and their roles in shaping their online experience, further advancing Digiwijzer their mission to prepare students for a digital future. Furthermore, it distinguishes Digiwijzer from other competitors with a unique adaptable series of lessons on this specific and highly needed topic, making it more valuable and attractive to take multiple lessons.

Vision for the learning experience on social media algorithms

Every student needs to become algorithmic literate regarding social media, empowering them to be aware of, understand, critically reflect on and use the skills to influence the mechanics of social media platforms and the ways in which they impact everyday life. Ensuring students understand and critically engage with the platforms that encompass a large part of their digital landscape makes algorithmic literacy a vital subcomponent of digital literacy. It plays a vital role in achieving the goal for every student to become digital literate and to prepare them for the digital world.

Mission for the learning experience on social media algorithms:

The mission is to empower students to become algorithmic literate regarding social media and to enable them to apply it in everyday life. By providing a comprehensive learning experience, the goal is to equip students with the awareness, knowledge, skills and attitude that are required to make use of social media in a conscious and responsive manner.



Analysis

Stakeholder map
a stakeholder map shows primary, secondary and tertiary stakeholders while categorizing them as active or passive stakeholders.

Primary:

- **Students (active):** are the target group and active participators in the learning experience. Their engagement and feedback in the development will also shape the design of the educational designs as well as creating the learning experience.
- **Digiwijzer (active):** are responsible for developing and delivering the learning experience, involving the introduction, use of and updating the educational designs and the development of basic and custom learning material. Besides, the digicoaches inspired teachers with questions and statements for class discussions that they can use later on.
- **Schools / school board (passive):** are decision-makers who will reach out to Digiwijzer to provide the learning experience on their school.

Secondary:

- **SLO (passive):** sets guidelines for digital literacy learning goals and thereby might influence schools in decision making.
- **Teachers (active):** will be present and actively help the Digiwijzer team during learning experiences. Get inspired for having class discussions later.
- **Parents (passive):** support their children's learning and might also be educated on the importance of algorithmic literacy, allowing the students to apply this knowledge at home, in daily life.
- **Edtech/Competitors (passive):** are potential collaborators or competitors.

Tertiary:

- **Media/Press (passive):** might be involved by writing about the unique learning experience provided by Digiwijzer.
- **Government (passive):** are final decision makers in officially putting learning goals in the law.
- **Social Media platforms (active):** are the topic of the learning experience and will be discussed and/or used to enhance the learning experience.

SWOT Analysis

Strengths:

- **Innovative Learning Experience:** The educational tools together with supportive learning material create a unique learning experience to improve algorithmic literacy, meeting a growing demand for this topic as part of teaching digital literacy.
- **Tailored learning experiences:** The combination of educational tools allows for the creation of custom lessons, ensuring the experience is adaptable to specific needs of schools and students.
- **Collaborative development:** the active collaboration with students, teachers and experts during the development process helps ensure relevance and high engagement of the learning experience, and a unique selling point that education is created not only for, but together with students.
- **Expertise:** as the providers of the learning experience, digiwijzer has a deep understanding of the educational landscape, as well as expertise on algorithmic and digital literacy.

Weaknesses

- **Dependence on Schools' Interest:** The learning experience relies heavily on schools reaching out to Digiwijzer, which could slow down growth if schools are not proactive or face budget constraints.
- **Scalability Challenges**: A custom learning experience for each school may be resource-intensive, making it difficult to scale quickly without significant investment or resource management.
- **No legal mandate for learning goals:** Although SLO provides concept learning goals, there is no current legal mandate to have algorithmic literacy as part of the curriculum, which might reduce urgency for schools to adopt it.
- **Parental Awareness**: Parents might not immediately see the importance of algorithmic literacy, which could limit the effectiveness of the learning experience beyond the classroom, in daily life.

Opportunities:

- **Growing demand for digital literacy (and algorithmic literacy):** Digital and algorithmic systems increasingly influence our everyday life, and that of students. There is a growing demand for education that prepares students for the future, hence the creation of core learning goals for digital literacy.
- **Core learning goals Digital Literacy:** aligning the learning goals of the learning experience on algorithmic literacy with the learning goals digital literacy creates the opportunity to highlight the relevance of the learning experience, leading to potentially higher adoption.
- **Technological opportunities:** using technology such as social media platforms, AI, or data tools in the learning experience can make the lessons more engaging, relevant, and future proof.
- **Media and Press Coverage**: Positive media attention can stimulate recognition, leading to increased adoption of the learning experience by schools.

Threats:

- **Competitors:** Competitors in EdTech, offering learning material or similar experiences on algorithmic literacy, could create a competitive market which requires Digiwijzer to continuously innovate and improve the learning experience.
- **Changing Educational Policies:** Government or educational board policy changes, for example a change in the learning goals digital literacy, could either limit or delay the adoption of the learning experience on algorithmic literacy by schools**.**
- **Budget Constraints:** Schools with limited budgets might prioritize other educational programs, making it harder to adopt the learning experience on algorithmic literacy.

Stakeholder Journey

To explore the learning experience within the business context, two stakeholder experience journeys were created, resulting in two possible implementation pathways:

Option A: Design as product for schools

One of the two options of the learning experience and it's belonging designs is that the designs will be a product that Digiwijzer sells, with the intention that schools integrate the learning experience into their curriculum. This aligns with Digiwijzer their vision that every school can teach digital literacy (also algorithmic literacy) themselves.

What it means for the Learning experience:

- Intention is to be integrated in the curriculum.
    - Digiwijzer gives an 'introduction' workshop
        - The introduction of the LE is given and one of the uses of the product.
        - Teachers participate and learn how to use it (get inspired for its uses)
        - After this workshop, the school decides upon buying the product & licence

What it means for the design:

- Design must allow for multiple uses (thus include teacher instruction)
    - throughout the years, with new trends/videos etc.
- The physical designs must be low cost (schools need multiple for a class)
- The tech is integrated into the application:
    - positioning in the game (no use of lights)
    - Notifying and showing who is "done" in each round in each phase.
    - showing the required bubbles on screen.
    - Questions & Answers in App.
        - updated by Digiwijzer for schools specific needs
            - The application is a licence: X amount of money for X students per year.

Option B: Design as part of a lesson series

The second option for the learning experience and its designs is that it will be ready to use lessons that will be part of Digiwijzer their available lessons they can teach. In other words, as part of ready to use lessons for 'digicoaches voor de klas'. Each school can ask for a custom created series of lessons in which this topic can also be included, or in which this topic is included solely. Schools can also indicate which learning material will be used in these custom lessons is also open and adjusted by Digiwijzer as the schools will indicate what type of learning material works best.

what it means for the learning experience:

- Custom series of lessons, based on desired learning goals and time
- adjustable learning material
- Teachers can participate
- given by digicoaches

what it means for the design:

- the physical design can be 'higher ' cost (Digiwijzer just needs a couple which can be used over and over again, total of around 10 (40 participants at once)
- Tech integrated into the design:
    - Lights to indicate position, and when one is done in each phase
    - sensors to sense whether all data points are filled.
    - switch on the button part to indicate phase 1, 2 or 3
- Printed physical cards and filter bubbles
    - Need to be updated and printed new

In both options, it requires a team updating the questions, answers and content in the application in which all games are integrated. The application needs to be updated with new (popular) content, including viral videos, trends and possible filter bubbles. Digiwijzer needs to update the app with these videos from other social media apps including metadata so that the videos can be categorized for creation of filter bubbles in the app.

Strategy

Schools want the learning experience provided by Digiwijzer to integrate algorithmic literacy into their educational curriculum, which supports their students in becoming digital literate. This involves creating a custom series of interactive lessons together with Digiwijzer in which several designs or tools will be used as well as the use of suitable learning material and class discussions. This will create a custom learning experience on algorithmic literacy regarding social media algorithms for each school.

Tactics

To implement the strategy, the following tactics will be employed. Tactics upon the design will be employed in the project while tactics on the learning experience are out of scope for this project.

1. **Learning Experience Design:** Collaborate with schools and students to develop learning activities and experiences that are tailored to algorithmic literacy learning goals regarding social media algorithms. These experiences will be combined to create a learning experience on algorithmic literacy that can be custom made towards a school their educational needs. It encompasses guidelines for each phase of the learning experience.
2. **Develop designs (& learning material):** Based on the created learning experience, create educational design that supports students in achieving the goals of algorithmic literacy regarding social media algorithms and enable them to apply this in daily life. Moreover, create the required learning material for the learning experience according to the guidelines.
3. **Test designs (& learning experience):** Collaborate with experts, schools and students to test the educational designs on their use and whether they achieve the desired learning goals. Next, collaborate with schools and students to test the full learning experience including the additional learning material on its outcomes.
4. **Improve Designs(& Improve learning experience):**
   The educational designs need to be improved based on feedback and data gathered from testing them. The full learning experience will be improved, including adapting the guidelines and creating improved learning material.
5. **(Marketing and Outreach):** Develop a targeted marketing strategy to promote the benefits of Digiwijzer's algorithmic literacy program to schools. This will include informational sessions, demonstrations, and success stories to illustrate the impact of the program on student learning.

(Tactics in between brackets are out of scope for this project, and are included in the Action plan for further development after this project)

Action plan (including estimated planning)

The action plan outlines specific steps to execute the identified tactics out of scope from this project onward. As digital literacy needs to be included from September onward, the aim to launch Behind the Feed is September as well

1. **Develop Educational Games (January – April):** Develop a couple of educational games that will be used in pilot testing the learning experience, allowing for changes for developing full number of required games.
2. **Create Learning material (February – March)**: Develop basic learning material that will be used in every series of lessons according to the guidelines of the learning experience including the introduction.
3. **Pilot test learning experience including the games (May-June):** collaborate with schools and students to create a custom series of lessons and to test basics of the full learning experience including the games and additional learning material on its outcomes. Gather valuable feedback from students and teachers on several schools.
4. **Improve learning experience (June-July)**: The full learning experience will be improved based upon the gathered feedback, including improving the guidelines and improving the basic learning material. Additionally, custom learning material can be made generally as well, making it easier to apply at multiple schools.
5. **Scale and Expand (August):** Prepare and market for a broader rollout to schools, including developing the required number of games and updating the application over time.

Business Model

The business model, particularly the calculations, has been discussed in several meetings with hybrid-coach Mitchell Jacobs. Based on his experience, estimations were done for development of the games and costs for providing behind the feed as a service.

Product:

Behind the feed is a learning experience on social media algorithms for students aged 12 to 16 years old. Through a gamified custom series of lessons, it empowers students to explore how social media algorithms work, evaluate their impact, and develop the skills to use social media more critically and responsibly. It features three games that are connected by an overarching storyline which students play in duos in various phases of the experience: Enter the Bubble, Guess the Data & Video and Social Media Battle. The experience consists of 5 phases: Introduction. Explore, Compare, Test and Conclude.

Model:

As the learning experience is provided by Digiwijzer as a service, Behing the Feed will make use of a **Fee-for-Service business model**, which involves providing a service to customers and charging a fee directly related to the service. Revenue will be generated by charging schools for providing the learning experience, considering wages of digicoaches and game development costs. While Behind the Feed can be customized and therefore different at every school, charging prices will vary. Calculations will be done by taking a hypothesized average of lessons provided to schools.

Development of Design & Application

Currently, the games and applications are prototypes. Calculations on revenue should include development costs of the final design of the games and the belonging application. Required changes towards development of these designs are addressed to detail the estimations and calculations.

Design

The game board, Black Box and Button Box, percentage slider and game pawns will be made from hard wood and need to be custom painted and treated, ensuring durability and lowering the chances of damages. The data tokens will remain the same, custom made and engraved Perspex. All other game content contains cards and booklets, which will be made from plastic coated paper.

The non-visible hardware in the design includes the integrated microcontroller, LED lights, buttons and sensors. The microcontroller needs to have a wifi or bluetooth module, required for connecting with the application on students their phones and wireless connection with the Button Box holding two buttons. While the use of IED lights remain the same, the design needs to include sensors, like IR or UltraSonic sensors to detect placement of physical data.

The costs for the hardware of the design was estimated to be around €500.

Hardware	**Material**
Physical design	
Game Board	Hard wood, custom painted & treated
Button Box	Hard wood, custom painted & treated
Black Box	Hard wood, custom painted & treated
Game Accessories	
Pawns	Hard wood, custom painted & treated
Data Tokens	Perspex, custom engraved
Percentage slider	Hard wood, custom painted & treated
Cards & Booklets ▪ Question cards (65) ▪ Action cards (36) ▪ Information card (1) ▪ Update cards (7) ▪ Playing rules ▪ Answer booklet	Plastic coated paper
Technology	- Microcontrollers including wifi/bluetooth module (with code) (2) - LED lights (20) - Sensors (IR or ultrasonic sensor) (20) - Buttons (2) - Batteries (2)

Application

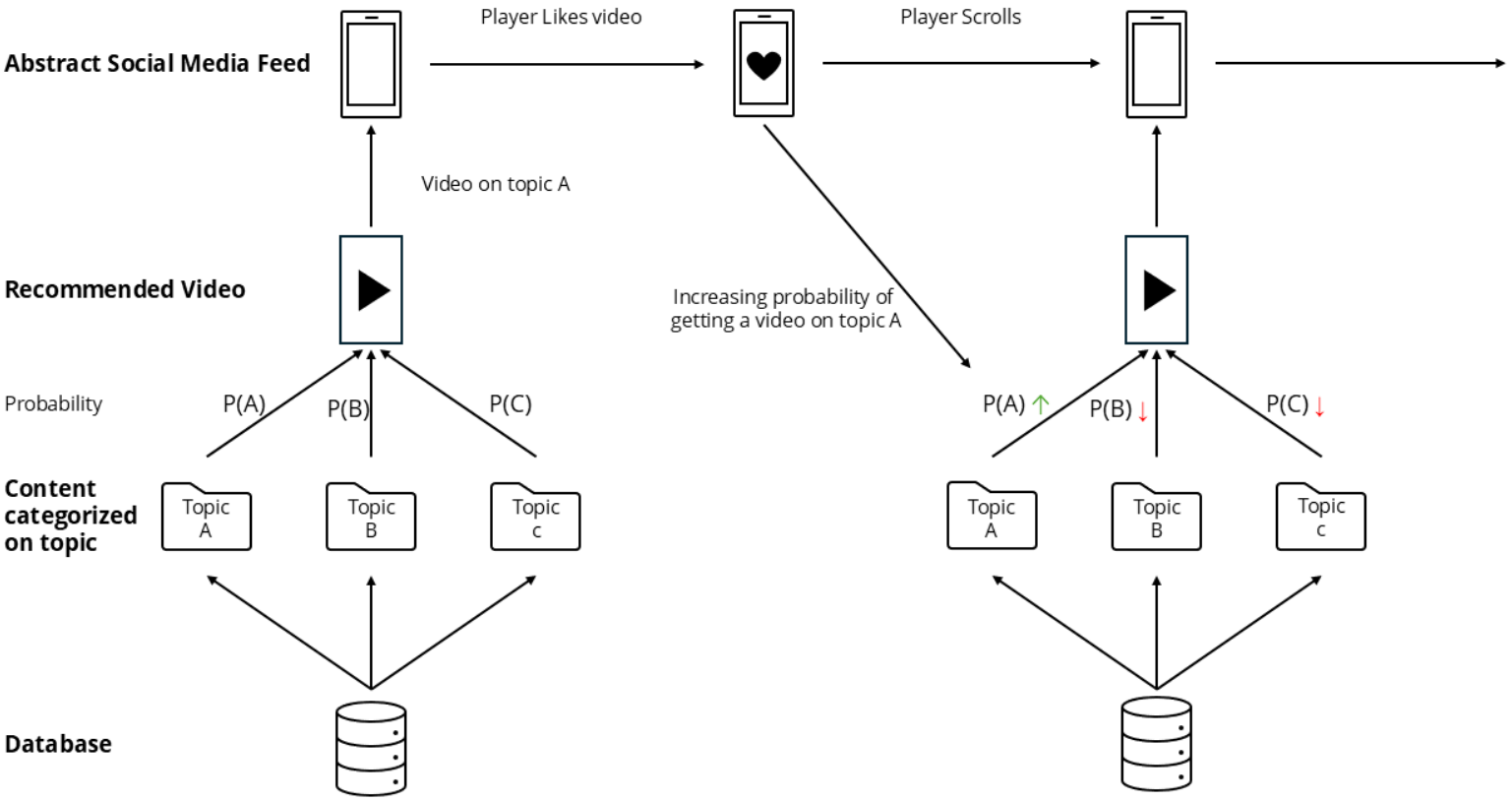
Developing the application involves developing the front end and back end, requiring UX/UI design(ers) and programmers for back-end development. The back end requires to incorporate several elements to make the application work, considering how the games work, the relation with the design and required updates.

The games include an abstract simulation of a social media feed. This social media feed should show videos from a database divided in topics. Each video has metadata that it belongs to this topic. A video from each topic has an equal probability to be shown on the feed at the start of the game. As students are required to enter a filter bubble (90% content on a topic), they take actions at each video, increasing or decreasing the probability of that topic being chosen again (see figure below). The back-end requires the development of this algorithm as well as the creation of this database.

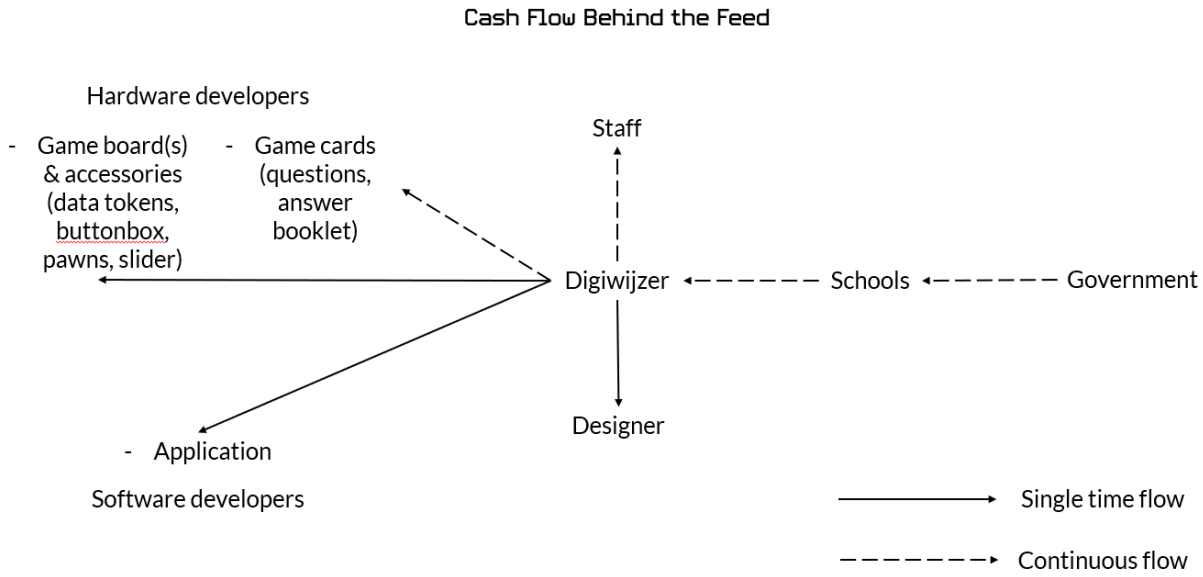
As this database should be regularly updated with new content, an admin dashboard must be made for the application through which the Digiwijzer team can update the content.

As the design requires connection with the application, the back end of the application must include and use a connection via bluetooth or wifi.

The cost for developing the application was estimated to be around €50.000.



Cash flow



The diagram illustrates the cash flow for "Behind the Feed" at Digwijzer. It includes the relationships:

Digiwijzer is at the center:

- Hardware developers

Digiwijzer makes single-time payments to hardware developers for creating game boards, accessories (such as data tokens, button boxes, pawns, sliders), and continuous payments for updating the game cards (including question cards and answer booklets).

- Software Developers:

Digiwijzer makes single-time payments to software developers for developing the application.

- Designer

Digiwijzer pays the designer for designing the learning experience and professionalizing training.

- Employees

Digiwijzer pays their employees for their work in the company, delevering the learning experience

Schools hire Digiwijzer to come provide Behind the Feed

- Digiwijzer

Digwijzer receives revenue from schools they provide the learning experience at, hypothesizing providing the learning experience is an ongoing service resulting in a continuous form of revenue.

- Government

The government provides continuous financial support to schools, which in turn supports Digiwijzer indirectly.

Calculations:

Calculations were done upon the amount of investments and the estimated average revenue of providing Behind the Feed a single time, such that could be calculated how many times the learning experiences must be provided to return the investment and start making profit. These calculations show whether it is a realistic business model.

Investments	**Costs**	**Number**	**Total**
Hardware	€ 500.00	10	€ 5,000.00
Software (application)	€ 50,000.00	1	€ 50,000.00
Technology Development	€ 60.00	160 hours (4 weeks of 40 hours)	€ 9,600.00
Profesionalizing Digiwijzer	€ 60.00	8 hours(1 day)	€ 480.00
Total Investment			€ 65,080.00

Investments

As the games are played with, and thus the designs are used with, four players, and a class consisting of 30 students, a total of 10 designs would be reasonable to develop, including back-up designs. As development of a single design is estimated to cost €500, it sums up to €5000. The technology should be programmed, wired and installed in the games by a developer asking €60/h, estimated to take 160 hours, adding up to 9600. Software development for the application was estimated to cost €50.000, and professionalizing the Digi coaches to familiarize them with the learning experience and games is estimated to cost €480 for 1 day. This leads to a total investment of roughly €65000.

Estimated Revenue Behind the Feed	**Costs**	**Number**	**Total**
Hourly lessons costs (2 digicoaches)	€ 500.00	8.5 (average amount)	€ 4,250.00
Employee costs (per day)	€ 400.00	4 days (2 persons*(8.5 hours lessons + preparating each lesson)	€ 1,600.00
Revenue			€ 2,650.00

Estimated Revenue

The hourly cost of a digicoach for the learning experience is estimated to be €125. One lesson hour requires and hour preparation (15 minutes setting up, 15 breaking down, 30 minutes preparing learning material), leading to the cost of €250 for one digicoach for one lesson. As the learning experience requires 2 digicoaches, this adds up to €500. As the learning experience can vary between 6.5 and 12.5 lessons, it was hypothesized that on average the learning experience will take 8.5 lessons, costing €4250. It was estimated that a digicoach costs digiwijzer €400 a day. As preparation takes roughly the same time as the learning experience itself, it was estimated that one learning experience of 8.5 lessons costs one digicoach 2 days of work. As they are given by two digicoaches, this results in four days of €400, with a total of €1600 for each provided learning experience. This results in an average revenue of €2650 per learning experience.

Break Even Point

Since the total investments are €65080, and the average revenue of providing one learning experience is €2650, a total of (€65080 / €2650= 24.56) 25 learning experiences need to be given before profit on the learning experience will be made.

As the learning experiences can be custom made, they can be provided over a course of time. Some schools may decide to integrate one lesson per week, while other schools implement the learning experience in a project week, allowing the learning experience to be provided in several schools at the same time. Estimating that on average one learning experience can be provided per week, there is potential for profitability within six to nine months, considering availability at schools due to curricula and holidays.

This estimated is made based upon the following. As an average learning experience takes 8.5 hours to be provided, but also a similar amount of preparation, one learning experience will cost 2 days of work. While this allows two learning experiences to be given in one week, hypothesized to happen, other weeks may not involve providing a learning experience.

Appendix B

Benchmark results, conclusions and Overview

General Conclusions:

Diversity of Learning Materials and Methods:

A variety of materials is used across the educational related work, ranging from videos and worksheets to games and interactive platforms. This suggests that digital literacy education benefits from a multi-modal approach, accommodating different learning styles.

Game-based learning is prominent, as seen in several examples like MediaJungle, EDUX and The Filter Bubble App. Games provide a hands-on, experiential method for teaching complex concepts like algorithms, filter bubbles, and data privacy, which enhances engagement and retention.

Group Learning and Class Discussions Dominate:

The majority of tools employ group learning and classroom discussions as core teaching strategies. This collaborative approach encourages peer learning and helps students reflect on the societal implications of digital media use.

Kinaesthetic learning is least Common:

kinaesthetic learning, or learning through physical activity and hands-on manipulation, is the least applied learning method in the digital literacy programs evaluated. This may be due to the conceptual nature of many digital literacy topics—such as algorithms, data privacy, and media influence—making them more naturally suited to discussion-based, inquiry-based, or technology-driven methods rather than physical interaction.

Given the proven effectiveness of kinaesthetic learning in other areas, its underutilization in digital literacy education represents a missed opportunity. Introducing more hands-on activities that involve physical interaction—such as simulations, role-playing, or building tangible models—could provide a more immersive and memorable learning experience.

Cost and Accessibility Vary Widely:

Many programs are offered for free, particularly those that focus on web-based tools like the Hoezo Mediawijs website or the Bits of Freedom: Manipulatie course. However, programs that offer more structured, in-person workshops or physical materials tend to come with a higher price tag (e.g., Edux: Regie over Media and MediaJungle), which could pose challenges for schools with limited budgets.

Focus on Media and Digital Literacy:

Almost all educational tools and programs have a strong emphasis on media literacy, helping students become aware of the influence of media and social platforms. However, the depth of focus on algorithms varies. Some related work, like Digiwijzer and De Baas op Internet, introduce students to the concept of algorithms and their societal impacts, but fewer programs provide deep, hands-on understanding of how algorithms work or how they can be manipulated.

The Workshop Baas in Eigen Bubbel is the most closely related to the topic and learning goals of algorithmic literacy, as it engages students in understanding data trails, filter bubbles, and algorithms through interactive activities like building algorithms and analyzing data profiles. However, the workshop's is given by the Dutch Institute Beeld en Geluid. As a museum-based initiative, their focus on media use and societal impact ties into a larger mission of preserving media heritage and promoting critical media awareness, making it less narrowly focused on algorithmic literacy compared to other educational tools.

On the other hand, Digiwijzer aligns closely with the vision and learning outcomes of this project, particularly in aiming to make every student digitally literate by the time they graduate—a goal that in my opinion encompasses algorithmic literacy as a key component. While Digiwijzer offers a broad framework for digital literacy, there appears to be a gap in how deeply it addresses algorithmic literacy specifically. Given the growing importance of understanding algorithms in daily life, there may be an opportunity for Digiwijzer to enhance its offerings in this area. Additionally, the Workshop Baas in Eigen Bubbel could be seen as a competitor, given its strong focus on hands-on learning and algorithms, making it a more direct match for seeking deeper and unique learning method and experience of algorithmic concepts.

Summarizing:

Group learning and classroom discussions are often used as core teaching method and learning activity, suggesting it promotes collaborative reflection on societal implication of digital media. Game-based learning is also prominent. Games can provide effective teaching of complex concepts like algorithms, filter bubbles, and data privacy, suggesting it might enhance engagement and learning. Kinaesthetic learning is rarely used, likely due to the abstract nature of topics like algorithms and data privacy, presenting an opportunity to incorporate the teaching method, which might be beneficial to learning and engagement. Free web-based tools are common, while structured workshops often have higher costs.

Because of high relevance to the project, the workshop ‘Baas in eigen Bubbel’ and ‘digicoaches in de klas’ from Digiwijzer were explored as existing business context.

The former mentioned explores algorithmic literacy through interactive activities, but the institution ‘Beeld en Geluid’ has a broader mission focussing on media heritage and awareness, less on algorithmic literacy.

Digiwijzer their mission to promote digital literacy aligns closely with the focus of promoting algorithmic literacy. Their current offerings involve ‘digicoaches in the klas’, which entails custom series of lessons on a variety of topics given by a teacher from Digiwijzer. As this seems to lack depth on algorithmic literacy, there is potential for expansion. The alignment of their vision and mission with the vision of the designer makes it the chosen business context to shape strategy and development of the learning experience. It is important to clarify that while there has been no formal collaboration between Digiwijzer and the designer, this business context was selected and applied as if such a collaboration were in place.

The following page shows an overview of the Becnhmark. Zoom for readability of the content of each cell.

	About	Type of learning material	Learning Goals / Vision	Time/Duration	Method	Target Group	Location	Costs	Remarks
De Baas Op het Internet https://debaasopinternet.nl/	De Baas Op Internet, invented and developed by Waag technology & society, Bits of Freedom and Network Democracy, offers teaching modules for children to increase awareness about the internet. Teachers and students work in a playful way on topics such as privacy, encryption, big data and internet structures. Awareness, freedom of choice and ability to act are central here.	Multiple Interactive Teaching Modules, including: • Class discussions • Videos • Working sheets • Hands-on Assignments	Vision: increase awareness of internet. Overall Goal: let children become more digital literate through understanding the network of the internet. Related lesson Goals: Data traces: a look into the business model of internet companies and handlebars of keeping ownership on data that is being collected. (Very related) Algorithms: a look into how algorithms influence behaviour of devices and take opinion.	6 Modules of about 1.5 hours each	Lecture-Based Group Learning Inquiry-Based	Children Aged 10 to 14 years old.	Classroom	Free	Teacher needs to facilitate the modules themselves, but there are teacher instructions.
Workshop Baas in eigen bubbel https://www.beeldengeluid.nl/onderwijs/workshops/vo/baas-in-eigen-bubbel	This workshop, provided by the Dutch institute Beeld en Geluid that has a audiovisual archive and museum, provides information on data trails, filter bubbles, algorithms and privacy. During a interactie and dynamic two hour long session, the students explore the mechanisms of their media use.	Interactive dynamic workshop, including: • online game: Data traces and online filter bubbles (scenario in which data is collected through choices during a trip to a cinema, after which students are confronted with the conclusions based on this data. • Discussion about data traces and privacy • Building an algorithm • Card game data profiling • Discussion: awareness on societal impact	Vision: By keeping media heritage alive, encouraging responsible media use and promoting free speech in text, images and sound, we contribute to a pluralistic, creative and democratic society. From website text: Explore mechanisms of media use, filter bubbles, and know how to deal with them.	2 hours	Expeditionary Game-Based Group Learning	VO Students (Group of max. 30 students)	Den Haag or Hilversum, external is possible for more costs.	295 euro per group	Minimum of 2 supervisors, of which 1 teacher. Studetns need to use their own phone during the workshop.
Edux: Regie over Media https://edux.nl/maatwerk/digitale-geletterdheid/digitalig/ons-aanbod	With the help of the game, students work playfully to learn to think and act consciously and critically at moments in which media lure impulsive and emotional responses and behaviour. With help of various assignments, they learn to think critically about the consequences of recognizable situations in which they come into contact with the media. In addition, targeted 'stop and think' behaviour is encouraged.	1 box that includes 5 sets of the same game, access to an online learning environment. Potential workshop to learn to effectively use the game and online environment.	Learn to think and deal consciously and critical at moments that digital media lure impulsive and emotional behaviour. Learn to think critically about consequences of particular scenario's. Learn to use "stop-and-think-behavior".	No Information. Playable multiple times I expect.	Game-Based Individual Technology based	Higher classes of primary School, and bso.	Classroom	1 Box that includes the 5 card games and acces to learning environment: 285 euro. Including the workshop: 675 euro.	Workshop is meant for the teacher, not for students.
Bits of Freedom: Manipulatie (een korte cursus) https://www.kortecursusmanipulatie.nl/	Based on research of design researcher Dr. Holly Robbins a website with a short course upon the manipulation of social media was made, which also provides a long version with external links and interviews.	Website that provides textual information with use of animations and external links about the ways that social media manipulates users. 1. Censorship 2. profiling 3. Curation power 4. Dark Patterns 5. Self manipulation	Vision: Internet should add to an open and free society. Learning goals from website text: Learn the ways platforms manipulate what you see, like and share, and how this influences your world-view, what information you find and how you feel. Learn to be critical on how these platforms operate.	5-10 minute read (their website only)	Lecture based	Social Media / Internet Users in general	Web	Free	Solely a website, not necessarily teaching material.
www.hoezomeidawijs.nl	Website for youth that is a initiative of Netwerk Mediawijsheid. they work together with plenty organizations that are working on media literacy. This website provides trustworthy information about safe and smart use of internet and social media.	Website with textual information, videos and assignments on topics such as safe internet use, social media, positive and negative things online, trustworthiness and the future. Crafted in such a way that children can independently look around and make assignments, at home or at school.	Vision/Mission: Everyone media literate No specified learning goals.	No exact time, website can be used in several ways, for sources of information, assignments, or discussion tool. It has everything in one place, can be put to practice quickly, trustworthy, challenging and inspiring.	Lecture based Individual	Children 10 to 18 years old	Web	Free	No distinct method or way of learning, website solely provides information that can be put to practice in several ways: in school or at home.
Jongeren mediawijzer met VR https://www.podiumvooronderwijs.nl/mediawijzer-vr	360 degrees videos, made by Podium voor Onderwijs in collaboration with teachers, that helps youth to be more aware on their social media use.	Two 360 degree videos (VR) including lesson material, questions students need to answer and the teacher can use as questions for a class discussion.	More conscious use of social media (chatting & Sexting)	Two videos of around 3 minutes each, with several questions to answer in class. Time for answering these questions and the class discussion can vary.	Lecture-Based Group-based Technology based	Practical education 1-4 VMBO 1-4	Classroom	Free	Learning material is not the best, asking whether students have sent nudes is not really ethical. Moreover, it goes into chatting and sexting.
De Kiesraad in de klas https://kiesraadindeklas.nl/	Course program and serious game that supports students in being aware of dangerous situations online and reporting them to caretakers or professionals. The modules are undermining, cybercrime social media and sexting.	A serious game with various work assignments that spark discussion with students. The game (videos) is playable on a desktop or laptop, not mobile. In this game, the students are a board that advises students in the game about what to do.	Mission: guarantee the safety and wellbeing of children in the continuous changing (online) world. Social Media: awareness on that social media is not always reality and that users may have different intentions.	Maximum 15 to 30 minutes per subject.	Game/Lecture based Group based	Primary School, Groep 7 & 8.	Classroom	Free	Working assignments are not worked out extensively, but more as idea sparking for teachers. Moreover, social media part does not include algorithmic literacy.
The Filter Bubble App https://www.uu.nl/organisatie/pedagogiek-in-diverse-samenlevingen/the-filter-bubble-app	The filter bubble app is a app to use in class in secondary education through which more knowledge, awareness and agency about the functioning of social media is gained. The app pays special attention to the impact of 'filter bubbles' on perspective taking and opinion formation.	Students design their own platform and work on design challenges that are related to filter bubbles. They directly see the influece of their choices in their app. It is designed for use in the classroom in secondary education and consists of individual assignments, group assignments and class discussions.	Build more knowledge, awareness and agency about how social media works, while paying special attention to filter bubbles on perspective and creation of opinions.	Multiple lessons, not specified.	Game based Individual Group	Secundary education	Classroom	In collaboration with Utrecht University, Research	The app is in development and a tool for doing research
Workshop TikTok https://thehmm.nl/education/tiktok/	This workshop, provided by The Hmm a platform an laboratory focused on a better understanding of internet and digital culture of youth 8-16 years, is part of a series of workshops for every age group that supports digital literacy. In this workshop, it is learned how to convey information and how to work with the learning algorithm of TikTok. Custom Made	After an introduction, students are working hands-on on a TikTok documentary, filmed in TikTok. It includes information upon the creation of TikTok, and how the For You Page works and assignments in an interactive manner, after which a practical group assignment is made.	Learn how TikTok started. Learn how the TikTok algorithm works. Learn why a video goes viral. Learn how to deal with the algorithm.	45 minutes	Lecture based Group Based Inquiry based	Secondary Education	Classroom	Not specified	Not clear whether workshop is given by the makers or that instruction is given through which the teacher can provide the workshop themselves.
MediaJungle https://mediajungle.eu/	MediaJungle helps people to learn from, and with each other about (the influence of) media and (responsible) use of it. Their products are being used in over 2000 places in the Netherlands and Belgium in education, healthcare and at home.	MediaJungle provides several products. They have several games upon media literacy, an online platform with serious games, educational material, and masterclasses and trainings, and services in the form of workshops, trainings, parents evenings and guest lessons.	Aim to help people to learn from, and with each other about (the influence of) media and (responsible) use of it. No specified learning goals.	Varying durations.	Game based Group based Technology based Lecture based	Various target groups	Classroom, online, home	Various pricing	Large Company that provides a lot upon media literacy.
Mediabegrip https://mediabegrip.nl/	Mediabegrip, an acitivity of stichting onderwijsdata, is an online course method for media literacy. It provides an interactive course that is based upon actualities around (social) media, coupled with clear learning goals and vocabulary every week.	Their lessons consist of presentations, vocabulary class discussions and/or mutiple assignments.	Goal: Make guide students in the world full of online media, make them aware of the pros and cons and dangers of social media. Each lesson is coupled to media literacy goals. Example lesson: Make students aware of the online world they live in (reflect on media use).	No time Specified	Lecture based Group Based Inquiry based	PO: Groep 5 t/m 8 VO: klas 1 & 2	Classroom	249 to 549 for a year, dependent on starter, basis or premium and number of students.	Teachers need to facilitate it themselves. Long term lesson plan. Focused on Media Literacy, not focused on algorithms
De InternetHelden https://www.bureaujeugdenmedia.nl/de-internethelden/	Course package about online safety and digital citizenship, directed at teenagers (onderbouw VO). It is put together by Bureau Jeugd & Media in collaboration with Safer Internet Centre Nederland at initiative from Google.	The courses is dealing with six themes: • conscious sharing • Don't fall for false • secure your secrets • Doing more kind brings you further • Don't walk around with it • Take care of yourself and regularly new lesson will be made that relate to theme weeks or days like the week against bullying. Each theme consist of text and explanation for a teacher, 3 or 4 lessons per theme en a presentation and worksheets for in class. Focus is on class conversations.	Lessons fit into media literacy of digital literacy from SLO, and use the six competences of the media literacy competence model. No specified learning goals.	• 3 or 4 lessons per theme. • 6 themes, 18 to 24 lessons total. • additional lessons	Lecture based Group based	Teenagers (onderbouw VO)	Classroom	Free, but a teacher session and/or parent evening is optional, for which the school must pay travel costs.	Teachers need to facilitate it themselves. Focused on Media Literacy, not focused on algorithms
MediJa Praat https://www.uitgeverijpica.nl/titels/medija-praat-pica	Medija Praat, sold by Pica: a publisher for accessible books and smart tools for education and created by Jonger, is a tool to help to start a conversation about (social) media with children.	It consists of 54 cards with stimulating questions, a block card and a blanco card. Orange cards can be used from 10 years and older, while pink cards can be used for 13 years and older.	Vision: help to teach students to deal with (online) media.	No time specified	Group based	10 Years and older	Classroom Home	15,95	Focused on Media Literacy, not specified whether algorithms are included.
Digiwijzer https://digiwijzer.nl/oplossingen/digicoach/	Digiwijzer is an organization that aims to make every student digital literate when they graduate High School. They support schools in implementing digital literacy, provide an online learning environment, e-learning for teachers, can give parent nights, teacher workshops or even lessons and workshops themselves.	The most related part is DigiCoaches in de klas , in which Digiwijzer provides lessons in digital literacy for students, but also inspire teachers how they can teach these lessons themselves. Social Media is one of the possible themes. The interactive lessons vary from explanation and group assignments to the use of worksheets.	Vision: aim is to make every student digital literate when they graduate High School. They will be prepared for the digital world through strong guidance by teachers and the correct involvement of parents. Mission: Support each school on their way to structure and independency in digital literacy. Prevent that education is fully dependent on external parties. No specified learning goals.	Varying, based upon the needs of the school	Lecture based Group Based Inquiry based Technology based	Primary school Secondary school	Classroom	Varying	Organization that can provide a lot to schools upon digital, and thus also on media, literacy.

Appendix C - Review of Participatory Design literature

Paper	Key Points	Participatory Design (Technique(s))
Druin A. (1999). Cooperative inquiry: developing new technologies for children with children. In Proceedings of the SIGCHI conference on Human Factors in Computing Systems (CHI '99). Association for Computing Machinery, New York, NY, USA, 1999, 592–599. https://doi.org/10.1145/302979.303166	• Cooperative inquiry is an approach that emphasized the importance of involving children as active participants in the design process. • Based on the theoretical framework (from HCI) a combination of techniques has been adapted and developed to form cooperative inquiry: Contextual inquiry, participatory design and technology immersion.	Through contextual inquiry it was found that children wanted to be storytellers with technology, which was taken into account in PD sessions where low-tech materials were used to prototype storytelling technologies for the future. For these sessions it is important to note that children and adults should work together, no partner should make all the decisions. The selection of low-tech prototyping tools is also critical (dependent on the context).

Guha ML, Druin A, Chipman G, et al. (2004) Mixing ideas: A new technique for working with young children as design partners. In: IDC '04: Proceedings of the 2004 conference on interaction design and children: Building a community, MD,1–3 June 2004, pp. 35–42. New York: Association for Computing Machinery. https://doi.org/10.1145/1017833.1017838	• Mixing ideas is a new cooperative inquiry technique to foster effective collaboration with young children (4-6),
	• It is a framework for merging individual ideas into bigger collaborative ideas, designed to support young children in successfully collaborating during a brainstorming design process.
	• Findings include:
	  • Young children need more structure to collaborate during the brainstorm process.
	  • It is important that each person feels they contributed their ideas. (sharing ideas before mixing).
	  • drawing is an important bridge for young children to mix ideas
	  • physically cutting and pasting offer another bridge for ideas mixing
	  • one-on-oe work between adults and children is an important part of the team process.
	  • Adults need to remember to facilitate the mixing of ideas.
		Mixing Methods:
		It consists of 3 phases:
		• stage 1: each individual child generates individual ideas. observing, drawing and asking to draw a better situation. Adults only annotated the drawings.
		• stage 2: initial mixing of these ideas. First mixing was done with only two or three children through table-size papers and magic markers.
		• stage 3: mixing the big idea. including all children, one big idea was generated, based on the individual and group ideas. Children were demonstrating a need for strucutre so the adults prepared possible roadmaps of idea mixing. Idea was split in manageable pictures to be rearranged and put together with tape as a way to begin thinking of how ideas could be mixed, allowing physically manipulating the idea

Druin, A. (2002). The role of children in the design of new technology. *Behaviour and information technology*, *21*(1), 1-25.	Paper that suggest a framework for understanding the role of children in technology design processes, particularly that support learning. 4 roles for which a historical overview, research, development methods as well as strengths challenges and unique contributions are provided: informant, design partner, user, tester. Design Partner: role is often for children in the method: Idea elaboration. To support the best circumstances for idea elaboration with children, the team of this paper has changed the way they set expectations, brainstorm and reflect as a team. Expectations Expectations must be defined so that all team members/participants can understand their roles: to ensure they believe they are truly partners and neither of them are completely in charge. children need to learn that their ideas are valuable and adults need to learn that children are no longer to be observed and designed for. Practices: no raising hands, use first names not last, informal clothing and equal benefit. common goals and doing collaborative design activities as soon as possible helps in building respect. Brainstorming cooperative inquiry: Participatory Design: low-tech prototyping Team reflection Through journaling and end discussions or debriefing, a reflection on the design process takes place, capturing design history, refocusing efforts if necessary and evaluating what was made as a team. it helps set expectations and change brainstorm practices. What is critical is that we as adults understand why we choose the methods we do in working with children. It can make a difference in what we do in designing new technologies for children.	cooperative inquiry --> Participatory Design --> low-tech prototyping
Iversen, O. S., Dindler, C., & Hansen, E. I. K. (2013). Understanding teenagers' motivation in participatory design. *International Journal of Child-Computer Interaction*, *1*(3–4), 82–87. https://doi.org/10.1016/j.ijcci.2014.02.002	This paper focusses on teenagers in PD, and how they are engaged. A range of tools is identified that designers employed in order to engafe the teenagers: rewards, storytelling, identification, collaboration, endorsement, technology and performance. Next to these tools, a deeper understanding of teenagers' motivation and motives is essential to understanding how tools and techniques may be made to support teenagers' motivation. They propose a Cultural–Historical Activity Theory approach to teenagers' motives and motivation as a framework for understanding how various tools may be employed to engage teenagers in Participatory Design activities. The durability and effect of these different tools for motivation varied significantly. tools to engage teenagers in the PD process are highly dependent on how the tools are appropriated and valued in the relationships between the teenagers, understood in relation to their hierarchy of motives. Hedegaard suggests that the dominating motives found among teenagers typically revolve around their social acceptance and position in relation to peers. Endorsements, performances, and collaboration resonate in various ways with this overarching category of motives.	Motivating tools: • Rewards: all material goods that were given to the teenagers to make the design interventions a convenient and pleasant experience. • Storytelling: how teenagers were provided with an opportunity to communicate their own experiences and accounts to a broader audience. • Technology: an element of digital technology in a session. • Identification: With respect to identification, each teenager was provided with a project identity card, through which they could communicate their commitment to the project to others. • Collaboration: Collaboration with other teenagers, and in general, was used as a tool for engaging the teenagers in the design process. • Endorsements: use of endorsements throughout the entire design process. • Performance: Despite the pressure of performing in front of strangers, and more importantly, close peers, the teenagers were highly motivated to make public presentations.

Appendix D

12 October 2024

Vergelijking leerdoelen & Conceptdoelen Digitale Geletterdheid SLO

In dit document wordt een vergelijking gemaakt tussen de leerdoelen die worden geadresseerd in het Final Master (design) Project (FMP) van Yorn Thijssen, en de conceptdoelen Digitale Geletterdheid (DG) voor de onderbouw voortgezet (speciaal) onderwijs van SLO. Er wordt eerst een overzicht gegeven van de leerdoelen die worden geadresseerd in het FMP, inclusief voorbeelden waaraan te denken valt. Hierna volgt een lijst van aansluitende doelen die voorkomen in de conceptdoelen DG, met daarbij het vergelijkbare doel dat wordt, of vergelijkbare doelen die worden geadresseerd, in het FMP.

Doelen Algoritmische Geletterdheid

In het FMP wordt de term algoritmische geletterdheid gebruikt zoals beschreven door Dogruel et. al. (2021). Letterlijk vertaald is het gedefinieerd als:

"het bewustzijn van het gebruik van algoritmes in online toepassingen, platforms en diensten, weten hoe algoritmes werken, in staat zijn om algoritmische besluitvorming kritisch te evalueren, en de vaardigheden hebben om om te gaan met of zelfs invloed uit te oefenen op algoritmische operaties."[1]

Algoritmische Geletterdheid kan dus worden opgedeeld in vier verschillende, maar niet van elkaar afzonderlijke, doelen:

1. **bewust zijn** van het gebruik van algoritmes in online toepassingen, platforms en diensten (Sociale Media),
2. **weten** hoe algoritmes werken,
3. in staat zijn om algoritmische besluitvorming **kritisch** te **evalueren,**
4. de **vaardigheden** hebben om om te gaan met of zelfs invloed uit te oefenen op algoritmische operaties.

[1] Dogruel, L., Masur, P., & Joeckel, S. (2021). Development and Validation of an Algorithm Literacy Scale for Internet Users. *Communication Methods and Measures*, *16(2)*, 115–133. https://doi.org/10.1080/19312458.2021.1968361

Bij elk doel valt te denken aan:

1. De leerling is zich **bewust** van het gebruik van algoritmes in online toepassingen, platforms en diensten (Sociale Media).

- Bewust zijn dat algoritmes bepalen welke informatie of content je ziet, en dat anderen dus ook andere content zien.
- Bewust zijn van mogelijke filter bubbels.

2. De leerling **weet** hoe algoritmes werken.

- Weten welke data worden verzameld bij het gebruiken van online toepassingen, platforms en diensten (sociale media).
- Weten hoe op basis van verzamelde data een profiel wordt gemaakt en content wordt voorspeld/geselecteerd;

3. De leerling is in staat om algoritmische besluitvorming **kritisch te evalueren**.

- Kritisch zijn op de persoonlijk voorgestelde content en waarom je deze content ziet.
- Bepalen of je bepaalde content wel wilt zien en mogelijk actie ondernemen indien gewenst.
- Nadenken over hoe persoonlijk voorgestelde content jou en anderen kan beïnvloeden.

4. De leerling heeft de **vaardigheden** om om te gaan met of zelfs invloed uit te oefenen op algoritmische operaties/besluitvorming.

- Acties kunnen ondernemen om uit een filter bubbel te kunnen komen.
- Instellingen weten te vinden die persoonlijk voorgestelde content in/uit kan schakelen
- Ervoor kunnen zorgen dat je verschillende content te zien krijgt.

Gerelateerde conceptdoelen Digitale Geletterdheid SLO

In dit overzicht zullen de conceptdoelen digitale geletterdheid die gerelateerd zijn aan algoritmische geletterdheid worden weergegeven, waarbij de vergelijking wordt gemaakt met de doelen algoritmische geletterdheid door tussen haakjes aan te geven aan welk doel de uitwerking is gerelateerd. De doelen die zeer vergelijkbaar zijn, zijn geel gemarkeerd.

Kerndoel 2: Digitale media en Informatie

Doelzin: De leerling navigeert doelgericht in het digitale media- en informatielandschap voor het verwerven en verwerken van informatie.

Het gaat hierbij om:

- Beschrijven hoe sociale media werken en hoe ze de aandacht van gebruikers trekken, vasthouden en beïnvloeden. (***1. Bewustzijn, 2. Weten)***
- Reflecteren op de geschiktheid van gebruikte zoekstrategieën, zoekhulpmiddelen en zoekopdrachten voor het verkrijgen van het gewenste resultaat; (***4. Vaardigheden).***
- Reflecteren op welke wijze eigen kennis, opvattingen en voorkeuren de interpretatie van digitale informatie beïnvloeden. (***3. Kritisch evalueren*)**

Te denken valt aan:

- Zich bewust zijn van mogelijke filterbubbels bij het zoeken naar informatie;

Kerndoel 3: Veiligheid en Privacy

Doelzin: De leerling gaat veilig om met digitale systemen, data en de privacy van zichzelf en anderen.

Het gaat hierbij om:

- Adequaat omgaan met ongepaste content, ongepast gedrag en veiligheidsrisico's in digitale omgevingen. (***4. Vaardigheden***)

Te denken valt aan:

- Je bewust zijn van je recht om te weten welke informatie over je verzameld wordt en waarom. Weten dat instellingen daarover transparant moeten zijn. (aanvulling havo/vwo 3)

Kerndoel 4: Data

Doelzin: De leerling verkent het gebruik van data en dataverwerking.

Het gaat hierbij om:

- Beschrijven van het gebruik van data door bedrijven, instellingen en overheden (***2. Weten***)
- Reflecteren op het gebruik van AI bij het verwerken van data (***3. Kritisch evalueren***)

Te denken valt aan:

- Bespreken dat de groeiende beschikbaarheid van digitale data en de toenemende rekenkracht van digitale systemen het mogelijk maakt om data in steeds meer gevallen te benutten voor analyses en het verbeteren van producten en dienstverlening.
- Reflecteren op het gebruik van AI, waarbij in grote hoeveelheden data naar verbanden en patronen gezocht wordt, zoals in persoonlijke ziekenhuisdossiers, röntgenfoto's etc.

Kerndoel 5: Artificiële Intelligentie

Doelzin: De leerling verkent de mogelijkheden en beperkingen van AI.

Het gaat hierbij om:

- Beschrijven van de rol en invloed van data voor de werking van AI-systemen. (***2. Weten***)
- Herkennen van veelvoorkomende AI-systemen en hun toepassingen door bedrijven, instellingen en overheden. (***1. Bewustzijn***)
- Doelgericht, verantwoord en kritisch interacteren met een AI-systeem. (***3. Kritisch evalueren***)
- Reflecteren op de mogelijkheden en beperkingen van AI-systemen. (***2. Weten. 3. Kritisch evalueren***)

Te denken valt aan:

- Uitleggen dat AI leert op basis van data en dat de kwaliteit van die data van invloed is op de kwaliteit van uitvoer van een AI systeem.
- Begrijpen wat de eigenschappen van een AI-systeem zijn: beslissingen van AI zijn moeilijk of niet te herleiden; resultaten van AI zijn altijd gekleurd door beperkingen in datasets waarmee ze getraind zijn en zijn dus niet altijd correct (aanvulling havo/vwo 3)

Kerndoel 8: Digitale technologie, jezelf en de ander

Doelzin: De leerling maakt weloverwogen keuzes bij het gebruik van digitale technologie en digitale media.

Hierbij gaat het om:

- Evalueren van de invloed van digitale technologie en digitale media op eigen denken en gedrag en op de interactie met anderen. (***1. Bewustzijn. 3. Kritisch evalueren***)
- Rekening houden met eigen fysieke en mentale gezondheid en die van anderen (***3. Kritisch evalueren. 4. Vaardigheden)***
- Reflecteren op en vormgeven van de eigen online identiteit in relatie met anderen. (***3. Kritisch evalueren. 4. Vaardigheden)***

Te denken valt aan:

- Zelf bijdragen aan en beïnvloeden van je online identiteit. Presenteer je jezelf zoals je over wilt komen of op een manier die positief voor je is in je latere leven?

Kerndoel 9: Digitale technologie, de samenleving en de wereld

Doelzin: De leerling analyseert hoe digitale technologie, digitale media en de samenleving elkaar wederzijds beïnvloeden en verkent toekomstscenario's.

Hierbij gaat het om:

- Redeneren over kansen en risico's van het gebruik van digitale technologie in de samenleving vanuit ethisch, sociaal, economisch en ecologisch perspectief. (***2. Weten. 3. Kritisch evalueren***)

Te denken valt aan:

- Inzicht hebben in de economische, ethische en maatschappelijke gevolgen van het grootschalig verzamelen en gebruiken van data door bedrijven en overheden.

Appendix E: Co-Design Protocol

This document includes the protocol for a Co-Design session I will conduct for my M2.2 FMP project at the faculty of Industrial Design at the Eindhoven University of Technology. The goal of the co-design session is to brainstorm and create ideas for activities that contribute to a learning experience on algorithmic literacy for students aged 12 to 16 years old. A total of 1 or 2 teachers and 4 to 6 students participates in one session. Students aged 16+ are involved for ethical reasons and their experience with algorithms and their (critical attitude towards) learning. The session involves a short interview and brainstorming using the Stickies and Mixing Ideas technique in a total of 3 rounds. The planning of the full sessions includes:

- Introduction (Explanation project & planning of the session) (5 minutes)
- Short interview on Algorithmic literacy (5 minutes)
- Explanation of the technique, learning goals and activities (5-10 minutes)
- Individual Idea generation (5 minutes)
- Sharing Ideas (5 minutes)
- Group Idea Generation (10 minutes)
- Sharing Ideas (5 minutes)
- Big Idea (10 minutes)
- Final questions and conclusion (5 minutes)

Introduction (5 minutes)

In this introduction, an explanation of the project will be given as well as an explanation and overview of the co-design session.

Short interview (5 minutes)

A short interview will be conducted in which students and teachers will be asked upon their awareness, knowledge and attitude towards algorithms, with emphasis on social media, and upon what learning activities they like the most and think work best. This interview has a twofold contribution: it can verify the hypothesized algorithmic literacy, and lets them get into the topic of algorithms, social media and learning activities.

Explanation algorithmic literacy technique, learning goals and activities (5 minutes)

Algorithmic literacy and the game (SMB) will be explained, and groups will be made that include 1 teacher and 2 or 3 students. The techniques that are going to be used in the remainder of the session will be explained, which are stickies and mixing ideas. The learning goals that lead to the learning outcome will be described and activities will be shown that can work as stimuli for generating ideas. The view upon a learning experience is mentioned and thus that the goal of the session is to create ideas without the limit of the use of time. The outcome of the ideas will eventually determine the time span of the learning experience.

Individual idea generation (5 minutes)

Participants will be asked to come up with ideas for learning activities that contribute to reaching the learning outcome, with use of the learning goals and activities as stimuli. In this part it is emphasized to come up with as many ideas as possible instead of the best idea, and to generate ideas such that all learning goals are achieved. Emphasized is that time is no limit, the amount of time will be based upon the idea generation.

Sharing Ideas (5 minutes)

After individually generating ideas, the participants share these ideas with the group they are working in.

Group Idea Generation (Big Idea if there is 1 group) (10 minutes)

After sharing, each group is asked to discuss their ideas and to come up with an idea that is a collection of learning activities that will achieve the learning goals best and thus contribute to the learning outcome. They will use a template on a a3 paper.

Sharing ideas (5 minutes, if applicable)

Each group presents their idea of the collection of learning activities and describes how they have come to this idea.

Big Idea (10 minutes, if applicable)

With the use of both group ideas, all participants collectively create one big idea for a collection of learning activities that, according to them, achieves the learning goals the best. They will make use of a new a3 paper for this.

Conclusion and final Questions (5 minutes)

After the creation of the big idea, participants will be asked whether they think this learning experience will also achieve the outcome that students become algorithmic literate in daily life or think that after the experience it will become less over time. Moreover, they will be asked whether they would like to be supported in this and in what way they think this would work best (reflection moments, tips & tricks, discussion sessions with teachers or other students now and then). The session will be concluded by the researcher by thanking the participants for their contribution.

Learning goals:

The student uses algorithmic literacy in daily life, which means that the student:

(1) is aware of the use of algorithms in online applications, platforms, and services.

(2) knows how algorithms work;

(3) can critically evaluate algorithmic decision-making.

(4) has the skills to cope with or even influence algorithmic operations.

Interview Questions:

Short interview:

1. **Awareness & Knowledge of Algorithms:**
    - How familiar are you with the concept of algorithms?
    - Can you describe any examples of algorithms you encounter in your daily life, particularly on social media?
2. **Impact of Algorithms:**
    - How do you think algorithms influence the content you see on social media?
    - Have you ever thought about how algorithms shape what you interact with online?
3. **Attitude Toward Algorithms:**
    - Do you feel that algorithms positively or negatively affect your experience on social media? Why?
    - How important do you think it is to understand how algorithms work?
4. **Learning Preferences:**
    - What types of learning activities (like games, group discussions, or hands-on projects) do you enjoy the most in school?
    - Which learning methods help you understand complex topics better?

For the **final questions** (after creating the big idea):

1. **Effectiveness of Learning Experience:**
    - Do you think this learning experience would help students become more aware and literate about algorithms in their everyday life? Why or why not?
    - How long do you think the impact of this learning experience would last? Would students retain this knowledge or forget it over time?
2. **Support for Ongoing Learning:**
    - Would you like support in maintaining or expanding your understanding of algorithms after the learning experience? If so, what kind of support would be most useful?
        - Examples: Reflection moments, tips & tricks, discussion sessions with teachers or peers.
3. **General Feedback:**
    - Is there anything you would change or improve in the learning activities or the approach we've discussed?

Stimuli for Idea Generation:

- Experiments
- Excursion
- (Group) Project
- Internship
- Playing games
    - Digital Game
    - Physical Game
- Role playing game
- Physical Activity
- Use of Competition
- Use of Scores
- Use of Teams
- Listening to theory
- Interactive lecture
- Presentation/Movie/Documentary
- LessonUp
- Mentimeter
- Drawing
- Building
- Over the line (statements)
- Use of mobile/personal devices
- Group presentation
- Group or discussions with the class
- Reflection
- Assignments
- Doing research

The presentation used in the protocol is shown starting from the following page.

Co-Design

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Wie ben ik?

- Yorn Thijssen (24)
- Sevenum (Limburg)
- Master Industrial Design (TU/e)
- Master Science Education (leraren opleiding, TU/e)

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Voorbereidend Project

Social Media Battle

User Vs Company

- Educatief spel
- Algoritmes in Sociale Media
- 2 rondes: In & Uit een filter bubbel komen
- Algoritmische geletterdheid

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Project doel

Een leerervaring creëren dat de algoritmische geletterdheid van sociale media-algoritmes bij leerlingen van 12 tot 16 jaar versterkt en hen in staat stelt dit in het dagelijks leven toe te passen, waarbij gebruik wordt maakt van het educatieve spel Social Media Battle.

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Vandaag

- Interview (algoritmes & leeractiviteiten)
- Brainstormen Leeractiviteiten & Creeëren Leerervaring (3 rondes: Individueel, in groepen, gezamenlijk)
- Interview (Gecreëerde idee & verdere ondersteuning)

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Interview

Algoritmische geletterdheid

Je bewust zijn van het gebruik van algoritmes in online applicaties, platforms en diensten, weten hoe algoritmes werken, in staat zijn om algoritmische besluitvorming kritisch te evalueren, en de vaardigheden hebben om om te gaan met of zelfs invloed uit te oefenen op algoritmische operaties.

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Algoritmische geletterdheid

1. Je bewust zijn van het gebruik van algoritmes in online applicaties, platforms en diensten (sociale media);
2. weten hoe algoritmes werken;
3. in staat zijn om algoritmische besluitvorming kritisch te evalueren;
4. de vaardigheden hebben om om te gaan met of zelfs invloed uit te oefenen op algoritmische operaties;

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Leerervaring Algoritmische Geletterdheid

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Leerervaring Algoritmische Geletterdheid

Gebruik van algoritmes zonder of met weinig Algoritmische Geletterdheid:

- Niet / weinig bewust
- Geen / weinig kennis
- Niet / amper kritisch
- Geen / weinig vaardigheden

Te denken valt aan:
- Youtube Kids
- Start met Social Media
    - Gebruik van TikTok

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Leerervaring Algoritmische Geletterdheid

- Niet / weinig bewust
- Geen / weinig kennis
- Niet / amper kritisch
- Geen / weinig vaardigheden

Te denken valt aan:
- Youtube Kids
- Start met Social Media
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Leerervaring Algoritmische Geletterdheid

Gebruik van algoritmes zonder of met weinig Algoritmische Geletterdheid:

- Niet / weinig bewust
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- Geen / weinig vaardigheden

Te denken valt aan:
- Youtube Kids
- Start met Social Media
  - Gebruik van TikTok

Leerervaring (activiteiten) die bijdragen aan Algoritmische Geletterdheid:

- Creeëren van Bewustwording
- Verkrijgen van kennis
- Kritisch worden
- Vaardigheden leren

Te denken valt aan:
- Spelen van Social Media Battle

Toepassen van Algoritmische Geletterdheid in het dagelijks leven.

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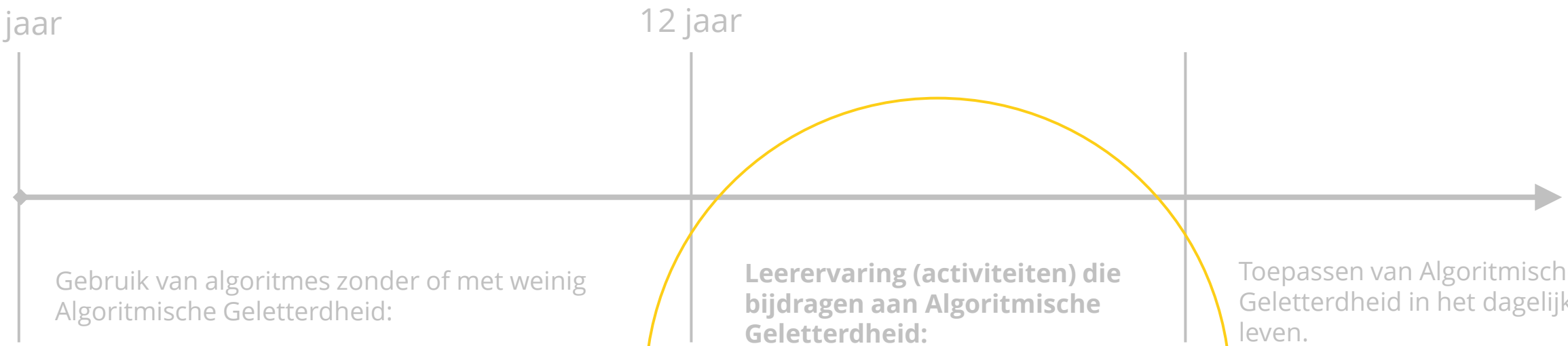
Leerervaring Algoritmische Geletterdheid



Gebruik van algoritmes zonder of met weinig Algoritmische Geletterdheid:

- Niet / weinig bewust
- Geen / weinig kennis
- Niet / amper kritisch
- Geen / weinig vaardigheden

Te denken valt aan:
- Youtube Kids
- Start met Social Media
    - Gebruik van TikTok

Leerervaring (activiteiten) die bijdragen aan Algoritmische Geletterdheid:

- **Creeëren van Bewustwording**
- **Verkrijgen van kennis**
- **Kritisch worden**
- **Vaardigheden leren**

Te denken valt aan:
- **Spelen van Social Media Battle**

Toepassen van Algoritmische Geletterdheid in het dagelijks leven.

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Leerervaring Algoritmische Geletterdheid

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Social Media Battle

User Vs Company

- 2 vs 2
- BeYou platform
- Gebruikers duo vs bedrijfs duo
- Gebruikers duo: in & uit een filter bubbel komen
- Bedrijfs duo: algoritme updaten & data verzamelen

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Situatie:
De filter bubbel van het gebruiker duo zit op 30%.
Het bedrijf duo bezit het Like, en het
Niet-Interessant Algoritme.

1:
Het gebruiker duo drukt op de knop en komt op een vraag locatie.

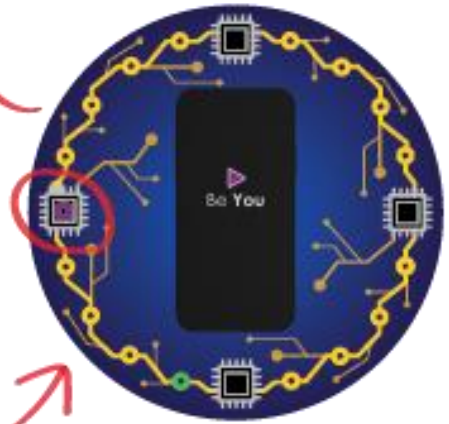
2:
Ze pakken een kaartje met een vraag die wordt gelezen door het ander duo.

3:
Het antwoord is goed en mogen een actie uitvoeren van maximaal 1 data token op het platform.

4:
Ze zien content over honden, maar het doel is een bubbel met content over auto's.

5:
Ze kiezen voor 'niet interessant' dat de bubbel doet stijgen met 10%. Dit kost 1 data token omdat het bedrijfs duo dit algoritme bezit.

6:
Het bedrijfs duo is aan de beurt, drukt op de knop en komt op een actie locatie.



7:
Ze pakken een actie kaart dat hen 60% van een update geeft.

8:
Met deze 60% kiezen ze er voor om het algoritme te updaten met het Share Algoritme.

Co-Design sessie

Brainstormen over leeractiviteiten die bijdragen aan de leerdoelen van Algoritmische geletterdheid.

- Individueel Ideeën bedenken (5 minuten)
  - Ideeën delen (5 minuten)
- Ideeën bespreken en combineren van leeractiviteiten tot een complete leerervaring (10 minuten)
  - Groeps presentatie (5 minuten)
- Gezamenlijk creëren van 1 concrete leerervaring (10 minuten)

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Algoritmische geletterdheid (leerdoelen)

De leerling past algoritmische geletterdheid toe in het dagelijks leven, wat betekent dat de leerling:

1. zich bewust is van het gebruik van algoritmes in online applicaties, platforms en diensten (sociale media);

Te denken valt aan:

- Bewust zijn dat algoritmes bepalen welke content jij ziet, en dat anderen andere content zien.
- Bewust zijn van mogelijke filter bubbels.

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Algoritmische geletterdheid (leerdoelen)

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Te denken valt aan:

- Bewust zijn dat algoritmes bepalen welke content jij ziet, en dat anderen andere content zien.
- Bewust zijn van mogelijke filter bubbels.

2. weet hoe algoritmen werken;

Te denken valt aan:

- Weten welke data worden verzameld.
- Weten hoe op basis van deze data een profiel wordt gemaakt en content wordt geselecteerd;

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Algoritmische geletterdheid (leerdoelen)

De leerling past algoritmische geletterdheid toe in het dagelijks leven, wat betekent dat de leerling:

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- Bewust zijn van mogelijke filter bubbels.

2. weet hoe algoritmen werken;

Te denken valt aan:

- Weten welke data worden verzameld.
- Weten hoe op basis van deze data een profiel wordt gemaakt en content wordt geselecteerd;

3. algoritmische besluitvorming kritisch kan evalueren;

Te denken valt aan:

- Kritisch nadenken over waarom je bepaalde content ziet.
- Kritisch bepalen of je bepaalde content wel wilt zien en mogelijk actie ondermenen.
- Nadenken over hoe de voorgestelde content jou en anderen kan beinvloeden.

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Algoritmische geletterdheid (leerdoelen)

De leerling past algoritmische geletterdheid toe in het dagelijks leven, wat betekent dat de leerling:

1. zich bewust is van het gebruik van algoritmes in online applicaties, platforms en diensten (sociale media);

Te denken valt aan:

- Bewust zijn dat algoritmes bepalen welke content jij ziet, en dat anderen andere content zien.
- Bewust zijn van mogelijke filter bubbels.

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Te denken valt aan:

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3. algoritmische besluitvorming kritisch kan evalueren;

Te denken valt aan:

- Kritisch nadenken over waarom je bepaalde content ziet.
- Kritisch bepalen of je bepaalde content wel wilt zien en mogelijk actie ondermenen.
- Nadenken over hoe de voorgestelde content jou en anderen kan beinvloeden.

4. de vaardigheden heeft om met algoritmes om te gaan of zelfs hun werking te beïnvloeden.

Te denken valt aan:

- weten welke acties je moet ondernemen om uit een filter bubbel te komen.
- Er voor kunnen zorgen dat je verschillende content te zien krijgt.

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Co-Design sessie (Individueel)

Bedenk zo veel mogelijk ideeën voor leeractiviteiten die bij kunnen dragen aan een van de leerdoelen van algoritmische geletterdheid. Probeer voor elk doel minimaal 1 idee te bedenken.

- Zonder limieten (bijvoorbeeld van tijd).
- Alles is mogelijk.
- Doe dit ook individueel, dus in stilte.
- Kijk naar de verschillende activiteiten als inspiratie.

- Dit kan bijvoorbeeld in de vorm: [Leerdoel] door middel van [Leeractiviteit]
  - Meerdere leerdoelen zijn mogelijk

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Algoritmische geletterdheid (leerdoelen)

De leerling past algoritmische geletterdheid toe in het dagelijks leven, wat betekent dat de leerling:

1. zich bewust is van het gebruik van algoritmes in online applicaties, platforms en diensten (sociale media);
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4. de vaardigheden heeft om met algoritmes om te gaan of zelfs hun werking te beïnvloeden.

Te denken valt aan:

- Bewust zijn dat algoritmes bepalen welke content jij ziet, en dat anderen andere content zien.
- Bewust zijn van mogelijke filter bubbels.

Te denken valt aan:

- Weten welke data worden verzameld.
- Weten hoe op basis van deze data een profiel wordt gemaakt en content wordt geselecteerd;

Te denken valt aan:

- Kritisch nadenken over waarom je bepaalde content ziet.
- Kritisch bepalen of je bepaalde content wel wilt zien en mogelijk actie ondermenen.
- Nadenken over hoe de voorgestelde content jou en anderen kan beinvloeden.

Te denken valt aan:

- weten welke acties je moet ondernemen om uit een filter bubbel te komen.
- Er voor kunnen zorgen dat je verschillende content te zien krijgt.

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Voorbeelden

Kritisch Nadenken (leerdoel 3) door middel van **een klasdiscussie (Leeractiviteit).**

Kennis	**Vaardigheden**
Kennis en vaardigheden opdoen (leerdoel 2 en 4) door middel van het spelen van het spel **Social Media Battle**	

Kennis opdoen door een **onderzoekend project** uit te voeren met verschillende modules

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Algoritmische geletterdheid (leerdoelen)

De leerling past algoritmische geletterdheid toe in het dagelijks leven, wat betekent dat de leerling:

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3. algoritmische besluitvorming kritisch kan evalueren;
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Te denken valt aan:

- Kritisch nadenken over waarom je bepaalde content ziet.
- Kritisch bepalen of je bepaalde content wel wilt zien en mogelijk actie ondermenen.
- Nadenken over hoe de voorgestelde content jou en anderen kan beinvloeden.

Te denken valt aan:

- weten welke acties je moet ondernemen om uit een filter bubbel te komen.
- Er voor kunnen zorgen dat je verschillende content te zien krijgt.

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Co-Design sessie (delen van ideëen)

Deel jullie (beste) ideeën met de anderen in jullie groepje

- Ongeveer 1 minuut per persoon

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Co-Design sessie (Groep)

Bespreek jullie ideeën voor leeractiviteiten. Combineer jullie ideeën of verzin samen nieuwe activiteiten en combineer ze tot een complete leerervaring.

- Wees hierin iets specifieker voor elke leeractiviteit.
- Probeer in jullie idee van de leerervaring elk doel minimaal 1 keer te adresseren.
- Plak jullie ideeën op de A3 template

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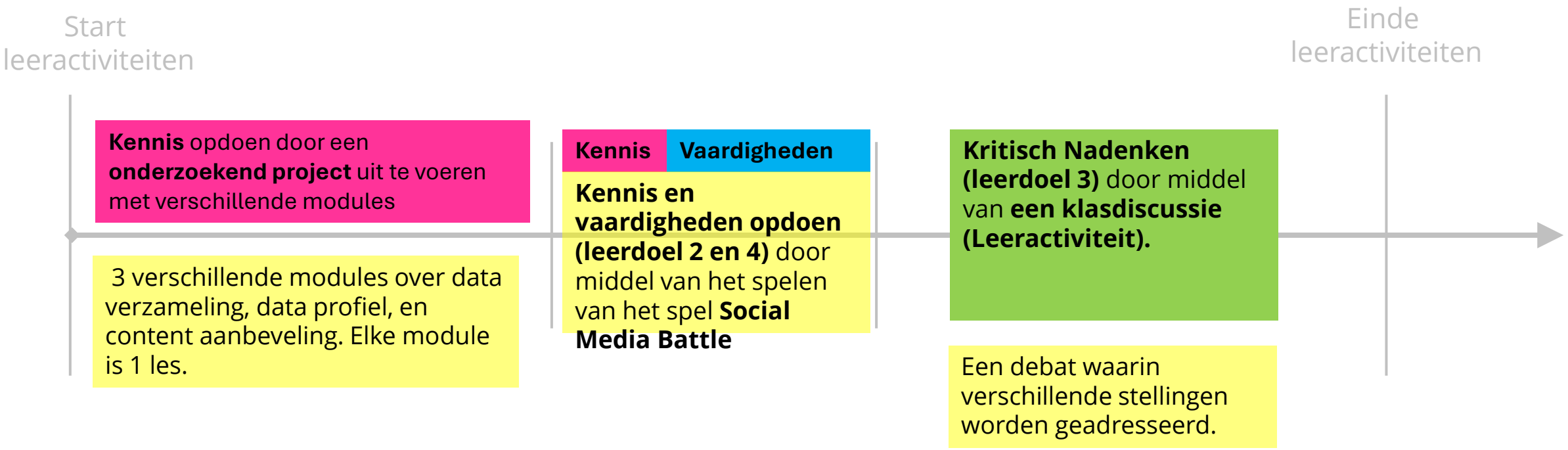
Voorbeeld



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Co-Design sessie (delen van ideëen)

Deel als groep jullie idee van de complete leerervaring met het ander groepje, en hoe jullie tot dit idee zijn gekomen.

- Ongeveer 2,5 minuut per groep

YORN THIJSSEN

Co-Design sessie (Gezamenlijk)

Combineer jullie ideeën van de leeractiviteiten of verzin samen nieuwe activiteiten en combineer ze tot één gezamenlijke complete leerervaring waarvan jullie denken dat die het beste de doelen van algoritmische geletterdheid ondersteunt.

- Wees hierin nóg iets specifieker voor elke leeractiviteit.
- Probeer in jullie idee van de leerervaring elk doel minimaal 1 keer te adresseren.
- Plak jullie ideeën op de A3 template

YORN THIJSSEN

Conclusie / Interview

YORN THIJSSEN

Bedankt!

YORN
THIJSSEN

Appendix F - Co-Design Results & Analysis

Thematic analysis Pre-Interviews

Co-Design ronde 2 **Groep 1**

Presentatie/Film?Docu
Luisteren naar theorie

Spellen spelen
Fysiek spel
Gebruik van scores
Gebruik van competitie
Rollenspel

Excursie

Experimenteren

Opdrachten
(Groeps)Project
Bouwen
Reflectie
Onderzoek doen

Start Leeractiviteiten

Dag 1 | **Dag 2** | **Dag 3** | **Dag 4** | **Dag 5**

Einde Leeractiviteiten

Film met informatie over algoritmes

Uitleg opdracht reflectieverslag

Spelletje waarbij 2 spelers de werking van een algoritme nabootsen. een soort 'wie is het?' waarbij van één van de spelers een profiel wordt opgebouwd. De ene speler is een social media gebruiker, de ander het systeem.

de gebruiker krijgt een aantal keer achter elkaar een selectie afbeeldingen te zien en geeft aan welke hen aanspreekt. Na een aantal rondes spreekt de gebruiker zijn voorkeur niet uit maar raad het systeem (speler 2) welke afbeelding de gebruiker zal kiezen.

Excursie naar social media bedrijf --> informatie over algoritmes (presentatie)

Zelf aan de slag met bijv. TikTok. Kijken wat er gebeurd als je bepaald dingen liked of skipt of als je het voor een bepaalde tijd bekijkt.

Reflectieverslag maken over het gebruik van social media. Door bijvoorbeeld bij te houden welke/hoeveel filmpjes

Na 5 dagen reflectieverslag maken

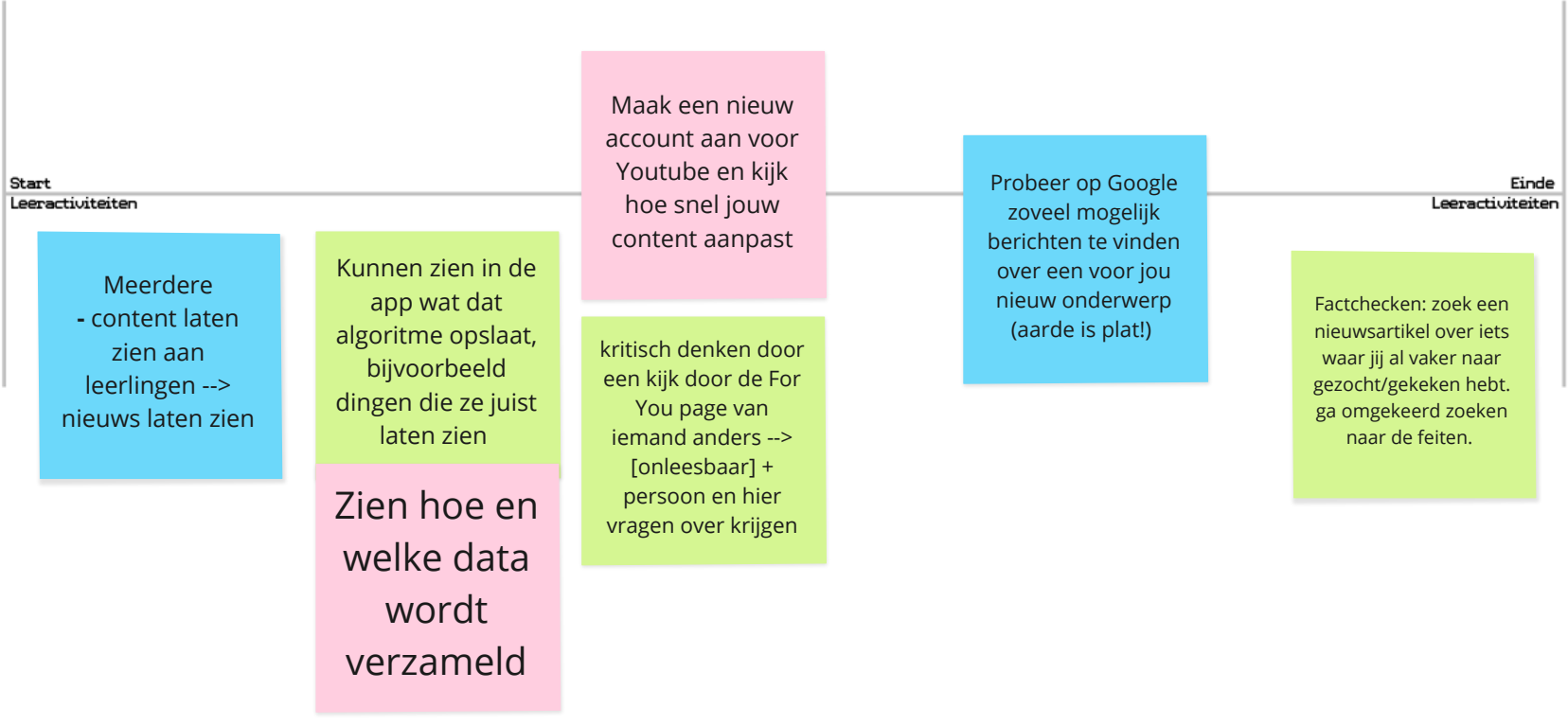
Interactieve lezing/les
gebruik van mobiele apparaten

Vaardigheden

Kennis

Spelen van Social Media Battle

Co-Design ronde 2 **Groep 2**



Co-Design ronde 3 **Gezamenlijke Leerarvaring**

Meerdere
- content laten zien aan leerlingen --> nieuws laten zien

kritisch denken door een kijk door de For You page van iemand anders --> [onleesbaar] + persoon en hier vragen over krijgen

Kunnen zien in de app wat dat algoritme opslaat, bijvoorbeeld dingen die ze juist laten zien

Maak een nieuw account aan voor Youtube en kijk hoe snel jouw content aanpast

Factchecken: zoek een nieuwsartikel over iets waar jij al vaker naar gezocht/gekeken hebt. ga omgekeerd zoeken naar de feiten.

Presentatie/Film?Docu
Luisteren naar theorie

Spellen spelen
Fysiek spel
Gebruik van scores
Gebruik van competitie
Rollenspel

Zien hoe en welke data wordt verzameld

Excursie

Probeer op Google zoveel mogelijk berichten te vinden over een voor jou nieuw onderwerp (aarde is plat!)

Experimenteren

Opdrachten
(Groeps)Project
Bouwen
Reflectie
Onderzoek doen

Dag 1 **Dag 2** **Dag 3** **Dag 4** **Dag 5**

Start Leeractiviteiten

Einde Leeractiviteiten

Film met informatie over algoritmes

Spelletje waarbij 2 spelers de werking van een algoritme nabootsen. een soort 'wie is het?' waarbij van één van de spelers een profiel wordt opgebouwd. De ene speler is een social media gebruiker, de ander het systeem.

Excursie naar social media bedrijf --> informatie over algoritmes (presentatie)

Zelf aan de slag met bijv. TikTok. Kijken wat er gebeurd als je bepaald dingen liked of skipt of als je het voor een bepaalde tijd bekijkt.

Reflectieverslag maken over het gebruik van social media. Door bijvoorbeeld bij te houden welke/hoeveel filmpjes

Uitleg opdracht reflectieverslag

de gebruiker krijgt een aantal keer achter elkaar een selectie afbeeldingen te zien en geeft aan welke hen aanspreekt. Na een aantal rondes spreekt de gebruiker zijn voorkeur niet uit maar raad het systeem (speler 2) welke afbeelding de gebruiker zal kiezen.

Interactieve lezing/les
gebruik van mobiele apparaten

Na 5 dagen reflectieverslag maken

Vaardigheden

Kennis

Spelen van Social Media Battle

Co-Design ronde 2 Groep 1

1. eigen algoritmes vergelijken en discussiëren groepjes)
2. nieuw account en fyp maken van je originele profiel, met account andere fyp's leren
3. evalueren met klas en groep
4. VR spel, steeds dieper in de rabbit-hole, enige manier om er uit te komen is om het te negeren.
5. Social Media Battle

Start
Leeractiviteiten

Einde
Leeractiviteiten

Co-Design ronde 2 Groep 2

Start
Leeractiviteiten

Discussie/interactie over vraagstuk. e.v.t. m.b.v. lessonup

bewustwording door klassikaal (tiktok) account

Simulatie van het gebruik van algoritmes om zo de negatieve en positieve effecten te kunnen beoordelen.

Leerlingen gaan op meerdere manieren reageren op posts. Laat ze merken welke invloed gedrag heeft op hun feed.

Eigen socials bekijken & vergelijken met vriend/vriendin uit de klas a.h.v. werkblad met vragen. Evalueren

- Situaties van problemen waar jongeren tegen aanlopen laten vertellen. (evt. anoniem)
- Als video in de klas.

Bewustwording

Een debat over een stelling met betrekking tot algoritmes op social media om zelf-studie/zelf-onderzoek te motiveren

Vaardigheden

Kennis

Spelen van Social Media Battle

Vaardigheden ontwikkelen door een competitie.

- kijken wie het minste of meeste dezelfde videos krijgt

Oefenopdracht:

2 leerlingen maken een nieuw social media account aan.
- de eerste die iets te zien krijgt van een bepaald onderwerp heeft gewonnen
- Hierin mag de startpagina niet verlaten worden.

Verdieping: Een wedstrijd van een week om een algoritme te bouwen

Other (individual) idea's

Bewustwording van algoritmes door beeldmateriaal

Hoe kom je in en uit een filter bubbel. Dit kunnen ze leren door een nieuw social media account te maken en expres in een bepaalde bubbel te komen en hier ook weer uit te komen

For you page bekijken van een klasgenoot

Nieuw account en fyp maken van je originele profiel, met account andere fyp's leren (evalueren met klas en groep)

bewust zijn dat algoritmes bepalen wat je ziet door een documentaire en een interactieve les

Altijd proberen 2 kanten te benaderen in bv discussies in de klas over populaire topics

Filmpje kijken over hoe TikTok te werk gaat

VR spel, steeds dieper in de rabbit hole. Enige manier oom er uit te komen is om het te negeren.

in groepen of klassikaal discussiëren wat voor gevolgen algoritmes hebben

weten dat anderen andere content voorgeschoteld krijgen door een groepsdiscussie

Stel dat school in een algoritme werkt. je hebt een thema bij O&O en dit thema interesseert je en je ziet dit opeen in andere lessen zoals een boek bij NL of in AK.

algoritme puzzel buddy's

Laat leerlingen in duo's op social media scrollen.
- beiden op hun eigen account
- laat ze merken dat ze allebei andere dingen zien

Eigen algoritmes vergelijken en discussiëren (groepjes)

Met klas een blank account aanmaken. klas kan gegevens invoegen en dan eens kijken hoe snel je in een bubbel komt.

Virus spel, bubbel. interactieve les VR/Blackmirror

Bewust zijn van filter bubbels, experimenteren met een aantal zoekopdrachten in incognito-modus in verschillende groepjes en deze vergelijken met elkaar

Analysis of Ideas

Reflection

Reflectieverslag maken over het gebruik van social media. Door bijvoorbeeld bij te houden welke/hoeveel filmpjes

Na 5 dagen reflectieverslag maken

Visual (Lecture/ Presentation/ Docu/Movie)

bewust zijn dat algoritmes bepalen wat je ziet door een documentaire en een interactieve les

Film met informatie over algoritmes

Meerdere - content laten zien aan leerlingen --> nieuws laten zien

Bewustwording van algoritmes door beeldmateriaal

interactieve les VR/Blackmirror

Filmpje kijken over hoe TikTok te werk gaat

Kunnen zien in de app wat dat algoritme opslaat, bijvoorbeeld dingen die ze juist laten zien

Zien hoe en welke data wordt verzameld

Bewustwording van algoritmes door beeldmateriaal

- Situaties van problemen waar jongeren tegen aanlopen laten vertellen. (evt. anoniem)
- Als video in de klas.

Bewustwording

Discussion

- Situaties van problemen waar jongeren tegen aanlopen laten vertellen. (evt. anoniem)
- Als video in de klas.

Bewustwording

Discussie/interactie over vraagstuk. e.v.t. m.b.v. lessonup

Een debat over een stelling met betrekking tot algoritmes op social media om zelf-studie/zelf-onderzoek te motiveren

weten dat anderen andere content voorgeschoteld krijgen door een groepsdiscussie

in groepen of klassikaal discussiëren wat voor gevolgen algoritmes hebben

Altijd proberen 2 kanten te benaderen in bv discussies in de klas over populaire topics

Comparing algorithms

Eigen socials bekijken & vergelijken met vriend/vriendin uit de klas a.h.v. werkblad met vragen. Evalueren

kritisch denken door een kijk door de For You page van iemand anders --> [onleesbaar] + persoon en hier vragen over krijgen

bewustwording door klassikaal (tiktok) account

For you page bekijken van een klasgenoot

Laat leerlingen in duo's op social media scrollen.
- beiden op hun eigen account
- laat ze merken dat ze allebei andere dingen zien

Eigen algoritmes vergelijken en discussiëren (groepjes)

Other

Probeer op Google zoveel mogelijk berichten te vinden over een voor jou nieuw onderwerp (aarde is plat!)

Excursie naar social media bedrijf --> informatie over algoritmes (presentatie)

Factchecken: zoek een nieuwsartikel over iets waar jij al vaker naar gezocht/gekeken hebt. ga omgekeerd zoeken naar de feiten.

Bewust zijn van filter bubbels, experimenteren met een aantal zoekopdrachten in incognito-modus in verschillende groepjes en deze vergelijken met elkaar

algoritme puzzel buddy's

Verdieping: Een wedstrijd van een week om een algoritme te bouwen

Using Algorithms / Creating new account

Simulatie van het gebruik van algoritmes om zo de negatieve en positieve effecten te kunnen beoordelen.

Maak een nieuw account aan voor Youtube en kijk hoe snel jouw content aanpast

Zelf aan de slag met bijv. TikTok. Kijken wat er gebeurd als je bepaald dingen liked of skipt of als je het voor een bepaalde tijd bekijkt.

Nieuw account en fyp maken van je originele profiel, met account andere fyp's leren (evalueren met klas en groep)

Dit kunnen ze leren door een nieuw social media account te maken en expres in een bepaalde bubbel te komen en hier ook weer uit te komen

Leerlingen gaan op meerdere manieren reageren op posts. Laat ze merken welke invloed gedrag heeft op hun feed.

Stel dat school in een algoritme werkt. je hebt een thema bij O&O en dit thema interesseert je en je ziet dit opeen in andere lessen zoals een boek bij NL of in AK.

Met klas een blank account aanmaken. klas kan gegevens invoegen en dan eens kijken hoe snel je in een bubbel komt.

Game/gamification

Spelletje waarbij 2 spelers de werking van een algoritme nabootsen. een soort 'wie is het?' waarbij van één van de spelers een profiel wordt opgebouwd. De ene speler is een social media gebruiker, de ander het systeem.

VR spel, steeds dieper in de rabbit hole. Enige manier oom er uit te komen is om het te negeren.

Virus spel, bubbel.

de gebruiker krijgt een aantal keer achter elkaar een selectie afbeeldingen te zien en geeft aan welke hen aanspreekt. Na een aantal rondes spreekt de gebruiker zijn voorkeur niet uit maar raad het systeem (speler 2) welke afbeelding de gebruiker zal kiezen.

Oefenopdracht:

2 leerlingen maken een nieuw social media account aan.
- de eerste die iets te zien krijgt van een bepaald onderwerp heeft gewonnen
- Hierin mag de startpagina niet verlaten worden.

Vaardigheden ontwikkelen door een competitie.

- kijken wie het minste of meeste dezelfde videos krijgt

Vaardigheden

Kennis

Spelen van Social Media Battle (3x)

Analysis on Learning Goals, categorized by idea

Film met informatie over algoritmes

bewust zijn dat algoritmes bepalen wat je ziet door een documentaire en een interactieve les

weten dat anderen andere content voorgeschoteld krijgen door een groepsdiscussie

Altijd proberen 2 kanten te benaderen in bv discussies in de klas over populaire topics

Zien hoe en welke data wordt verzameld

Filmpje kijken over hoe TikTok te werk gaat

Een debat over een stelling met betrekking tot algoritmes op social media om zelf-studie/zelf-onderzoek te motiveren

Bewustwording van algoritmes door beeldmateriaal

- Situaties van problemen waar jongeren tegen aanlopen laten vertellen. (evt. anoniem)
- Als video in de klas.

Bewustwording

Discussie/interactie over vraagstuk. e.v.t. m.b.v. lessonup

Eigen algoritmes vergelijken en discussiëren (groepjes)

Excursie naar social media bedrijf --> informatie over algoritmes (presentatie)

interactieve les VR/Blackmirror

Virus spel, bubbel.

1. bewust zijn van het gebruik van algoritmes in online toepassingen, platforms en diensten

For you page bekijken van een klasgenoot

Laat leerlingen in duo's op social media scrollen.
- beiden op hun eigen account
- laat ze merken dat ze allebei andere dingen zien

bewustwording door klassikaal (tiktok) account

2. begrijpen hoe algoritmes werken

Spelletje waarbij 2 spelers de werking van een algoritme nabootsen. een soort 'wie is het?' waarbij van één van de spelers een profiel wordt opgebouwd. De ene speler is een social media gebruiker, de ander het systeem.

Reflectieverslag maken over het gebruik van social media. Door bijvoorbeeld bij te houden welke/hoeveel filmpjes

Na 5 dagen reflectieverslag maken

Bewust zijn van filter bubbels, experimenteren met een aantal zoekopdrachten in incognito-modus in verschillende groepjes en deze vergelijken met elkaar

algoritme puzzel buddy's

Dit kunnen ze leren door een nieuw social media account te maken en expres in een bepaalde bubbel te komen en hier ook weer uit te komen

Maak een nieuw account aan voor Youtube en kijk hoe snel jouw content aanpast

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kritisch denken door een kijk door de For You page van iemand anders --> [onleesbaar] + persoon en hier vragen over krijgen

Kunnen zien in de app wat dat algoritme opslaat, bijvoorbeeld dingen die ze juist laten zien

Nieuw account en fyp maken van je originele profiel, met account andere fyp's leren (evalueren met klas en groep)

Meerdere
- content laten zien aan leerlingen --> nieuws laten zien

Verdieping: Een wedstrijd van een week om een algoritme te bouwen

Probeer op Google zoveel mogelijk berichten te vinden over een voor jou nieuw onderwerp (aarde is plat!)

Eigen socials bekijken & vergelijken met vriend/vriendin uit de klas a.h.v. werkblad met vragen. Evalueren

3. in staat zijn om algoritmische beslissingen kritisch te evalueren

Simulatie van het gebruik van algoritmes om zo de negatieve en positieve effecten te kunnen beoordelen.

Leerlingen gaan op meerdere manieren reageren op posts. Laat ze merken welke invloed gedrag heeft op hun feed.

4. de vaardigheden hebben om om te gaan met of zelfs invloed uit te oefenen op algoritmische processen

Reflectieverslag maken over het gebruik van social media. Door bijvoorbeeld bij te houden welke/hoeveel filmpjes

in groepen of klassikaal discussiëren wat voor gevolgen algoritmes hebben

Factchecken: zoek een nieuwsartikel over iets waar jij al vaker naar gezocht/gekeken hebt. ga omgekeerd zoeken naar de feiten.

Na 5 dagen reflectieverslag maken

Zelf aan de slag met bijv. TikTok. Kijken wat er gebeurd als je bepaald dingen liked of skipt of als je het voor een bepaalde tijd bekijkt.

Vaardigheden ontwikkelen door een competitie.

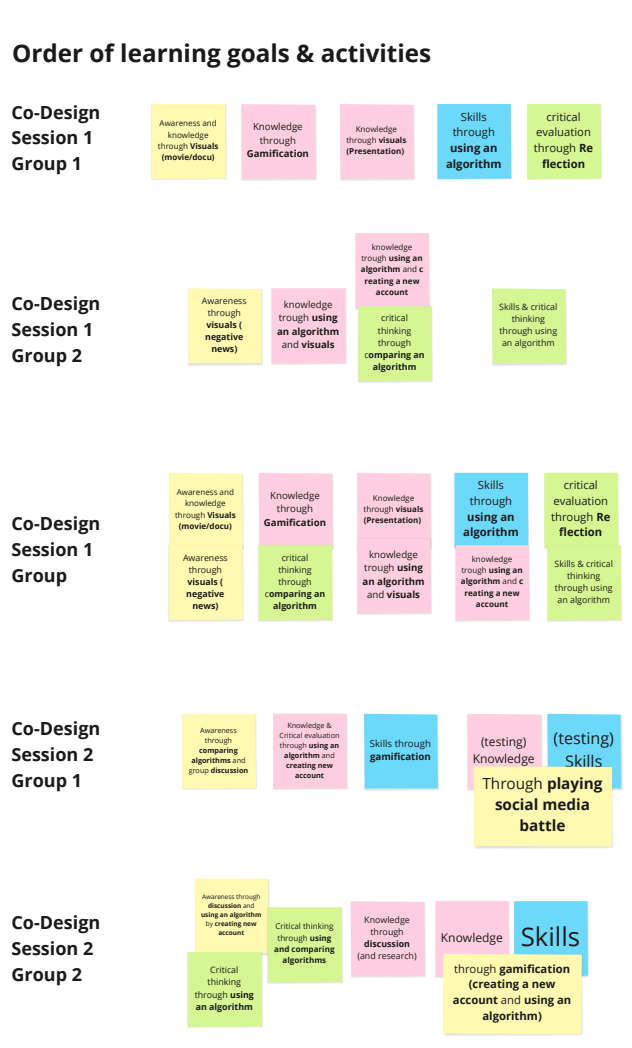
- kijken wie het minste of meeste dezelfde videos krijgt

VR spel, steeds dieper in de rabbit hole. Enige manier oom er uit te komen is om het te negeren.

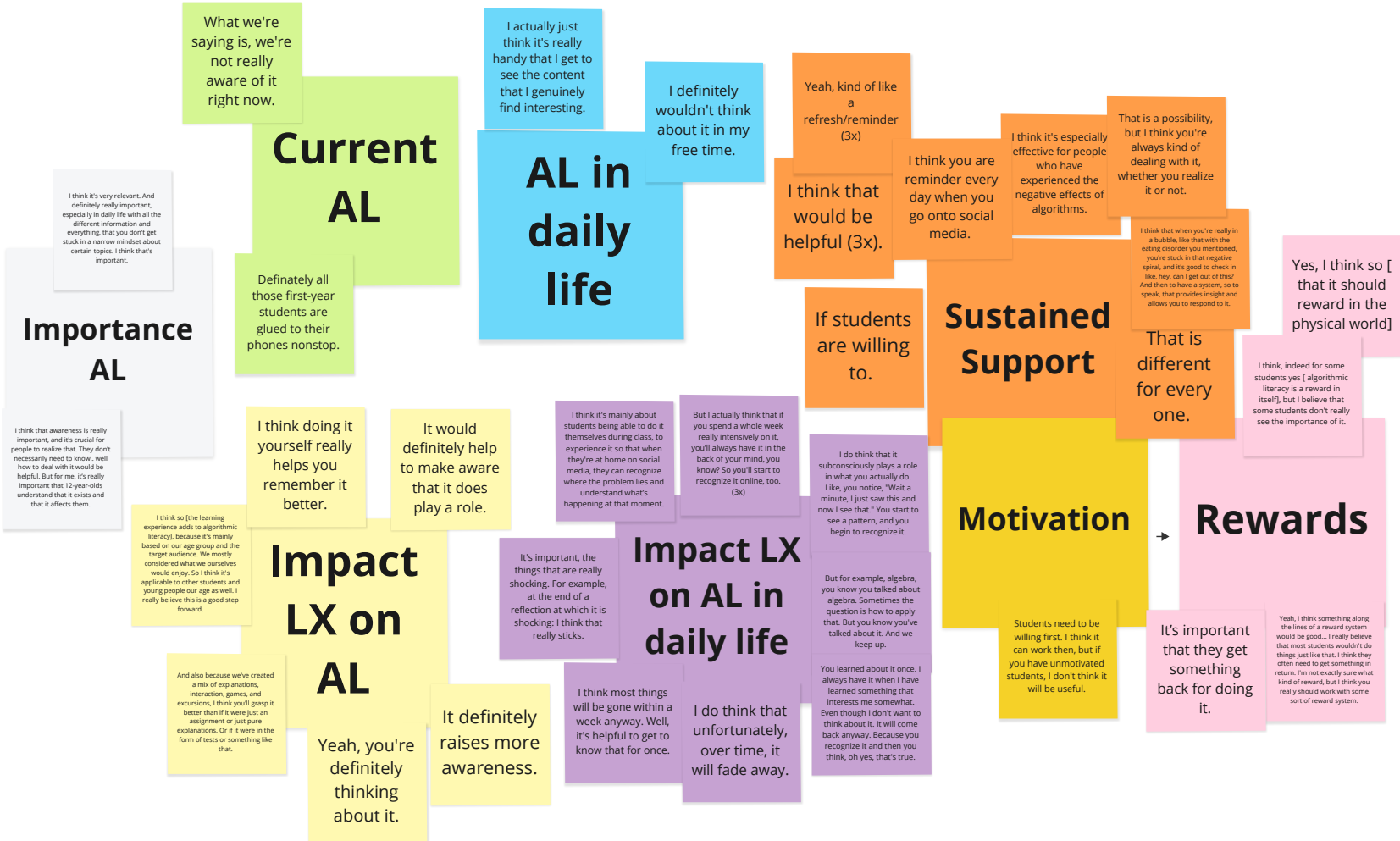
Oefenopdracht:

2 leerlingen maken een nieuw social media account aan.
- de eerste die iets te zien krijgt van een bepaald onderwerp heeft gewonnen
- Hierin mag de startpagina niet verlaten worden.

Order of learning goals & activities



Thematic analysis post-interviews



Appendix G - Final Learning Experience Concept

Zoom for readability of each cell
Following pages also show readable parts of the table

Path	Before Learning Experience		(During) Learning Experience									After Learning Experience
Activities	Social Media Use The learner is using social media in daily life	Introduced The learner is introduced a Learning Experience on Algorithmic Literacy regarding Social Media will take place.	Introduction Listen, look and participate in an interactive introduction on algorithms in social media	Exploring Algorithm Explore the use of an algorithm, see how fast and which behaviour gets one into a filter bubble.	Use of Learning Material Use the learning material to delve deeper into the subject	Discussion Reflective discussion with the class about what was experienced and learned	Comparing Algorithms Compare algorithms/feeds with that of classmates or other people	Use of Learning Material Use the learning material to delve deeper into the subject	Discussion Reflective discussion with the class about what was experienced and learned	Social Media Battle Play Social Media Battle to test the knowledge and skills learned throughout the experience	Closing Closing the learning experience by discussing the game and overall experience with the class	Informed Social Media Use The learner is using social media in daily life while being algorithmic literate
Algorithmic Literacy Learning Goals			Awareness Knowing Critical Evaluation Skills	Awareness Knowing Skills	Awareness Knowing Skills	Awareness Knowing Skills	Awareness Critical Evaluation	Awareness Critical Evaluation	Awareness Critical Evaluation	Awareness Knowing Critical Evaluation Skills	Awareness Knowing Critical Evaluation Skills	Awareness Knowing Critical Evaluation Skills
Learning Cycle	Knowledge Through using Social Media, practical knowledge is gained, but no algorithmic literacy.	Behavior Learners are not looking forward to it. They need to participate because school thinks it is important.	Insight Becoming algorithmic literate is important while using social media extensively. Algorithms can be helpful but also harmful.	Knowledge Learners understand how an algorithm on social media works; what data is collected and how this leads to personalized content.	Skills Learners are able to apply the knowledge about algorithms when using social media.	Behavior Learners will be more conscious of the use of algorithms in social media in relation to themselves.	Knowledge Learners see and learn that other people see completely different things.	Skills Learners are able to think critically about algorithmic decision making and content they see.	Behavior Learners will be more conscious of the use of algorithms in social media in relation with others.	Knowledge & Skill Learners test the knowledge and skills they learned about algorithms in social media	Behavior Learners summarize and conclude their learning on algorithms in social media	Behavior Learners act on social media with the use of their algorithmic literacy.
Learning Objectives			1. I see why I need to be aware of algorithms to become algorithmic literate 2. I recognize why it is necessary to understand how algorithms work 3. I see why I need to be able to critically evaluate algorithmic decision making 4. I see why the skills to influence algorithms are important	1. 1. I know that algorithms are used in a variety of applications, platforms and services 2. I understand how algorithms work 4. I know how to influence algorithmic operations	1. I will use the knowledge to be aware of algorithms in daily life 2. I create a better understanding of algorithmic working 4. I apply the knowledge to influence algorithmic operations	1. I will live a life in which I am more aware of algorithms in daily life 2. I will act on having the knowledge of how algorithms work 4.I will be able to work with algorithmic operations	1. 1. I know that algorithms are used in a variety of applications, platforms and services 3. I know how to be critical towards algorithms and their workings	1. I will use the knowledge to be aware of algorithms in daily life 3. I will create critical thoughts about the use of algorithmic operations	1. I will live a life in which I am more aware of algorithms in daily life 3. I will be and think more critically towards the use of algorithmic operations	Knowledge 1. 1. I know that algorithms are used in a variety of applications, platforms and services 2. I understand how algorithms work 3. I know how to be critical towards algorithms and their workings 4. I know how to influence algorithmic operations & Skill 1. I will use the knowledge to be aware of algorithms in daily life 2. I create a better understanding of algorithmic working 3. I will create critical thoughts about the use of algorithmic operations 4. I apply the knowledge to influence algorithmic operations	1. I will live a life in which I am more aware of algorithms in daily life 2. I will act on having the knowledge of how algorithms work 3. I will be and think more critically towards the use of algorithmic operations 4.I will be able to work with algorithmic operations	1. I will live a life in which I am more aware of algorithms in daily life 2. I will act on having the knowledge of how algorithms work 3. I will be and think more critically towards the use of algorithmic operations 4.I will be able to work with algorithmic operations
Digital Literacy Learning Goals SLO			Kerndoel 2: Beschrijven hoe sociale media werken en hoe ze de aandacht van gebruikers trekken, vasthouden en beïnvloeden. Kerndoel 5: Herkennen van veelvoorkomende AI-systemen en hun toepassingen door bedrijven, instellingen en overheden.	Kerndoel 3: Adequaat omgaan met ongepaste content, ongepast gedrag en veiligheidsrisico's in digitale omgevingen.	Kerndoel 4: Beschrijven van het gebruik van data door bedrijven, instellingen en overheden. Kerndoel 5: Beschrijven van de rol en invloed van data voor de werking van AI-systemen.	Kerndoel 3: Adequaat omgaan met ongepaste content, ongepast gedrag en veiligheidsrisico's in digitale omgevingen. Kerndoel 4: Beschrijven van het gebruik van data door bedrijven, instellingen en overheden. Kerndoel 4: Reflecteren op het gebruik van AI bij het verwerken van data.	Kerndoel 5: Doelgericht, verantwoord en kritisch interacteren met een AI-systeem. Kerndoel 8: Rekening houden met eigen fysieke en mentale gezondheid en die van anderen	Kerndoel 4: Beschrijven van het gebruik van data door bedrijven, instellingen en overheden. Kerndoel 8: Evalueren van de invloed van digitale technologie en digitale media op eigen denken en gedrag en op de interactie met anderen.	Kerndoel 2: Reflecteren op welke wijze eigen kennis, opvattingen en voorkeuren de interpretatie van digitale informatie beïnvloeden. Kerndoel 5: Reflecteren op de mogelijkheden en beperkingen van AI-systemen. Kerndoel 9: Redeneren over kansen en risico's van het gebruik van digitale technologie in de samenleving vanuit ethisch, sociaal, economisch en ecologisch perspectief. Kerndoel 8: Rekening houden met eigen fysieke en mentale gezondheid en die van anderen	Kerndoel 6: afwegen met behulp van computationele denkstrategieën of en zo ja, in hoeverre het doel met een digitaal product bereikt kan worden.	Kerndoel 9: Redeneren over kansen en risico's van het gebruik van digitale technologie in de samenleving vanuit ethisch, sociaal, economisch en ecologisch perspectief.	
Emotions	Neutral / Mixed	Unexcited	Shocked repulsed Eagerness	Explorative Excited Curious	Content	Confidence Safety	Shocked Surprised Compassion	Content	Belonging Confidence	Excited Joyful Happy	Satisfied Happy	Satisfied
Discrete Emotion			Disgust Desire	Desire Happiness	Relaxation	Relaxation Happiness	Disgust Desire Happiness	Relaxation	Relaxation Happiness	Happiness Desire	Happiness	Happiness
Tools / Resources	Smartphone (social media)		Smartphone Interactive Whiteboard (IWB)	Design Smartphone	Working sheets Personal device/laptop		Design Smartphone	Working sheets Personal device/laptop		Social Media Battle Smartphone		Smartphone (social media)
People	Learner Classmates/Friends Parents Teacher	Learner Classmates Teacher	Learner Classmates Teacher (External experts?)									Learner Classmates/Friends Parents Teacher
Location	Home School	School	School									Home School

Path	Before Learning Experience		(During) Learning Experience				
Activities	Social Media Use The learner is using social media in daily life	Introduced The learner is introduced a Learning Experience on Algorithmic Literacy regarding Social Media will take place.	Introduction Listen, look and participate in an interactive introduction on algorithms in social media	Exploring Algorithm Explore the use of an algorithm, see how fast and which behaviour gets one into a filter bubble.	Use of Learning Material Use the learning material to delve deeper into the subject	Discussion Reflective discussion with the class about what was experienced and learned	Comparing Algorithms Compare algorithms/feeds with that of classmates or other people
Algorithmic Literacy Learning Goals							
Learning Cycle	Knowledge Through using Social Media, practical knowledge is gained, but no algorithmic literacy.	Behavior Learners are not looking forward to it. They need to participate because school thinks it is important.	Insight Becoming algorithmic literate is important while using social media extensively. Algorithms can be helpful but also harmful.	Knowledge Learners understand how an algorithm on social media works; what data is collected and how this leads to personalized content.	Skills Learners are able to apply the knowledge about algorithms when using social media.	Behavior Learners will be more conscious of the use of algorithms in social media in relation to themselves.	Knowledge Learners see and learn that other people see completely different things.

Learning Objectives			1. I see why I need to be aware of algorithms to become algorithmic literate 2. I recognize why it is necessary to understand how algorithms work 3. I see why I need to be able to critically evaluate algorithmic decision making 4. I see why the skills to influence algorithms are important	1. 1. I know that algorithms are used in a variety of applications, platforms and services 2. I understand how algorithms work 4. I know how to influence algorithmic operations	1. I will use the knowledge to be aware of algorithms in daily life 2. I create a better understanding of algorithmic working 4. I apply the knowledge to influence algorithmic operations	1. I will live a life in which I am more aware of algorithms in daily life 2. I will act on having the knowledge of how algorithms work 4.I will be able to work with algorithmic operations	1. 1. I know that algorithms are used in a variety of applications, platforms and services 3. I know how to be critical towards algorithms and their workings
Digital Literacy Learning Goals SLO			Kerndoel 2: Beschrijven hoe sociale media werken en hoe ze de aandacht van gebruikers trekken, vasthouden en beïnvloeden. Kerndoel 5: Herkennen van veelvoorkomende AI-systemen en hun toepassingen door bedrijven, instellingen en overheden.	Kerndoel 3: Adequaat omgaan met ongepaste content, ongepast gedrag en veiligheidsrisico's in digitale omgevingen.	Kerndoel 4: Beschrijven van het gebruik van data door bedrijven, instellingen en overheden. Kerndoel 5: Beschrijven van de rol en invloed van data voor de werking van AI-systemen.	Kerndoel 3: Adequaat omgaan met ongepaste content, ongepast gedrag en veiligheidsrisico's in digitale omgevingen. Kerndoel 4: Beschrijven van het gebruik van data door bedrijven, instellingen en overheden. Kerndoel 4: Reflecteren op het gebruik van AI bij het verwerken van data.	Kerndoel 5: Doelgericht, verantwoord en kritisch interacteren met een AI-systeem. Kerndoel 8: Rekening houden met eigen fysieke en mentale gezondheid en die van anderen

Emotions	Neutral / Mixed	Unexcited	Shocked repulsed Eagerness	Explorative Excited Curious	Content	Confidence Safety
Discrete Emotion			Disgust Desire	Desire Happiness	Relaxation	Relaxation Happiness
Tools / Resources	Smartphone (social media)		Smartphone Interactive Whiteboard (IWB)	Design Smartphone	Working sheets Personal device/laptop	
People	Learner Classmates/Friends Parents Teacher	Learner Classmates Teacher	Learner Classmates Teacher (External experts?)			
Location	Home School	School	School			

After Learning Experience

Comparing Algorithms

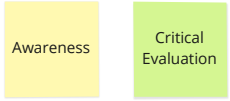
Compare algorithms/feeds with that of classmates or other people

Knowledge

Learners see and learn that other people see completely different things.

Use of Learning Material

Use the learning material to delve deeper into the subject

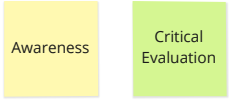


Skills

Learners are able to think critically about algorithmic decision making and content they see.

Discussion

Reflective discussion with the class about what was experienced and learned



Behavior

Learners will be more conscious of the use of algorithms in social media in relation with others.

Social Media Battle

Play Social Media Battle to test the knowledge and skills learned throughout the experience

Knowledge & Skill

Learners test the knowledge and skills they learned about algorithms in social media

Closing

Closing the learning experience by discussing the game and overall experience with the class

Behavior

Learners summarize and conclude their learning on algorithms in social media

Informed Social Media Use

The learner is using social media in daily life while being algorithmic literate

Behavior

Learners act on social media with the use of their algorithmic literacy.

1. 1. I know that algorithms are used in a variety of applications, platforms and services

3. I know how to be critical towards algorithms and their workings

1. I will use the knowledge to be aware of algorithms in daily life

3. I will create critical thoughts about the use of algorithmic operations

1. I will live a life in which I am more aware of algorithms in daily life

3. I will be and think more critically towards the use of algorithmic operations

Knowledge

&

Skill

1. 1. I know that algorithms are used in a variety of applications, platforms and services

2. I understand how algorithms work

3. I know how to be critical towards algorithms and their workings

4. I know how to influence algorithmic operations

1. I will use the knowledge to be aware of algorithms in daily life

2. I create a better understanding of algorithmic working

3. I will create critical thoughts about the use of algorithmic operations

4. I apply the knowledge to influence algorithmic operations

1. I will live a life in which I am more aware of algorithms in daily life

2. I will act on having the knowledge of how algorithms work

3. I will be and think more critically towards the use of algorithmic operations

4.I will be able to work with algorithmic operations

1. I will live a life in which I am more aware of algorithms in daily life

2. I will act on having the knowledge of how algorithms work

3. I will be and think more critically towards the use of algorithmic operations

4.I will be able to work with algorithmic operations

Kerndoel 5: Doelgericht, verantwoord en kritisch interacteren met een AI-systeem.

Kerndoel 8: Rekening houden met eigen fysieke en mentale gezondheid en die van anderen

Kerndoel 4: Beschrijven van het gebruik van data door bedrijven, instellingen en overheden.

Kerndoel 8: Evalueren van de invloed van digitale technologie en digitale media op eigen denken en gedrag en op de interactie met anderen.

Kerndoel 2: Reflecteren op welke wijze eigen kennis, opvattingen en voorkeuren de interpretatie van digitale informatie beïnvloeden.

Kerndoel 5: Reflecteren op de mogelijkheden en beperkingen van AI-systemen.

Kerndoel 9: Redeneren over kansen en risico's van het gebruik van digitale technologie in de samenleving vanuit ethisch, sociaal, economisch en ecologisch perspectief.

Kerndoel 8: Rekening houden met eigen fysieke en mentale gezondheid en die van anderen

Kerndoel 6: afwegen met behulp van computationele denkstrategieën of en zo ja, in hoeverre het doel met een digitaal product bereikt kan worden.

Kerndoel 9: Redeneren over kansen en risico's van het gebruik van digitale technologie in de samenleving vanuit ethisch, sociaal, economisch en ecologisch perspectief.

Shocked Surprised Compassion	Content	Belonging Confidence	Excited Joyful Happy	Satisfied Happy	Satisfied
Disgust Desire Happiness	Relaxation	Relaxation Happiness	Happiness Desire	Happiness	Happiness
Design Smartphone	Working sheets Personal device/laptop		Social Media Battle Smartphone		Smartphone (social media)
					Learner Classmates/Friends Parents Teacher
					Home School

Appendix H

Vergelijking leerdoelen & Conceptdoelen Digitale Geletterdheid SLO

In dit document wordt een vergelijking gemaakt tussen de leerdoelen die worden geadresseerd in het Final Master (design) Project (FMP) van Yorn Thijssen, en de conceptdoelen Digitale Geletterdheid (DG) voor de onderbouw voortgezet (speciaal) onderwijs van SLO. Er wordt eerst een overzicht gegeven van de leerdoelen die worden geadresseerd in het FMP, inclusief voorbeelden waaraan te denken valt. Hierna volgt een lijst van aansluitende doelen die voorkomen in de conceptdoelen DG, met daarbij het vergelijkbare doel dat wordt, of vergelijkbare doelen die worden geadresseerd, in het FMP. Deze vergelijking is geverifieerd door, en aangevuld met inzichten uit een meeting met Sanne van der Velden, teamlid van het kerndoelenontwikkelingsteam digitale geletterdheid.

Doelen Algoritmische Geletterdheid

In het FMP wordt de term algoritmische geletterdheid gebruikt zoals beschreven door Dogruel et. al. (2021). Letterlijk vertaald is het gedefinieerd als:

“het bewustzijn van het gebruik van algoritmes in online toepassingen, platforms en diensten, weten hoe algoritmes werken, in staat zijn om algoritmische besluitvorming kritisch te evalueren, en de vaardigheden hebben om om te gaan met of zelfs invloed uit te oefenen op algoritmische operaties.”[1]

Algoritmische Geletterdheid kan dus worden opgedeeld in vier verschillende, maar niet van elkaar afzonderlijke, doelen:

1. **bewust zijn** van het gebruik van algoritmes in online toepassingen, platforms en diensten (Sociale Media),
2. **weten** hoe (sociale media) algoritmes werken,
3. in staat zijn om algoritmische besluitvorming **kritisch** te **evalueren,**
4. de **vaardigheden** hebben om om te gaan met of zelfs invloed uit te oefenen op algoritmische operaties.

[1] Dogruel, L., Masur, P., & Joeckel, S. (2021). Development and Validation of an Algorithm Literacy Scale for Internet Users. *Communication Methods and Measures*, *16(2)*, 115–133. https://doi.org/10.1080/19312458.2021.1968361

Bij elk doel valt te denken aan:

1. De leerling is zich **bewust** van het gebruik van algoritmes in online toepassingen, platforms en diensten (Sociale Media).

- Bewust zijn dat algoritmes bepalen welke informatie of content je ziet, en dat anderen dus ook andere content zien.
- Bewust zijn van mogelijke filter bubbels.

2. De leerling **weet** hoe algoritmes werken.

- Weten welke data worden verzameld bij het gebruiken van online toepassingen, platforms en diensten (sociale media).
- Weten hoe op basis van verzamelde data een profiel wordt gemaakt en content wordt voorspeld/geselecteerd;

3. De leerling is in staat om algoritmische besluitvorming **kritisch te evalueren**.

- Kritisch zijn op de persoonlijk voorgestelde content en waarom je deze content ziet.
- Bepalen of je bepaalde content wel wilt zien en mogelijk actie ondernemen indien gewenst.
- Nadenken over hoe persoonlijk voorgestelde content jou en anderen kan beïnvloeden.

4. De leerling heeft de **vaardigheden** om om te gaan met of zelfs invloed uit te oefenen op algoritmische operaties/besluitvorming.

- Acties kunnen ondernemen om uit een filter bubbel te kunnen komen.
- Instellingen weten te vinden die persoonlijk voorgestelde content in/uit kan schakelen
- Ervoor kunnen zorgen dat je verschillende content te zien krijgt.

Gerelateerde conceptdoelen Digitale Geletterdheid SLO

In dit overzicht zullen de conceptdoelen digitale geletterdheid die gerelateerd zijn aan algoritmische geletterdheid worden weergegeven, waarbij de vergelijking wordt gemaakt met de doelen algoritmische geletterdheid door tussen haakjes aan te geven aan welk doel de uitwerking is gerelateerd. De doelen die zeer vergelijkbaar zijn, zijn geel gemarkeerd.

Kerndoel 1: Digitale Systemen

Doelzin: De leerling zet digitale systemen functioneel in

Het gaat hierbij om:

- Beschrijven van wat technisch nodig is om digitale systemen te laten werken (en in een netwerk te laten samenwerken) (**2. Weten)**

Kerndoel 2: Digitale media en Informatie

Doelzin: De leerling navigeert doelgericht in het digitale media- en informatielandschap voor het verwerven en verwerken van informatie.

Het gaat hierbij om:

- Beschrijven hoe sociale media werken en hoe ze de aandacht van gebruikers trekken, vasthouden en beïnvloeden. (***1. Bewustzijn, 2. Weten)***
- Reflecteren op de geschiktheid van gebruikte zoekstrategieën, zoekhulpmiddelen en zoekopdrachten voor het verkrijgen van het gewenste resultaat; (***4. Vaardigheden).***
- Reflecteren op welke wijze eigen kennis, opvattingen en voorkeuren de interpretatie van digitale informatie beïnvloeden. (***3. Kritisch evalueren*****)**

Te denken valt aan:

- Zich bewust zijn van mogelijke filterbubbels bij het zoeken naar informatie;

Kerndoel 3: Veiligheid en Privacy

Doelzin: De leerling gaat veilig om met digitale systemen, data en de privacy van zichzelf en anderen.

Het gaat hierbij om:

- Adequaat omgaan met ongepaste content, ongepast gedrag en veiligheidsrisico's in digitale omgevingen. (***4. Vaardigheden***)

Te denken valt aan:

- Je bewust zijn van je recht om te weten welke informatie over je verzameld wordt en waarom. Weten dat instellingen daarover transparant moeten zijn. (aanvulling havo/vwo 3)

Kerndoel 4: Data

Doelzin: De leerling verkent het gebruik van data en dataverwerking.

Het gaat hierbij om:

- Beschrijven van het gebruik van data door bedrijven, instellingen en overheden (***2. Weten***)
- Reflecteren op het gebruik van AI bij het verwerken van data (***3. Kritisch evalueren***)

Te denken valt aan:

- Bespreken dat de groeiende beschikbaarheid van digitale data en de toenemende rekenkracht van digitale systemen het mogelijk maakt om data in steeds meer gevallen te benutten voor analyses en het verbeteren van producten en dienstverlening.
- Reflecteren op het gebruik van AI, waarbij in grote hoeveelheden data naar verbanden en patronen gezocht wordt, zoals in persoonlijke ziekenhuisdossiers, röntgenfoto's etc.

Kerndoel 5: Artificiële Intelligentie

Doelzin: De leerling verkent de mogelijkheden en beperkingen van AI.

Het gaat hierbij om:

- Beschrijven van de rol en invloed van data voor de werking van AI-systemen. (***2. Weten***)
- Herkennen van veelvoorkomende AI-systemen en hun toepassingen door bedrijven, instellingen en overheden. (***1. Bewustzijn. 2. Weten***)
- Doelgericht, verantwoord en kritisch interacteren met een AI-systeem. (***3. Kritisch evalueren***)
- Reflecteren op de mogelijkheden en beperkingen van AI-systemen. (***2. Weten. 3. Kritisch evalueren***)

Te denken valt aan:

- Uitleggen dat AI leert op basis van data en dat de kwaliteit van die data van invloed is op de kwaliteit van uitvoer van een AI systeem.
- Begrijpen wat de eigenschappen van een AI-systeem zijn: beslissingen van AI zijn moeilijk of niet te herleiden; resultaten van AI zijn altijd gekleurd door beperkingen in datasets waarmee ze getraind zijn en zijn dus niet altijd correct (aanvulling havo/vwo 3)

Kerndoel 6: Creëren met digitale technologie

Doelzin: De leerling gebruikt passende strategieën bij (het creëren en) het gebruik van verschillende typen digitale producten.

Hierbij gaat het om:

- afwegen met behulp van computationele denkstrategieën of en zo ja, in hoeverre het doel met een digitaal product bereikt kan worden. (**2. Weten. 3. Kritisch evalueren. 4. Vaardigheden)**

Kerndoel 8: Digitale technologie, jezelf en de ander

Doelzin: De leerling maakt weloverwogen keuzes bij het gebruik van digitale technologie en digitale media.

Hierbij gaat het om:

- Evalueren van de invloed van digitale technologie en digitale media op eigen denken en gedrag en op de interactie met anderen. (***1. Bewustzijn. 3. Kritisch evalueren***)
- Rekening houden met eigen fysieke en mentale gezondheid en die van anderen (***3. Kritisch evalueren. 4. Vaardigheden)***

- ~~Reflecteren op en vormgeven van de eigen online identiteit in relatie met anderen. (***3. Kritisch evalueren. 4. Vaardigheden)***~~

~~Te denken valt aan:~~

- ~~Zelf bijdragen aan en beïnvloeden van je online identiteit. Presenteer je jezelf zoals je over wilt komen of op een manier die positief voor je is in je latere leven?~~

Kerndoel 9: Digitale technologie, de samenleving en de wereld

Doelzin: De leerling analyseert hoe digitale technologie, digitale media en de samenleving elkaar wederzijds beïnvloeden en verkent toekomstscenario's.

Hierbij gaat het om:

- Redeneren over kansen en risico's van het gebruik van digitale technologie in de samenleving vanuit ethisch, sociaal, economisch en ecologisch perspectief. (***2. Weten. 3. Kritisch evalueren***)

Te denken valt aan:

- Inzicht hebben in de economische, ethische en maatschappelijke gevolgen van het grootschalig verzamelen en gebruiken van data door bedrijven en overheden.

Addressed in Learning Experience:

Kerndoel 2: Digitale media en Informatie

Doelzin: De leerling navigeert doelgericht in het digitale media- en informatielandschap voor het verwerven en verwerken van informatie.

Het gaat hierbij om:

- Beschrijven hoe sociale media werken en hoe ze de aandacht van gebruikers trekken, vasthouden en beïnvloeden. (***1. Bewustzijn, 2. Weten)***
- Reflecteren op welke wijze eigen kennis, opvattingen en voorkeuren de interpretatie van digitale informatie beïnvloeden. (***3. Kritisch evalueren*)**

Kerndoel 3: Veiligheid en Privacy

Doelzin: De leerling gaat veilig om met digitale systemen, data en de privacy van zichzelf en anderen.

Het gaat hierbij om:

- Adequaat omgaan met ongepaste content, ongepast gedrag en veiligheidsrisico's in digitale omgevingen. (***4. Vaardigheden****)*

Kerndoel 4: Data

Doelzin: De leerling verkent het gebruik van data en dataverwerking.

Het gaat hierbij om:

- Beschrijven van het gebruik van data door bedrijven, instellingen en overheden (***2. Weten***)
- Reflecteren op het gebruik van AI bij het verwerken van data (***3. Kritisch evalueren***)

Kerndoel 5: Artificiële Intelligentie

Doelzin: De leerling verkent de mogelijkheden en beperkingen van AI.

Het gaat hierbij om:

- Beschrijven van de rol en invloed van data voor de werking van AI-systemen. (***2. Weten***)
- Herkennen van veelvoorkomende AI-systemen en hun toepassingen door bedrijven, instellingen en overheden. (***1. Bewustzijn. 2. Weten***)
- Doelgericht, verantwoord en kritisch interacteren met een AI-systeem. (***3. Kritisch evalueren***)
- Reflecteren op de mogelijkheden en beperkingen van AI-systemen. (***2. Weten. 3. Kritisch evalueren***)

Kerndoel 6: Creëren met digitale technologie

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Hierbij gaat het om:

- Afwegen met behulp van computationele denkstrategieën of en zo ja, in hoeverre het doel met een digitaal product bereikt kan worden. (**2. Weten. 3. Kritisch evalueren. 4. Vaardigheden)**

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Doelzin: De leerling maakt weloverwogen keuzes bij het gebruik van digitale technologie en digitale media.

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- Rekening houden met eigen fysieke en mentale gezondheid en die van anderen (***3. Kritisch evalueren. 4. Vaardigheden)***

Kerndoel 9: Digitale technologie, de samenleving en de wereld

Doelzin: De leerling analyseert hoe digitale technologie, digitale media en de samenleving elkaar wederzijds beïnvloeden en verkent toekomstscenario's.

Hierbij gaat het om:

- Redeneren over kansen en risico's van het gebruik van digitale technologie in de samenleving vanuit ethisch, sociaal, economisch en ecologisch perspectief. (2. Weten. 3. Kritisch evalueren)

Design Use Ideas

Exploring Algorithm 1

"Guess the Bubble" / "Beat the algorithm"

- P2 can try to guess to see if they know it earlier than the algorithm does. So "think as the algorithm". Multiple rounds possible. Switch each round. Bubbels for next round 'are created' this way.

"Get into a Bubble"

- Same design as above.
- P1 & P2 need to get into a bubble.
- they can Guess/try to win when they think they are in the bubble
  - % will be visible to <u>both</u>
- So a loss is also possible

Comparing Algorithms 2

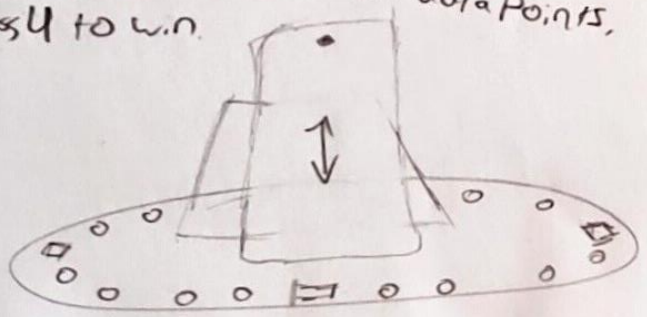
Just Compare

4 rounds, 4 Bubbles

- For x minutes, look at a bubble
- 4 times.
- Compare by use of Learning material

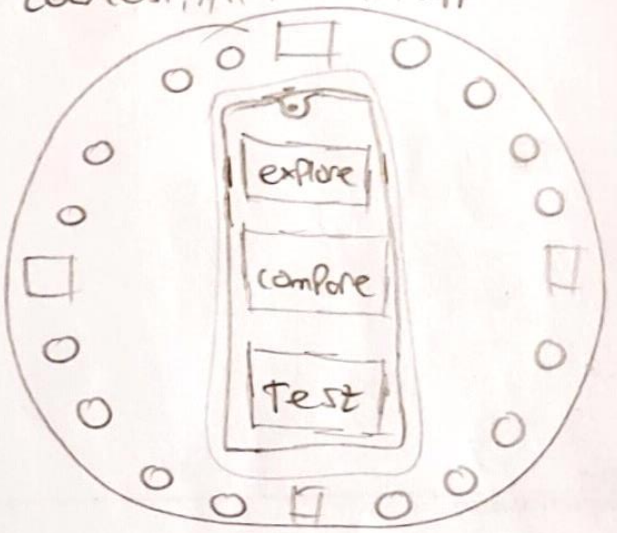
Guess the data

- "think as an algorithm"
  - based on the videos in a feed try to guess the data.
- Categories displayed on data tokens (Huge)
- Place data token in data Points, Guess 4 to win.

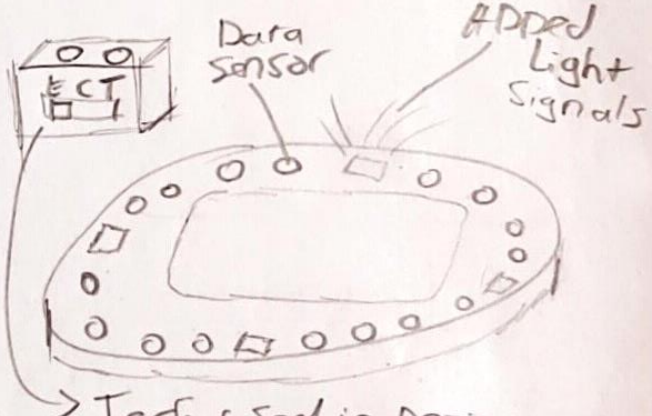


Social Media Battle 3

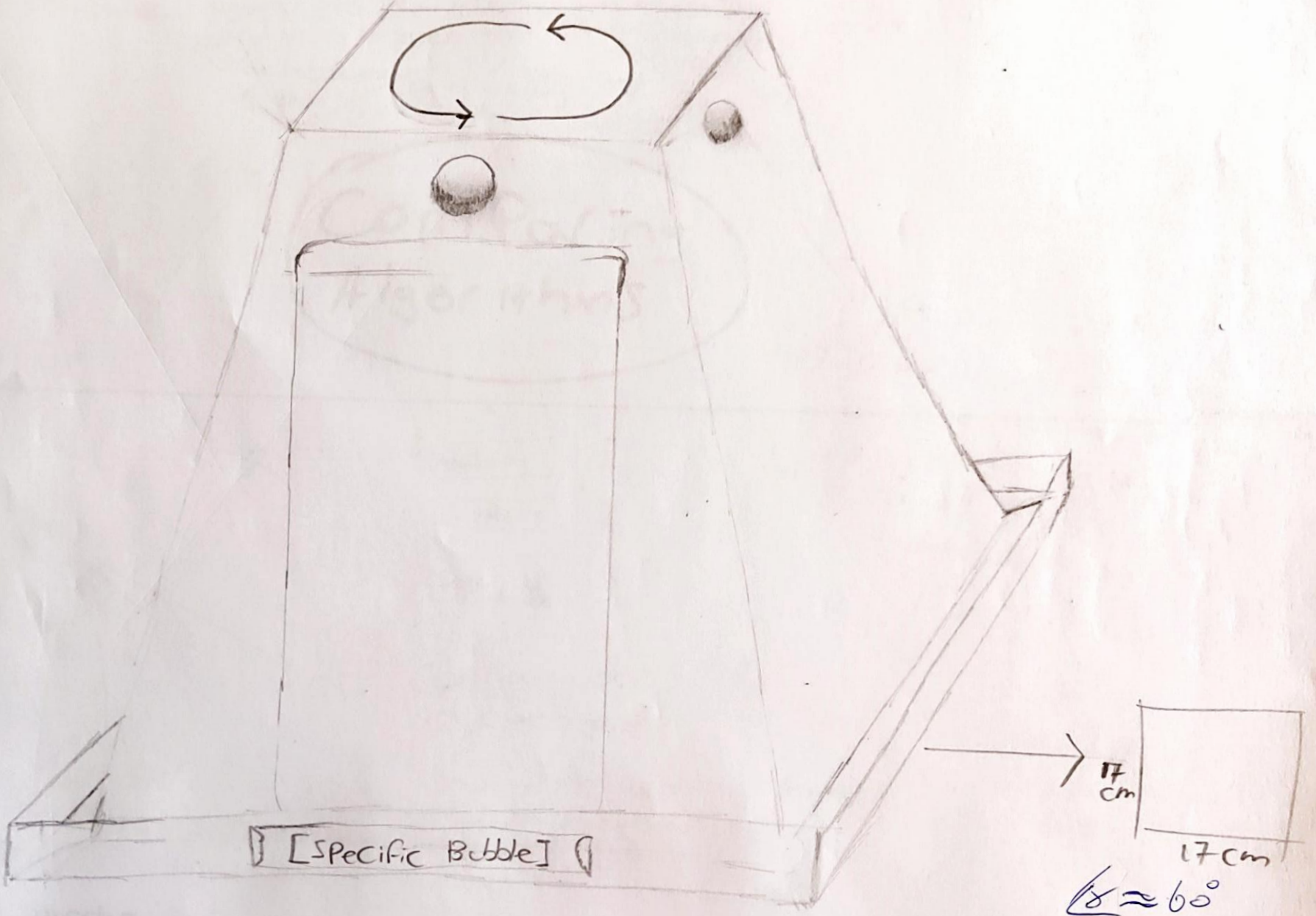
A Low cost, Hi Tech in app



B High developed model.

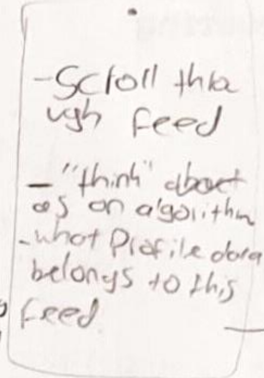


→ Tech used in Design instead of APP.

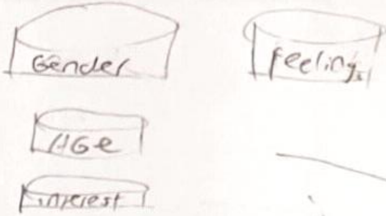

[Specific Bubble]
17 cm
17 cm
α ≈ 60°

Guess the filterbubble "Game"

while 1 person/duo is creating the bubble, the duo against sees them scrolling and tries to guess to what bubble the others are aiming for. "think 'beat' as the algorithm"

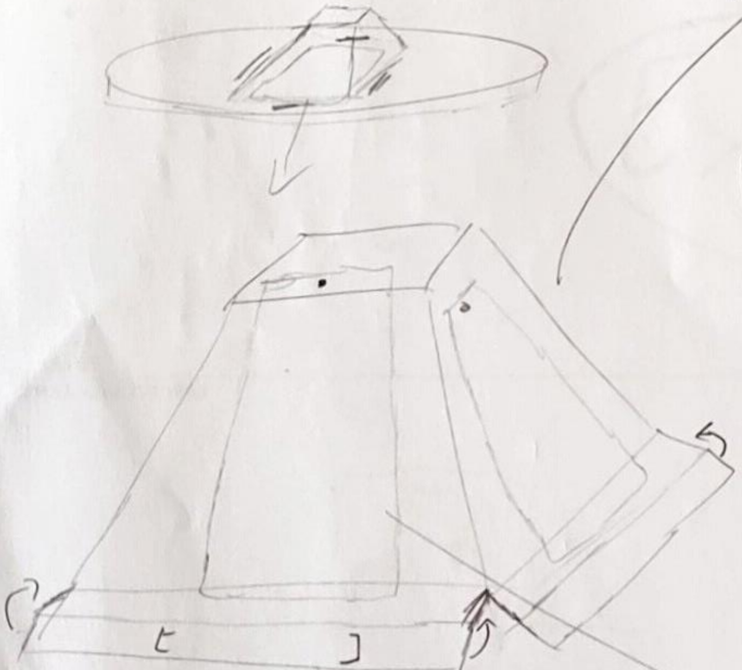


- Scroll through feed
- "think" about as an algorithm
- what profile data belongs to this feed



Addition to the Game

Turns



Comparing Algorithms

- Place them in the design
- once a group has all four All chips start giving light, visible to all that one knows 4 data points.

exploring 1

Comparing 2

Social media battle 3

[specific bubble] → card slot, to do different bubbles in groups.

turn after exploring algorithm

↳ also allows for comparising accounts (Good for integration: option A)

One APP: contain bubbels in each group.

"Create" these bubbles in Phase 1, compare them in Phase 2

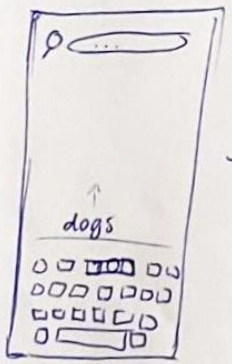
they exist already but they get the feel they create them

Total of 4 feeds/algorithms.

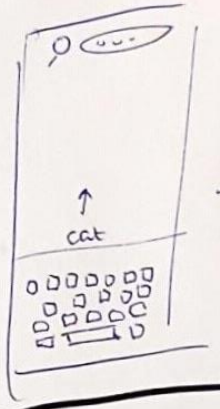
↳ compare while playing the data Game above

4 cards

Exploring Algorithm



- dog
- dog
- dog
- ...
- dog

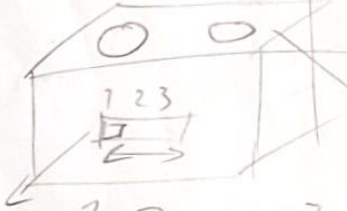


- cat
- dog
- cat
- dog

- Bird
- elephant

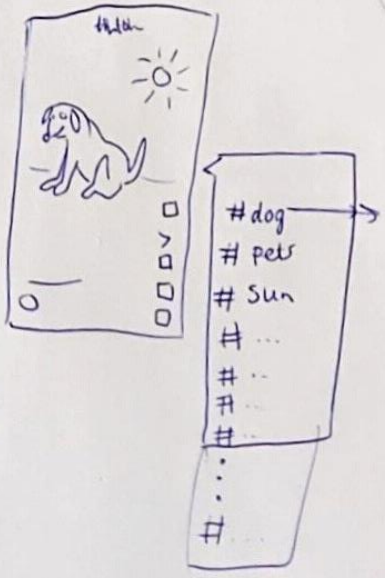
bubble Guess Game

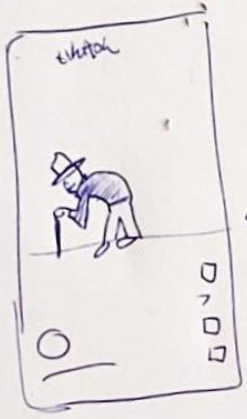
Live feed of other side, they need to Guess which bubble the others are getting into, and press the button. % will be visible.

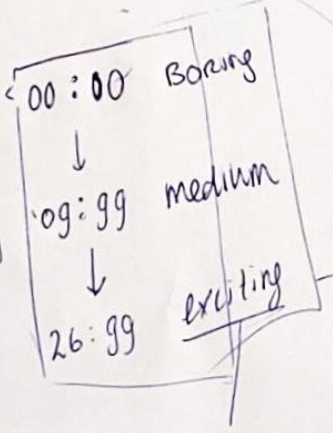


Phase 1, 2 and 3

evt met discussie ; evt uitsluiting op Social media Battle



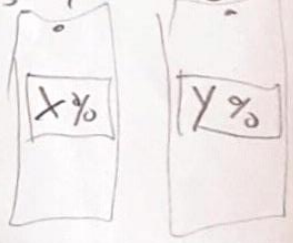




→ use of Hook etc.

Or, "Get into a bubble" Game

- the one who thinks has entered, pushes the button and sees whether this is true by showing %. But other across does also get to see this ?



Appendix J - Stakeholder journeys

Stakeholder journey Option A

This is the journey of a

IT Teacher

An IT Teacher gets the challenge to find something for, or sees the need for teaching students algorithmic literacy on social media algorithms themselves. They want an innovative way to teach students algorithmic literacy.

What are their key goals and needs?

- Goal: Make students algorithmic literate
- Need: Teaching method/material/way to make this happen

What do they struggle with most?

- Ample Teaching material
- No in-house competence/ expertise
- Support from other teachers to create learning material

What tasks do they have?

- Finding a way to teach algorithmic literacy
- Arrange this 'way', set it up for teachers, or contact external experts

What changes for them?

Outcome

Describe how the life and environment of the customer changes once they used the product or service.

What are they able to do now?

- Teach Algorithmic Literacy
- Use the new products in multiple ways
- Inspire teachers to use the product

What can they finally avoid doing?

- Ignore the influence of social media amongst students
- ongoing search for teaching this subject
- Stressing about finding time to make learning material

What changed in their environment?

- More informed (read: algorithmic literate) students
- Better conversations between students and teachers
- More use of the products instead of other learning material.

Journey Steps Which step of the experience are you describing?	**Discovery** Why do they even start the journey?	**Registration** Why would they trust us?	**Onboarding and First Use** How can they feel successful?	**Service** How can they be supported?	**Sharing** Why would they invite others?
Actions What does the customer do? What information do they look for? What is their context?	Other teachers mention specific problems with students and social media Need for teaching Algorithmic Literacy Teacher finds the website, learning experience and product	Contact Digiwijzer for more info and quote Deliberate with and finding (financial) support from school board Contact Digiwijzer, and choosing date for LE	LE (introduction workshop) takes place Teachers participate in LE, get inspired and learn ways to use the product Teachers learn to use the app Excites school to buy the product + license Contacting digiwijzer to buy the X amount of the products including package X of the service.	Receiving the products by post. Notifying teachers the products are available for use Helping teachers with the application (licence) Teachers use the products in own lessons Buy the licence every year	show other schools how AL can be reached
Needs and Pains What does the customer want to achieve or avoid? *Tip: Reduce ambiguity, e.g. by using the first person narrator.*	I want students to become algorithmic literate I need a way to teach algorithmic literacy I want to avoid boring learning material I want to avoid bothering teachers with learning this subject	I need more information and the quote for X amount of products including Licence students and I need to experience the product and inspire teachers for it's use I need support from the school board and financial support I want to avoid it being too expensive or too much work	I need students and teachers to become excited about it's use I want the board to see that it adds value to our schools curriculum, teachers and students I want to avoid the board seeing this as a bad buy I want to avoid teachers need to do much for integration into their lessons	I need teachers to actively ask for the use of the product I want the product, it's use, and helping other teachers to cost me little time. I want to avoid the products to be a bad buy, to end up in storage	I want to inspire other schools what we do with the products The products can be used multitiple times and in various forms I want to avoid other schools to struggle as we did
Touchpoint What part of the service do they interact with?	Website, gathering information on the learning experience and product.	Contact with digiwijzer team Reading extra information and Quote	Participation in the LE Using the product in various ways/phases Using the Application Contact with Digiwijzer	Products Application	Website Products Application
Customer Feeling What is the customer feeling? *Tip: Use the **emoji app** to express more emotions*	Stressing, searching and thinking about how to teach AL Blown away by the amazing product and service	Excited but not sure this will be supported	Happy with the LE, excite for and inspired by the product its multifunctional use	Very happy and celebrating the integration and use of the product throughout the school.	Praising the product and service
Backstage					
Opportunities What could I improve or introduce?	Improve media appearance	Make as much information available in a clear and concise manner on the website, including info for school boards, so the choice can be easily made to buy the product and licence.	The introduction workshop does not need to address every learning goal and do every possibility that can be done with the product. It needs to leave excitement to use and achieve learning goals through buying the product and service	Digiwijzer has an 'update' team that updates and maintains the service (app) for the game. They weekly come woth new video's/filter bubbles, trends, accounts etc. The application has a method to log in for students, for each school, click on their class and fill in their name. It counts the available slots for students. also a method to create the groups en match up for the phases and bubbles.	Increase word to mouth and media presence

Stakehoulder journey Option B

This is the journey of a

IT Teacher

An IT Teacher gets the challenge to find something for, or sees the need for teaching students algorithmic literacy on social media algorithms. They want an innovative way to teach students algorithmic literacy but do not have the expertise or competence to do so.

What are their key goals and needs?

- Goal: Make students algorithmic literate
- Need: External expertise and teaching on algorithmic literacy

What do they struggle with most?

- No in-house competence/ expertise
- Ample Teaching material
- Actually teaching the subject

What tasks do they have?

- Find External competence to teach algorithmic literacy
- Contact them and arrange teaching for students

What changes for them?

Outcome

Describe how the life and environment of the customer changes once they used the product or service.

What are they able to do now?

- Students: make better use of algorithms in/and social media
- School/teacher (s): empathize with students social media experience

What can they finally avoid doing?

- Ignore the influence of social media amongst students
- Ongoing search for teaching this subject
- Stressing about finding time to make learning material

What changed in their environment?

- More informed (read: algorithmic literate) students
- Better conversations between students and teachers

Journey Steps Which step of the experience are you describing?	**Discovery** Why do they even start the journey?	**Registration** Why would they trust us?	**Onboarding and First Lesson** How can they feel successful?	**Full Learning Experience** How do they experience the rest of the lessons?	**Sharing** Why would they invite others?
Actions What does the customer do? What information do they look for? What is their context?	Other teachers mention specific problems with students and social media Need for teaching Algorithmic Literacy Teacher finds the website, and information on custom series of lessons	Contact Digiwijzer for more info Deliberate with and finding (financial) support from school board Contact Digiwijzer, and creating custom series of lessons	First lesson takes place Teacher and students experience the introduction and first phase Looks forward to the next lesson	Present at all lessons Helping digiwijzer during the lessons (helping students, keep order) Close contact with digiwijzer for the lessons Has time to for and to focus on own lessons	Tell other schools how good digicoaches teach AL
Needs and Pains What does the customer want to achieve or avoid? *Tip: Reduce ambiguity, e.g. by using the first person narrator.*	I want students to become algorithmic literate I need external expertise to teach the subject I want to avoid bothering teachers to learn this subject in order to teach it	I need more information and a direction of how much it is going to be I want to avoid arranging this being too much work. I need support from the school board and financial support I want to avoid it being too expensive	I need students and teachers to become excited about the lessons I want to see that the students become more algorithmic literate I want to avoid the school needs to adapt their lessons schedule too much	I need the students to be motivated each lesson I want to have time for my own lessons besides helping during these lessons I want to avoid the digicoaches have to keep order all the time	I want to tell other schools how good this custom learning experience is I want to avoid other schools to struggle teaching AL as we did
Touchpoint What part of the service do they interact with?	Website, gathering information on digicoaches in de klas and the topic	Contact with digiwijzer team Extra information on the possibilities	Participation in the LE Using the product and Application Welcome digiwijzer on school and ongoing contact with them	Participation in the LE Products & Application Welcome digiwijzer on school and ongoing contact with them	Website
Customer Feeling What is the customer feeling? *Tip: Use the **emoji app** to express more emotions*	😕 Stressing, searching for external people to teach AL 😱 Blown away by the possibilities of digicoaches in de klas	😬 Excited but not sure this will be supported	😁 Happy with the first lesson of the LE, excited for the next lessons	🥳 Very happy with the lessons and the progress students are making	🙌 Praising the learning experience
Backstage					
Opportunities What could I improve or introduce?	More (media) appearance on AL being a new topic for digicoaches in de klas	Make as much information available in a clear and concise manner on the website, including info for school boards. Emphasize the custom-made lessons series on this topic, including the additional learning material.	The LE is given by digicoaches and (custom series of lessons) needs to be adjustable to the wishes of the school (which learning goals, which uses of the product, and what kind of additional learning material).	Digiwijzer has an 'update' team that updates and maintains the application and cards for the game. They weekly update new video's/filter bubbles, trends, accounts etc. The design is high end and makes use of technology and physicality for higher student motivation. The application is meant for use in the lessons given by digicoaches, and is not usable without their presence.	Increase word to mouth and media presence

Appendix K

Learning Experience Game Ideas User-test protocol

This document is a protocol for user testing several game ideas that are designed to be included in the learning experience on algorithmic literacy on social media algorithms. The goal of testing is to gather information on participant's emotional response to each game, the games potential to benefit learning and how they fit into the learning experience, and the overall experience of playing the games.

The games will be part of the learning experience on algorithmic literacy of social media algorithms. This learning experience consists of four phases: an introduction, exploring algorithms, comparing algorithms, and testing. In the user-test a total of 6 games will be tested of which 3 are made for exploring and 3 of comparing. All games are made smaller and shorter compared to how they would be really integrated and fully designed.

A minimum of 2 participants are required for participation in the user test. Participants are asked to play the games one by one, lasting a maximum of 5 minutes. After each game, they will fill in a questionnaire that measures their emotional response and asks them several questions about the game they just played. After participants are done playing every game, they will participate in a very short interview.

Games overview:

Explore

Explore games are designed to explore the mechanisms of a social media algorithm. How does such an algorithm work? What behavior on a platform causes individuals to enter a filter bubble?

Guess the bubble

This game is played with two or four players (two teams of two). One player or team has to enter a filter bubble while the other player or team has to guess which bubble they try to enter before the algorithm knows.

Player 1 attempts to enter a content bubble by performing actions on the platform.

Player 2 watches the actions and has to guess which bubble player 1 wants to end up in before the algorithm knows. Player two has 2 attempts to guess the correct bubble.

The game is played multiple rounds and players/teams swap roles each round. The player who guesses the filter bubble more often before the algorithm wins this game.

Enter the bubble (time)

This game is played with two or four players (two teams of two). The goal is to enter a filter bubble before the other player or team does by performing actions on the platform.

Both players or teams try to get more than X% into a content bubble as quickly as possible. If they think they have reached this bubble they can check the percentage. But they have to be careful since this can only be done twice, and the other player or team also sees the percentage. When this is 80% or more and the percentage of the player or team who checked is not, then they lose this round.

Enter the bubble (data)

This game is played with two or four players (two teams of two). The goal is to enter a filter bubble before the other player or team does by performing actions on the platform.

Every action a player or team performs costs an specific amount of data. The player or team who reaches the bubble with the most data still in possession wins. So it's not just about who reaches the bubble the fastest, but also who does so most strategically.

If they think they have reached this bubble they can check the percentage. But they have to be careful since this can only be done twice, and the other player or team also sees the percentage. When this is 80% or more and the percentage of the player or team who checked is not, then they lose this round. If both of the teams/players entered the bubble, the team with most data in possession wins.

Compare

Compare games are designed to compare feeds with each other. What are differences between the feeds of individuals, and what are potential consequences of having such a feed, in relation to themselves or in society?

Guess the data

This game is played with at least two and can be played by up to four people (two duo's or 4 single players). The goal is to think as an algorithm and guess what data an algorithm has to have created a specific feed. What data does the algorithm have such that it has created this feed?

Players can choose from several categories of data. If they get 4 different types of data from the feed the game is paused, and the information is checked. Are they correct? Then they win this round. This game is played multiple rounds (4 different feeds).

Critical View

Critical View is not necessarily a game, but more a discussion tool in which players can earn awards for the final game. Players will critically examine, discuss and compare four different feeds.

During and after viewing each feed players will be asked questions to discuss with each other. They have to be as critical as possible, because they can earn data for the end game.

After viewing each feed, they jointly decide who was the most critical and answered the questions the best. This person earns data for, and therefore has an advantage in, the end game.

Guess the Next

This game is played with at least two and can be played by up to four people. Players need to think like an algorithm and choose which video they would recommend after watching a feed?

Players need to watch the 4 feeds one by one and think about which video will be recommended next after seeing each feed.

After each feed players select one of the four videos, each video belonging to one feed. After viewing each feed, they can make final changes in the overview. Everything right? Then the players wins this game.

User test Protocol

Introduction (5 minutes)

Introduce the participants briefly to the topic, social media battle, the learning experience and the current games.

Testing games (around 6 x 5 minutes = 30 minutes)

Each game is introduced and played by participants after which they fill in a questionnaire. This questionnaire contains the Discrete Emotions Questionnaire and a couple of open questions.

Interview (5 – 10 minutes)

Participants will be interviewed after having played all the game options. They will be asked upon the most enjoyable game, the game that has most potential to learn from, and their integration into the full learning experience.

Questionnaire questions:

Please indicate your response using the scale provided.

While playing the game [game name] to what extent did you experience these emotions?

1	2	3	4	5	6	7
Not at all	Slightly	Somewhat	Moderately	Quite a bit	Very much	An extreme amount

Anger (Ag)
Wanting (Dr)
Dread (Ax)
Sad (S)
Easygoing (R)
Grossed out (Dg)
Happy (H)
Terror (F)
Rage (Ag)
Grief (S)
Nausea (Dg)
Anxiety (Ax)
Chilled out (R)
Desire (Dr)
Nervous (Ax)
Lonely (S)
Scared (F)
Mad (Ag)
Satisfaction (H)
Sickened (Dg)
Empty (S)
Craving (Dr)
Panic (F)
Longing (Dr)
Calm (R)
Fear (F)
Relaxation (R)
Revulsion (Dg)
Worry (Ax)
Enjoyment (H)
Pissed off (Ag)
Liking (H)

(Ag = Anger items, Dg = Disgust items, F = Fear items, Ax = Anxiety items, S = Sadness items, Dr = Desire items, R = Relaxation items, H = Happiness items.)

What did you think about the game in general?
Do you think (a full version of the game) could help students aged 12 to 16 explore and understand the mechanisms of algorithms in social media? Why (not)?

Do you think (a full version of the game) could help students aged 12 to 16 compare feeds and their impact on individuals and on society?

Interview questions

Considering the three *explore* games:

- Which was the most fun game to play and why?
- From which game would students learn most and why?
- Which game would best fit within the context of the learning experience and why?

Considering the three *compare* games:

- Which was the most fun game to play and why?
- From which game would students learn most and why?
- Which game would best fit within the context of the learning experience and why?

- Do you have any suggestions for or feedback upon the games or their integration into the learning experience?

Appendix L
User-test Results, Analysis & Conclusions

Results from the Discrete Emotions Questionnaire

	Game 1 (Guess the Bubble)	Game 2 (enter the bubble time)	Game 3 (enter the bubble data)	Game 4 (Guess the data)	Game 5 (Critical View)	Game 6 (Guess the next)
Anger	1.50	1.13	1.13	1.75	2.25	1.50
Disgust	1.00	1.00	1.00	1.33	1.42	1.21
Fear	1.13	1.25	1.04	1.08	1.42	1.17
Anxiety	1.67	1.75	1.54	1.71	2.04	1.71
Sadness	1.29	1.25	1.17	1.21	1.50	1.17
Desire	2.08	2.13	1.96	1.71	1.54	1.33
Relaxation	4.08	3.21	3.42	3.38	2.38	3.13
Happiness	3.08	3.08	2.79	2.75	2.29	3.13

Results Questions Forms & Additional Notes, per game.

Game 1: Guess the Bubble

What did you think about the game in general?

P1: Fun but it felt unfair for right now because of the quickness the user can use. There also seems to be no "tactical" way player 1 can play, since your objective is not to 'trick' player 2

P2: If it was longer and gave me the option to give my answer (or show how far the AI is in finding the bubble), It would be better and give more options to player 2.

P3: It is interesting that you think about what makes someone part of a bubble and what you could use to determine it. Depending on how extended the feed is it can become increasingly difficult (perhaps if the player wants to be part of multiple bubbles).

P4: I am not sure about the meaning of these percentages.

P5: It was really really simple and very easy-to-guess at the moment. But it could be harder once you have different percentages? Or you have to see the amount of "subbubbles" you are in to make it more challenging?

P6: I found it a bit too easy to guess. Interaction is very short so maybe think of ways to incoorporate both players more equally or just make it an individual exercise.

Do you think (a full version of the game) could help students aged 12 to 16 explore and gain knowledge about the mechanisms of algorithms in social media? Why/Why not?

P1: Yes, it can show kids how your decisions have an impact on the algorithm trying to learn your preferences.

P2: No, because it does not learn them anything new right now. It does help with repetition of knowledge and seeing it in context.

P3: I recon so, although it would have to be clear what metrics are actually used by the programs (so perhaps the program also uses amount of time looked at certain posts, though not sure). But that after the game students get feedback on if they thought right.

P4: Yes they will learn how to enter a bubble

P5: In a sense, it makes you aware of your online behaviour and what influence that has on your social media bubbles you being placed in. But it is not evident how the percentages are calculated.

P6: I think the trying to influence the algorithm person is more useful than the guessing. The guessing felt a bit passive in this game. I did not feel actively involved in the activity.

Notes:

- Question: Is, or will there be a pause moment to guess?
- Could be interesting to show the percentage, but not what bubble player 1 is getting into.
- Players do not watch the full video
- Very short interaction for player 2 in this game

Game 2: Enter the Bubble (time)

What did you think about the game in general?

P1: It felt like most of the focus is on being quick, and I'd like some more tactical decision making, but then again the racing against each other made it fun. It feels like either this should be more tactical and turn based, or more chaos and "halli-galli" like, so lean into the stress and speed (like put false videos in there that are anti the topic, but the thumbnail looks like the topic or something).

P2: I feel the competition more in this game than the previous one as there is a time and (sort of gamble) thingy involved. Maybe it is nice to see how much points you can get for what acticity (sharing is most, then commenting, then liking)

P3: Feels more gamelike because of time element, though less focus on algorithm.

P4: because I saw this feed before i was able to speedrun it. this made it not really fair

P5: It was nice, I personally liked the competition, but it felt like the interactions on the Figma were not completely clear from the start (as you would normally not grab something to swipe down). It was also unclear how much time it takes to get into a certain bubble. I would think that once you like cars you are in a car bubble, but also I guess the algorithm also explores the other bubbles. And what is the consequence of one mistake?

P6: Once I got the first auto video and then the second right after I already believed I was in the bubble. Making it very quick to get into the bubble. Which sometimes is the case so that worked well. I do think that another topic would be way more interesting. Where you can go into extreme left videos by first liking some groen links, vegetarian recepis and then get into this bubble.

Do you think (a full version of the game) could help students aged 12 to 16 explore and gain knowledge about the mechanisms of algorithms in social media? Why/Why not?

P1: With some more game elements certainly

P2: Not new knowledge as I mentioned before. It is a repitition of the knowledge gained in the 'lectures'. But nice to see/use in the context.

P3: Probably, but it could quickly become a thoughtless speedrun.

P4: not so much because giving time contraint would make a student not focus on the content

P5: Yes and no. I think it is nice to see what consequences your actions have, but I feel like it is oversimplified for the complex algorithm in social media. It kind of takes the effect away of the real mechanisms of algorithms of social media.

P6: Yes but I would maybe just let me show how deep I am in the filter bubble and then I can live know how far I am in. and then the game can just be. do you think you are deeper in than your opponent?

Notes:

- Does a player win automatically when they are at 80%?
    - Interesting to let the first person that is at that percentage win
    - Liking and disliking happens fats, faster than when you have all options on social media. Commenting f.e. would make it more interesting.
- What happens when players are roughly at the same time?
    - Indicate which player activated the check.
- In one of the tests, the participant had difficulty with the bubble being 'cars'. If this would be the game, than it would be too one dimensional and questionable whether it is representable
    - More extreme would be more interesting
- There are also different categories of videos that belong to someone's bubble
-

Game 3: Enter the Bubble (data)

What did you think about the game in general?

P1: It was fun, but it would've been nice if the data points resulted in some sort of conversation.

P2: I liked the game as it felt quite the same as the last one. I do think it would be valuable to see what actions cost the most data.

P3: The data adds more to the game than time (from my perspective). Gives it the added value of data as a valuable commodity.

P4: In this mockup i dont really understand the thing with giving data. everything you do gives out data, and it is not really up to the user to be strategic about how much they give away. only by spending less time on the app I guess. So for me it doesnt make sense to make a game around this

P5: I thought it was nice/simple, but there is only one factor here that plays a role (like or not) while in reality this is more complex. I think it is nice to break up what could produce data or not, but then I would also include other mini-games that look upon "time watching" or "not liking" and how that can influence the algorithm in an interactive way.

P6: It gave me a reason to be quick which was nice and stimulating. Maybe try to incorporate how long you look at a video instead of only focusing on likes and dislikes. In general I think the framing of filter bubbles is quite negative now. I actually like that I get nice recipes on instagram and see art I like.

Do you think (a full version of the game) could help students aged 12 to 16 explore and gain knowledge about the mechanisms of algorithms in social media? Why/Why not?

P1: It could help them learn, especially about them giving their data away, I'm just missing more specificity about what data is being given away.

P2: Yes, but only if you show the consequences of the actions

P3: Yes, as it takes the time out it is still a game but the information seems richer.

P4: not so much , see answer 15

P5: Yes as a part of more mini-games that explore the factors in how to influence the algorithm or a mini-game that is a little bit more complex. But this feels a little too simple on its own.

P6: I think it would be bad practice to teach students that not liking would result in not giving data. While actually everything you do is data.

Notes:

Game 4: Guess the data

What did you think about the game in general?

P1: It was a lot of fun, but I missed the collaborative element, and maybe even the subversion

P2: The game in general is nice because you need to get in 'the mind' of an AI. I like the reverse-thinking part of this game. I think this would be nice to do together. And it would be nice to compare your judgement with the actual data.

P3: It shows well how big of an assumption is made at times. Gives an uneasy feeling, which might boost thought processes in students.

P4: I don't like discussing these themes of sensitive data and biases, it makes me uneasy. Although maybe it is a good thing to make players feel uneasy. As long as there is a good discussion aftwards. Also i think the explanation of the game was unclear

P5: I think this was nice in a way that you "are the algorithm" and think in a way how it could analyse all the videos. Through this inside-out approach, though, you are more thinking about analyzing the different videos than really connecting it to social media algorithms. I think it still needs that extra step.

P6: I think this is the best game so far. I allowed me to reflect on the content. And think like an algorithm as what this person would like to see and do. Algorithms are also guessing what peoples lives look like.

Do you think (a full version of the game) could help students aged 12 to 16 explore and gain knowledge about the mechanisms of algorithms in social media? Why/Why not?

P1: Definitely, it shows how a feed, just like humans, is biased and often surface level.

P2: yes, if you show how much you got right

P3: Yes, though I wonder what the influence of the feed will be. Some students might be slightly offended if they belong to the category that is guessed.

P4: I think the games misses the point of comparing a filter buble to someone else's

P5: Yes slightly, it could help understand how an algorithm analyses videos, but still needs an extra step to see what this analysis means for the bubble creation.

P6: yes!

Notes:

- Players were most enthusiastic at this game.
- Could be fun to guess all categories instead of a couple to win. It is stereotypical but the algorithm does this as well.
    - Although the algorithm sometimes pokes with other videos, at which you eventually end up on ‘the wrong side of the feed’
- This would be more interesting and fun with 2 players.

Game 5: Critical View

What did you think about the game in general?

P1: The conversations are interesting, the competitive format feels counterproductive.

P2: I did like the discussion part of this game. I don't think there should be a winner for this though.

P3: The critical questions are good, but quite dependant on who is answering questions. So perhaps students would just skip that if there is not enough supervision.

P4: It is difficult to be critical about this content without specific questions. I would have liked to talk about how you are exploited and by who, and what the risks of watching this content are. but asking 'what did you see here' doesnt invite a critical attitude per se

P5: I think it was interesting in a way that you analyse together the videos and later think about the implications of the algorithm - quite educational. I only don't like the question who is most critical - because I don't think it matters at this minigame. I think it matters most to add to the conversation, whether it is critical or not. It is important to have this conversation and "who is the most critical" can sometimes shift a little bit depending on what beliefs you have. Think more about having the conversation on what are the shared morals?

P6: It was nice to have a discussion and together we can to good insights I believe. I would not ask students to choose who was more critical. I would just see this as an explorative exercise where no one can earn points. Maybe if you want to ensure they do the exercise just let them write three key points per question or something.

Do you think (a full version of the game) could help students aged 12 to 16 explore and gain knowledge about the mechanisms of algorithms in social media? Why/Why not?

P1: I think this certainly helps students to be confronted about the whirlpool that is a feed, however it will be very difficult to keep the conversations civil if the feed mimic real live (since some students feeds might actually look like this)

P2: I actually do not know

P3: Probably, but slightly. I think that students (if they are like I was) will be distracted and skip the questions to talk with others.

P4: Yes I think answering questions together is great

P5: I thought it was a really interesting conversation myself to think about the implications of the algorithm. I don't know about 12-16 years old though - maybe? I do like that you have to talk and maybe afterwards there could be a group discussion on it.

P6: Yes I think its a good exercise. I do think the questions can maybe be more specific so they are easier to answer and discuss more in depth

Notes:

- Only feed 2
- Discussing the critical questions with someone who actually has such kind of feed could result in more discussion. Maybe link it to history or fiction, instead of using real videos.
- The game is about a opinion/being critical so you should not want to make students choose a most critical person. ‘if I would not win, I would keep my mouth shut in the next round’.
- In user test 1 and 3 no person was chosen, in test 2 it was mentioned “I would give it to you’.

Game 6: Guess the next

What did you think about the game in general?

P1: Really fun, definitely my favorite, because now all the speculations and theory crafting on who this person is feeds into which video you think is next.

P2: I like it because this game had the reverse-thinking in it again (the thinking as an AI)

P3: I think it is good to be placed in the agency of the algorithm.

P4: I liked this game! it includes some nuance like the political views within the politics category

P5: Mostly feeling a little negative in general because of the content of the feed. But this was also nice, but maybe the choices were a little too simple to also discuss the subletly and the complexity of the algorithm. Maybe this could be used as an example, but others are more complex and difficult, so it can also be a discussion point in class.

P6: I liked taking the perspective of being an algorithm. I would also think it could be fun to create a feed for someone and see if they get into a bubble or not.

Do you think (a full version of the game) could help students aged 12 to 16 explore and gain knowledge about the mechanisms of algorithms in social media? Why/Why not?

P1: Definitely, I think it gives them a greater understanding of how algorithms choose a next video, and how this can trap the user in a spiral of similar videos.

P2: Maybe not the impact on society, but i do think it helps them with the comparing

P3: Yes, absolutely. Give them a moment to think about what happens when all the same content is suggested.

P4: yes

P5: Yes, but with more complex examples and in-class discussion to reach more depth. Maybe this discussion could be interactive in a way?

P6: Yes I think it is a fun way of exploring what an algorithm can decide for you.

Notes:

General Notes:

- Winning or losing a game does have influence on the emotional state.
- The content of the feed has influence on emotion.
- Sound could become a problem when players are watching other videos or that the videos do not align.
- Seeing similar videos as in the previous game makes it easier (for player 1)

Results Interview:

1. Considering the three explore games:
- Which was the most fun game to play and why?
- From which game would students learn most and why?
- Which game would best fit within the context of the learning experience and why?

User test 1: enter the bubble (data), because you know how much data you give away. Only with time aspect you won't learn anything.

Games 4/5/6 actually do what game 1 aims to do, which is thinking as an algorithm. That is a nice aspect: "thinking as AI"?

User test 2: First game, would be fun to do more rounds of. The second game is purely speed, less learning, but it is a game element. It is strong to use percentage, to make something complex more abstract.

User test 3: first game is guessing, is passive. Game three least fun, giving data is not right, and combines digital and physical which is weird. Game 2 is based on time, is nice competition.

2. Considering the three compare games:
- Which was the most fun game to play and why?
- From which game would students learn most and why?
- Which game would best fit within the context of the learning experience and why?

User test 1: Game 4 an 6 were most fun. Game 5 you would learn most from, but this is already done in the discussion afterwards.

User test 2: questions in game 5 is most educational, it creates awareness. But be careful with attention span, this age would scroll in the game while chatting with the other person. Most fun: game six.

User test 3: game 4, creating the profile, might even be more complex. It is a 1 on 1 comparising, this is how algorithms work. Critical view enables for a nice discussion, but could be difficult for children this age. But the questions should be more leading then. But do not incorporate choosing the most critical person.

3. Do you think that if the games are linked (f.e. by comparing the feeds that are created in explore, or winners earning data for end game) can improve the learning experience?

User test 1: consider how much reward, because it would make it easier for the winners. Maybe use a mechanism such as mario kart.

User test 2: would be interesting to use same feed, because you are looking at it differently. But with the same feed you do not have to think about other feeds.

4. How would it impact the game if the games are played with 2 vs 2 instead of 1vs1.

User test 1: with 2 it would create more strategy. Could also make use of a leaderboard, at which you can view the team with the most points in the class → they will be asked to explain and discuss.

User test 2: it would Improve discussion, but makes it also more difficult playing the game, think about how much you want this.

User test 3: with 2vs2 you would go faster off-topic. But should be controllable with teachers. Also competition could benefit from this, because competition works well in large groups if coached well.

5. Do you have any suggestions for or feedback upon the games or their integration into the learning experience?

User test 1: making a persona based on a feed (related to game 4) would be a fun game. To create a profile based on the least amount of videos. Intrinsic bias such as the algorithm.

Analysis & Conclusions

In total six participants, all ID students, participated in the user test in which they played six games, filled in the Discrete Emotion Questionnaire.

General Results:

All six participants indicated on a Likert scale from 1-7 to what extent they felt a certain emotion for 32 items after every game. For every game, the average of each participant for each emotion is calculated and the final average of all participants is calculated.

Not a single game has received a very high score for negative discrete emotions (anger, disgust, fear, anxiety, sadness). Game 5, critical view received relatively higher on these emotion items. Participants indicated that the content of the feed also influenced their emotion, which this games discussed the most.

Game 2 enter the bubble (time) received the highest score on desire while in game 1 enter the bubble participants felt most relaxed. On the other hand, apart from game five (critical view), participants indicated to be relatively relaxed during all the games. Participants felt happy during all the games but indicated to felt most happy during game six. But also during the first two games participants indicated to feel happy.

Next to the content having influence on emotion, also winning or losing a game has had influence on participant's emotional state. Since the games used similar videos and feeds, it has been easier for the participant who played as player 1 to win in other games.

Participants mentioned that the games would be more interesting to play with 2 against two, leading to more discussion and strategy thinking. Although this might lead to more distraction, it would improve discussion and work well for competition if being coached well. it was also suggested to maybe include a leaderboard that would show which duo does well such that they could be asked questions on their learning and strategy in the group discussion.

Game 1: Guess the Bubble

	Game 1 (Guess the Bubble)
Anger	1.50
Disgust	1.00
Fear	1.13
Anxiety	1.67
Sadness	1.29
Desire	2.08
Relaxation	4.08
Happiness	3.08

Game 1 was highest rated on relaxation. Participants indicated it being fun, but also unfair, really simple and easy-to-guess, due to the low interaction player 2 has. It was mentioned that it is lacking tactics since the intention of player 1 is not to trick player 2. Moreover, it was questioned whether, and therefore mentioned, that it was not clear when player 2 can guess and it would be better if player 2 has guessing moments.

Four out of six participants indicated that this game could help students aged 12 to 16 to explore and gain knowledge about the mechanisms of social media algorithms. One participant for example mentioned: " it makes you aware of your online behaviour and what influence that has on your social media bubbles you being placed in."

In the interview afterwards this game was mentioned in one of the sessions to be the most fun and educational to play in the learning experience.

Game 2: Enter the Bubble (time)

	Game 2 (enter the bubble time)
Anger	**1.13**
Disgust	**1.00**
Fear	**1.25**
Anxiety	**1.75**
Sadness	**1.25**
Desire	**2.13**
Relaxation	**3.21**
Happiness	**3.08**

During game 2 relaxation has also been the most prominent emotional state. Participants indicated to feel desire the most during this game, in comparison with the other five games. This desire could be from the time aspect included in this game. Participants mentioned it feeling more game-like because of the competition and time element. However, participants indicated missing or questioning the tactics, with one participant mentioning it either should be more tactical and turn-based, or more chaotic leaning into the speed and stress including false videos that look like, but are anti the topic that the player needs to get into. One participant also mentioned that other (extreme) topics would be more interesting than simple topics.

Participants gave mixed respond to the question whether this game can help students explore and learn about the mechanisms. While some mentioned that the focus on the time aspect could lead to a thoughtless speedrun without focusing on the content and behavior, others mentioned that it is nice to see what consequences your actions have, and with additional game-elements such as showing how far you are in the bubble, it could certainly help students. It was also questioned whether a participant automatically wins when at 80% of the bubble, and that it would be interesting to add this as game element instead of the guessing.

The competitive element in this game resulted in being mentioned in one of the sessions as the most fun to play in the learning experience.

Game 3: Enter the Bubble (data)

	Game 3 (enter the bubble data)
Anger	1.13
Disgust	1.00
Fear	1.04
Anxiety	1.54
Sadness	1.17
Desire	1.96
Relaxation	3.42
Happiness	2.79

The third game does not score highest on a an emotional state in comparison with the other games, but scores second highest on relaxation and third highest on desire. Moreover, it scores lowest on anxiety.

Participants mentioned they liked the addition of the data because 'it gives the added value of data as valuable commodity', but indicated that it would be more valuable to see what actions cost the most data, or that the data resulted in some sort of conversation. Moreover, multiple participants also indicated that it was very simple in this game, while in reality much more behavior produces data which would be nice to include as well.

If this were included, or the game would show what consequences the actions have, participants indicate that this game could help students learn about the mechanisms of social media algorithms. Especially about giving away data. It focusses less on the time element, but the information seems richer.

In the interview this game was mentioned in one session to be most fun and education, because of the data element. In another session it was indicated that this data element, combining the physical and digital seemed off and not correct with how complex it is in reality.

Game 4: Guess the data

	Game 4 (Guess the data)
Anger	**1.75**
Disgust	**1.33**
Fear	**1.08**
Anxiety	**1.71**
Sadness	**1.21**
Desire	**1.71**
Relaxation	**3.38**
Happiness	**2.75**

Game 4 scores relatively average on all emotions compared to the other games. Participant answered this game to be fun, nice and the best game so far due to the revere-thinking of an social media algorithm. It also show how big of an assumption is made at times.

However, it is also indicated that it could give an uneasy feeling discussing biases you might have, which was indicated that on the other hand could also be a good thing and might stimulate thought processes in students.

Five out of six participants indicated that it could help compare feeds, their impact on individuals and/or society and helps them to be critical towards this. 'it shows how a feed, just like humans, is biased and often surface level.'

In two of the three sessions this game was indicated to be most fun and education to play within the learning experience. It was suggested to do this together, and maybe even to build a full profile instead of winning with only some data categories correct.

Game 5: Critical View

	Game 5 (Critical View)
Anger	2.25
Disgust	1.42
Fear	1.42
Anxiety	2.04
Sadness	1.50
Desire	1.54
Relaxation	2.38
Happiness	2.29

Game five was rated the highest on all negative discrete emotions. During all sessions it was mentioned that the content of the feed influenced their emotions and during this game the content had to be watched most thoughtfully, possibly leading to this outcome.

Participants mentioned to like the conversation and discussion part in this game, but emphasized to exclude the part in which players need to choose the most critical person. They indicated it feels counterproductive, takes away the focus of the conversation, and that it matters most whether they are critical or not.

It was indicated that it certainly could help students to be confronted with the whirlpool that is a feed, but questioned whether this reaches its aim with the target group of 12 to 16 years old, due to their attention span. One participant also mentioned that it could also be difficult to keep the conversations civil because students could actually have a feed such as the feeds that are compared.

The game was mentioned to be most educational in multiple sessions, but that it is also already discussed further in the learning experience.

Game 6: Guess the next

	Game 6 (Guess the next)
Anger	**1.50**
Disgust	**1.21**
Fear	**1.17**
Anxiety	**1.71**
Sadness	**1.17**
Desire	**1.33**
Relaxation	**3.13**
Happiness	**3.13**

Participants indicated to feel most happy during this game, compared to the other games. This is supported by their reactions in which they mentioned it being really fun, to like this game and especially liking the reverse-thinking again, being placed in the agency of an algorithm.

All participants indicated that this game helps in comparing feeds and their impact, with one participant mentioning it gives them a greater understanding of how algorithms choose a next video and how this can trap a user in a spiral of similar videos. Another participant suggested that this goal would be reached if this game was supported by a discussion to reach more depth.

Conclusion Explore

In the Explore stage of the learning experience te aim is that through a game in which a social media algorithm is explored, learners understand how an algorithm on social media works, what data is collected (especially from which behavior) and how this leads to personalized content. The emotion(s) that the game specifically aims to achieve are desire and happiness. Desire to learn more about algorithms, and happiness that through playing a game, one does so.

	Game 1 (Guess the Bubble)	Game 2 (enter the bubble time)	Game 3 (enter the bubble data)
Anger	**1.50**	**1.13**	**1.13**
Disgust	**1.00**	**1.00**	**1.00**
Fear	**1.13**	**1.25**	**1.04**
Anxiety	**1.67**	**1.75**	**1.54**
Sadness	**1.29**	**1.25**	**1.17**
Desire	**2.08**	**2.13**	**1.96**
Relaxation	**4.08**	**3.21**	**3.42**
Happiness	**3.08**	**3.08**	**2.79**

Comparing these emotions across the three explore games, desire is scored highest in game 2 and happiness scored highest and similar in game 1 and 2. It would be logical to choose one game 1 or 2 to proceed with for the final design.

However, although game 1 was mentioned being fun, resulting in the happiness score, it was also unfair, really simple and easy-to-guess, hence the high score for relaxation in this game. Moreover, player 2 had low interaction, and the game lacked tactics since the intention of player 1 is not to trick player 2. Although game 2 scored high on desire, it is probably not the anticipated desire that the game aims to achieve. The desire is rated high probably due to the time-element, the need to be quick. So, the focus is more on being quick and less on learning how an algorithm works.

Game 3 is similar to game 2 but includes the data element and therefore takes away the need to be quick a little. Although it does not score the highest on desire and happiness, it does not score low on these emotions either. Participants mentioned that with the added element, it adds more to the game and the information seems richer.

Conclusion Compare

In the Compare stage of the learning experience te aim is that through a game in which feeds are compared, learners understand that every user has a different feed thus sees different things, how this might impact an individuals and/or society and helps them to be critical towards this? The emotion(s) that the game specifically aims to achieve are disgust, desire and happiness. Disgust towards what filter bubbles exist and how they can influence people, the desire to learn more about how to be critical towards, and how to deal with this and happiness that through playing a game, one does so.

	Game 4 (Guess the data)	Game 5 (Critical View)	Game 6 (Guess the next)
Anger	1.75	2.25	1.50
Disgust	1.33	1.42	1.21
Fear	1.08	1.42	1.17
Anxiety	1.71	2.04	1.71
Sadness	1.21	1.50	1.17
Desire	1.71	1.54	1.33
Relaxation	3.38	2.38	3.13
Happiness	2.75	2.29	3.13

Comparing these 3 emotions across the three compare games, disgust is highest in game 5, desire in game 4 and happiness in game 6.

It is noticeable that in game 5 the scores for the negative emotions are the highest compared to all games. This was probably due to the content of the feeds together with the fact players were required to discuss this content and thus wacht the content closely. Although participants enjoyed the discussion part, they mentioned that choosing a winner is odd and does not matter. Moreover, the discussion is part of, and also happens later on in the learning experience, so if the game would be used it can feel redundant to discuss it later in the complete learning experience.

Game 4 has scored second highest on desire, while also being mentioned as the most fun game to play out of the three compare games in two sessions. Participants liked the reverse thinking of an algorithm together with biases that players, and thus also algorithms, might have.

Game 6 scored the highest on happiness with participants mentioning to like the reverse-thinking and being in the agency of an algorithm again, helping to understand how a video is selected and how this can lead to a spiral of similar videos.

General Conclusions & Decisions

Participants mentioned that the games would be more interesting to play with 2 against two, leading to more discussion and strategy thinking. Therefore, the games will be played in duos, just like in the final game, opening possibilities for duos to work and play the games together during the whole experience and maybe even a reward system for these duo's.

It also opens the possibility to other suggestions that was done to include a leaderboard that would show which duo does well such that they could be asked questions on their learning and strategy in the group discussion.

While game 3 does not score the highest on happiness and desire, the scores are fine compared to the rest of the games. The data element added more to the game than speed rushing it like in game 2, and it made the information seem richer. For those reasons, game 3 will be chosen as base to develop further as a game for the Explore part in the learning experience.

Although game 5 was experienced as a game to learn the critical attitude the most, it could become redundant in a learning experience in which a discussion will already take place after playing the game. Moreover, if the game element of choosing a winner were removed as suggested, it would not really be a game anymore. Game 4 and game 6 were experience as fun because of the reverse thinking of an AI, while also scoring high on desire and Happiness. Game 4 and 6 could be combined and will form the base to develop a game further for the compare part in the learning experience.

Results & Analysis DEQ

Game 1 (Guess the Bubble)	P1	P2	P3	P4	P5	P6
Anger (Ag)	1	1	1	1	3	2
Wanting (Dr)	2	5	2	1	5	1
Dread (Ax)	1	1	1	1	1	2
Sad (S)	1	2	1	1	1	1
Easygoing (R)	3	4	5	5	6	3
Grossed out (Dg)	1	1	1	1	1	1
Happy (H)	2	3	4	4	2	5
Terror (F)	1	1	1	1	1	1
Rage (Ag)	1	2	1	1	1	1
Grief (S)	1	3	1	1	1	1
Nausea (Dg)	1	1	1	1	1	1
Anxiety (Ax)	2	1	4	1	2	1
Chilled out (R)	4	3	3	6	6	5
Desire (Dr)	3	6	4	1	3	1
Nervous (Ax)	2	3	3	1	3	1
Lonely (S)	1	1	1	1	1	1
Scared (F)	1	2	1	1	1	1
Mad (Ag)	2	3	1	1	3	1
Satisfaction (H)	3	1	3	5	4	3
Sickened (Dg)	1	1	1	1	1	1
Empty (S)	1	1	1	1	5	1
Craving (Dr)	1	4	1	1	1	1
Panic (F)	2	1	1	1	1	1
Longing (Dr)	1	2	1	1	1	1
Calm (R)	3	3	5	5	4	5
Fear (F)	1	2	1	1	1	1
Relaxation (R)	2	2	2	6	4	4
Revulsion (Dg)	1	1	1	1	1	1
Worry (Ax)	1	2	3	1	1	1
Enjoyment (H)	3	3	4	5	3	3
Pissed off (Ag)	2	3	1	1	1	1
Liking (H)	2	2	3	2	3	2

Game 2 (enter the bubble time)	P1	P2	P3	P4	P5	P6
Anger (Ag)	2	1	1	1	1	1
Wanting (Dr)	1	1	4	1	4	3
Dread (Ax)	1	1	1	1	1	2
Sad (S)	2	1	1	1	1	1
Easygoing (R)	2	3	3	6	6	2
Grossed out (Dg)	1	1	1	1	1	1
Happy (H)	3	5	3	3	3	3
Terror (F)	1	1	1	1	1	1
Rage (Ag)	1	1	1	1	1	1
Grief (S)	1	1	1	1	1	1
Nausea (Dg)	1	1	1	1	1	1
Anxiety (Ax)	2	3	2	1	3	1
Chilled out (R)	1	2	2	6	6	1
Desire (Dr)	2	1	4	1	4	3
Nervous (Ax)	4	2	3	1	3	2
Lonely (S)	1	1	1	1	1	1
Scared (F)	1	1	1	1	1	1

Mad (Ag)	2	1	1	1	1	1
Satisfaction (H)	3	4	3	6	5	4
Sickened (Dg)	1	1	1	1	1	1
Empty (S)	1	1	1	3	4	1
Craving (Dr)	1	5	1	1	1	1
Panic (F)	3	2	4	1	1	1
Longing (Dr)	1	3	1	1	4	2
Calm (R)	2	2	3	4	6	4
Fear (F)	1	1	1	1	1	1
Relaxation (R)	1	2	2	5	4	2
Revulsion (Dg)	1	1	1	1	1	1
Worry (Ax)	1	1	3	1	1	1
Enjoyment (H)	3	4	4	5	3	1
Pissed off (Ag)	2	1	1	1	1	1
Liking (H)	2	1	1	1	3	1

Game 3 (enter the bubble data)	P1	P2	P3	P4	P5	P6
Anger (Ag)	1	1	1	1	1	1
Wanting (Dr)	1	1	3	1	4	5
Dread (Ax)	1	1	3	3	1	1
Sad (S)	2	1	1	1	1	1
Easygoing (R)	3	4	2	3	5	1
Grossed out (Dg)	1	1	1	1	1	1
Happy (H)	2	5	3	3	5	2
Terror (F)	1	1	1	1	1	1
Rage (Ag)	1	1	1	2	1	1
Grief (S)	1	1	1	1	1	1
Nausea (Dg)	1	1	1	1	1	1
Anxiety (Ax)	3	1	2	2	1	1
Chilled out (R)	1	2	3	5	6	5
Desire (Dr)	1	5	3	1	4	3
Nervous (Ax)	3	1	1	2	2	1
Lonely (S)	1	1	1	1	1	1
Scared (F)	1	1	1	1	1	1
Mad (Ag)	2	1	1	1	1	1
Satisfaction (H)	2	5	4	2	3	1
Sickened (Dg)	1	1	1	1	1	1
Empty (S)	1	1	1	2	3	1
Craving (Dr)	1	2	1	1	1	1
Panic (F)	2	1	1	1	1	1
Longing (Dr)	1	1	1	1	3	1
Calm (R)	2	3	4	4	5	5
Fear (F)	1	1	1	1	1	1
Relaxation (R)	1	2	2	4	5	5
Revulsion (Dg)	1	1	1	1	1	1
Worry (Ax)	1	1	1	2	1	1
Enjoyment (H)	2	5	3	3	2	2
Pissed off (Ag)	1	1	1	2	1	1
Liking (H)	1	4	3	2	2	1

Game 4 (Guess the data)	P1	P2	P3	P4	P5	P6
Anger (Ag)	2	2	1	3	2	4

Wanting (Dr)	1	3	4	1	1	2
Dread (Ax)	2	1	1	4	1	1
Sad (S)	2	1	1	1	2	1
Easygoing (R)	1	6	2	4	5	1
Grossed out (Dg)	1	2	3	2	1	1
Happy (H)	1	1	3	4	1	2
Terror (F)	1	1	1	1	1	1
Rage (Ag)	2	1	1	2	1	1
Grief (S)	1	1	1	1	1	1
Nausea (Dg)	1	1	1	1	1	1
Anxiety (Ax)	2	1	2	2	1	1
Chilled out (R)	1	5	2	3	5	1
Desire (Dr)	1	3	3	2	3	1
Nervous (Ax)	2	1	2	2	3	1
Lonely (S)	1	1	1	1	1	1
Scared (F)	1	1	1	1	1	1
Mad (Ag)	2	2	1	2	1	3
Satisfaction (H)	2	5	4	2	4	3
Sickened (Dg)	1	1	2	2	1	1
Empty (S)	1	1	1	2	3	1
Craving (Dr)	1	2	1	1	1	1
Panic (F)	1	1	1	2	1	1
Longing (Dr)	1	1	1	1	4	1
Calm (R)	1	6	3	4	6	3
Fear (F)	2	1	1	1	1	1
Relaxation (R)	2	5	2	4	6	3
Revulsion (Dg)	1	1	2	1	1	2
Worry (Ax)	1	1	3	1	1	4
Enjoyment (H)	4	4	4	3	3	2
Pissed off (Ag)	1	1	1	2	1	3
Liking (H)	4	1	4	2	2	1

Game 5 (Critical View)	P1	P2	P3	P4	P5	P6
Anger (Ag)	3	2	5	1	3	3
Wanting (Dr)	1	1	2	3	1	1
Dread (Ax)	2	3	1	3	1	1
Sad (S)	3	3	1	1	2	2
Easygoing (R)	1	2	3	2	6	1
Grossed out (Dg)	1	1	5	1	1	1
Happy (H)	1	2	4	2	1	1
Terror (F)	2	1	1	1	1	1
Rage (Ag)	3	1	1	2	1	2
Grief (S)	3	1	1	1	1	1
Nausea (Dg)	1	1	2	1	1	1
Anxiety (Ax)	3	1	3	2	2	1
Chilled out (R)	1	4	2	2	6	1
Desire (Dr)	1	1	4	3	1	1
Nervous (Ax)	1	1	3	4	2	1
Lonely (S)	1	1	1	1	1	1
Scared (F)	2	1	1	1	3	1
Mad (Ag)	3	1	3	1	2	3
Satisfaction (H)	2	4	4	2	3	1

Sickened (Dg)	2	1	1	2	1	1
Empty (S)	1	1	1	3	3	1
Craving (Dr)	1	1	1	1	3	1
Panic (F)	2	1	1	3	1	1
Longing (Dr)	1	1	1	3	2	1
Calm (R)	1	1	5	2	1	2
Fear (F)	2	1	1	1	1	3
Relaxation (R)	1	3	2	2	5	1
Revulsion (Dg)	3	1	2	1	1	1
Worry (Ax)	3	1	4	1	3	2
Enjoyment (H)	3	1	4	4	1	1
Pissed off (Ag)	4	1	3	1	3	2
Liking (H)	2	3	3	2	3	1

Game 6 (Guess the next)	P1	P2	P3	P4	P5	P6
Anger (Ag)	1	1	1	1	3	3
Wanting (Dr)	1	1	4	1	1	1
Dread (Ax)	1	1	1	1	2	2
Sad (S)	1	1	1	1	3	2
Easygoing (R)	3	6	3	5	5	1
Grossed out (Dg)	1	1	1	3	1	1
Happy (H)	3	4	4	5	2	2
Terror (F)	1	1	1	1	2	1
Rage (Ag)	1	1	1	2	3	3
Grief (S)	1	1	1	1	1	1
Nausea (Dg)	1	1	1	1	1	1
Anxiety (Ax)	2	1	3	1	1	1
Chilled out (R)	1	4	4	5	2	2
Desire (Dr)	2	3	2	1	1	1
Nervous (Ax)	3	2	2	1	1	1
Lonely (S)	1	1	1	1	1	1
Scared (F)	1	1	1	1	2	1
Mad (Ag)	1	1	1	1	2	2
Satisfaction (H)	5	5	3	3	1	3
Sickened (Dg)	1	1	1	1	2	1
Empty (S)	1	1	1	2	1	1
Craving (Dr)	2	1	1	1	1	1
Panic (F)	1	1	1	1	1	1
Longing (Dr)	1	1	1	1	1	1
Calm (R)	3	6	5	2	2	2
Fear (F)	1	1	2	1	2	1
Relaxation (R)	1	6	1	3	1	2
Revulsion (Dg)	1	1	1	2	1	2
Worry (Ax)	1	1	4	1	3	4
Enjoyment (H)	5	4	3	5	1	3
Pissed off (Ag)	1	1	1	1	1	2
Liking (H)	4	4	1	2	1	2

Anger Items Game 1	P1	P2	P3	P4	P5	P6	
Anger (Ag)	1	1	1	1	3	2	
Rage (Ag)	1	2	1	1	1	1	
Mad (Ag)	2	3	1	1	3	1	
Pissed off (Ag)	2	3	1	1	1	1	
Average	1.5	2.25	1	1	2	1.25	1.5

Anger Items Game 2	P1	P2	P3	P4	P5	P6	
Anger (Ag)	2	1	1	1	1	1	
Rage (Ag)	1	1	1	1	1	1	
Mad (Ag)	2	1	1	1	1	1	
Pissed off (Ag)	2	1	1	1	1	1	
Average	1.75	1	1	1	1	1	1.125

Anger Items Game 3	P1	P2	P3	P4	P5	P6	
Anger (Ag)	1	1	1	1	1	1	
Rage (Ag)	1	1	1	2	1	1	
Mad (Ag)	2	1	1	1	1	1	
Pissed off (Ag)	1	1	1	2	1	1	
Average	1.25	1	1	1.5	1	1	1.125

Anger Items Game 4	P1	P2	P3	P4	P5	P6	
Anger (Ag)	2	2	1	3	2	4	
Rage (Ag)	2	1	1	2	1	1	
Mad (Ag)	2	2	1	2	1	3	
Pissed off (Ag)	1	1	1	2	1	3	
Average	1.75	1.5	1	2.25	1.25	2.75	1.75

Anger Items Game 5	P1	P2	P3	P4	P5	P6	
Anger (Ag)	3	2	5	1	3	3	
Rage (Ag)	3	1	1	2	1	2	
Mad (Ag)	3	1	3	1	2	3	
Pissed off (Ag)	4	1	3	1	3	2	
Average	3.25	1.25	3	1.25	2.25	2.5	2.25

Anger Items Game 6	P1	P2	P3	P4	P5	P6	
Anger (Ag)	1	1	1	1	3	3	
Rage (Ag)	1	1	1	2	3	3	
Mad (Ag)	1	1	1	1	2	2	
Pissed off (Ag)	1	1	1	1	1	2	
Average	1	1	1	1.25	2.25	2.5	1.5

Disgust items Game 1	P1	P2	P3	P4	P5	P6	
Grossed out (Dg)	1	1	1	1	1	1	
Nausea (Dg)	1	1	1	1	1	1	
Sickened (Dg)	1	1	1	1	1	1	
Revulsion (Dg)	1	1	1	1	1	1	
Average	1	1	1	1	1	1	1

Disgust items Game 2	P1	P2	P3	P4	P5	P6	
Grossed out (Dg)	1	1	1	1	1	1	
Nausea (Dg)	1	1	1	1	1	1	
Sickened (Dg)	1	1	1	1	1	1	
Revulsion (Dg)	1	1	1	1	1	1	
Average	1	1	1	1	1	1	1

Disgust items Game 3	P1	P2	P3	P4	P5	P6	
Grossed out (Dg)	1	1	1	1	1	1	
Nausea (Dg)	1	1	1	1	1	1	
Sickened (Dg)	1	1	1	1	1	1	
Revulsion (Dg)	1	1	1	1	1	1	
Average	1	1	1	1	1	1	1

Disgust items Game 4	P1	P2	P3	P4	P5	P6	
Grossed out (Dg)	1	2	3	2	1	1	
Nausea (Dg)	1	1	1	1	1	1	
Sickened (Dg)	1	1	2	2	1	1	
Revulsion (Dg)	1	1	2	1	1	2	
Average	1	1.25	2	1.5	1	1.25	1.333333

Disgust items Game 5	P1	P2	P3	P4	P5	P6	
Grossed out (Dg)	1	1	5	1	1	1	
Nausea (Dg)	1	1	2	1	1	1	
Sickened (Dg)	2	1	1	2	1	1	
Revulsion (Dg)	3	1	2	1	1	1	
Average	1.75	1	2.5	1.25	1	1	1.416667

Disgust items Game 6	P1	P2	P3	P4	P5	P6	
Grossed out (Dg)	1	1	1	3	1	1	
Nausea (Dg)	1	1	1	1	1	1	
Sickened (Dg)	1	1	1	1	2	1	
Revulsion (Dg)	1	1	1	2	1	2	
Average	1	1	1	1.75	1.25	1.25	1.208333

Fear items Game 1	P1	P2	P3	P4	P5	P6	
Terror (F)	1	1	1	1	1	1	
Scared (F)	1	2	1	1	1	1	
Panic (F)	2	1	1	1	1	1	
Fear (F)	1	2	1	1	1	1	
Average	1.25	1.5	1	1	1	1	1.125

Fear items Game 2	P1	P2	P3	P4	P5	P6	
Terror (F)	1	1	1	1	1	1	
Scared (F)	1	1	1	1	1	1	
Panic (F)	3	2	4	1	1	1	
Fear (F)	1	1	1	1	1	1	
Average	1.5	1.25	1.75	1	1	1	1.25

Fear items Game 3	P1	P2	P3	P4	P5	P6	
Terror (F)	1	1	1	1	1	1	
Scared (F)	1	1	1	1	1	1	
Panic (F)	2	1	1	1	1	1	
Fear (F)	1	1	1	1	1	1	
Average	1.25	1	1	1	1	1	1.041667

Fear items Game 4	P1	P2	P3	P4	P5	P6	
Terror (F)	1	1	1	1	1	1	
Scared (F)	1	1	1	1	1	1	
Panic (F)	1	1	1	2	1	1	
Fear (F)	2	1	1	1	1	1	
Average	1.25	1	1	1.25	1	1	1.083333

Fear items Game 5	P1	P2	P3	P4	P5	P6	
Terror (F)	2	1	1	1	1	1	
Scared (F)	2	1	1	1	3	1	
Panic (F)	2	1	1	3	1	1	
Fear (F)	2	1	1	1	1	3	
Average	2	1	1	1.5	1.5	1.5	1.416667

Fear items Game 6	P1	P2	P3	P4	P5	P6	
Terror (F)	1	1	1	1	2	1	
Scared (F)	1	1	1	1	2	1	
Panic (F)	1	1	1	1	1	1	
Fear (F)	1	1	2	1	2	1	
Average	1	1	1.25	1	1.75	1	1.166667

Anxiety items Game 1	P1	P2	P3	P4	P5	P6	
Dread (Ax)	1	1	1	1	1	2	
Anxiety (Ax)	2	1	4	1	2	1	
Nervous (Ax)	2	3	3	1	3	1	
Worry (Ax)	1	2	3	1	1	1	
Average	1.5	1.75	2.75	1	1.75	1.25	1.666667

Anxiety items Game 2	P1	P2	P3	P4	P5	P6	
Dread (Ax)	1	1	1	1	1	2	
Anxiety (Ax)	2	3	2	1	3	1	
Nervous (Ax)	4	2	3	1	3	2	
Worry (Ax)	1	1	3	1	1	1	
Average	2	1.75	2.25	1	2	1.5	1.75

Anxiety items Game 3	P1	P2	P3	P4	P5	P6	
Dread (Ax)	1	1	3	3	1	1	
Anxiety (Ax)	3	1	2	2	1	1	
Nervous (Ax)	3	1	1	2	2	1	
Worry (Ax)	1	1	1	2	1	1	
Average	2	1	1.75	2.25	1.25	1	1.541667

Anxiety items Game 4	P1	P2	P3	P4	P5	P6	
Dread (Ax)	2	1	1	4	1	1	
Anxiety (Ax)	2	1	2	2	1	1	
Nervous (Ax)	2	1	2	2	3	1	
Worry (Ax)	1	1	3	1	1	4	
Average	1.75	1	2	2.25	1.5	1.75	1.708333

Anxiety items Game 5	P1	P2	P3	P4	P5	P6	
Dread (Ax)	2	3	1	3	1	1	
Anxiety (Ax)	3	1	3	2	2	1	
Nervous (Ax)	1	1	3	4	2	1	
Worry (Ax)	3	1	4	1	3	2	
Average	2.25	1.5	2.75	2.5	2	1.25	2.041667

Anxiety items Game 6	P1	P2	P3	P4	P5	P6	
Dread (Ax)	1	1	1	1	2	2	
Anxiety (Ax)	2	1	3	1	1	1	
Nervous (Ax)	3	2	2	1	1	1	
Worry (Ax)	1	1	4	1	3	4	
Average	1.75	1.25	2.5	1	1.75	2	1.708333

Sadness items Game 1	P1	P2	P3	P4	P5	P6	
Sad (S)	1	2	1	1	1	1	
Grief (S)	1	3	1	1	1	1	
Lonely (S)	1	1	1	1	1	1	
Empty (S)	1	1	1	1	5	1	
Average	1	1.75	1	1	2	1	1.291667

Sadness items Game 2	P1	P2	P3	P4	P5	P6	
Sad (S)	2	1	1	1	1	1	
Grief (S)	1	1	1	1	1	1	
Lonely (S)	1	1	1	1	1	1	
Empty (S)	1	1	1	3	4	1	
Average	1.25	1	1	1.5	1.75	1	1.25

Sadness items Game 3	P1	P2	P3	P4	P5	P6	
Sad (S)	2	1	1	1	1	1	
Grief (S)	1	1	1	1	1	1	
Lonely (S)	1	1	1	1	1	1	
Empty (S)	1	1	1	2	3	1	
Average	1.25	1	1	1.25	1.5	1	1.166667

Sadness items Game 4	P1	P2	P3	P4	P5	P6	
Sad (S)	2	1	1	1	2	1	
Grief (S)	1	1	1	1	1	1	
Lonely (S)	1	1	1	1	1	1	
Empty (S)	1	1	1	2	3	1	
Average	1.25	1	1	1.25	1.75	1	1.208333

Sadness items Game 5	P1	P2	P3	P4	P5	P6	
Sad (S)	3	3	1	1	2	2	
Grief (S)	3	1	1	1	1	1	
Lonely (S)	1	1	1	1	1	1	
Empty (S)	1	1	1	3	3	1	
Average	2	1.5	1	1.5	1.75	1.25	1.5

Sadness items Game 6	P1	P2	P3	P4	P5	P6	
Sad (S)	1	1	1	1	3	2	
Grief (S)	1	1	1	1	1	1	
Lonely (S)	1	1	1	1	1	1	
Empty (S)	1	1	1	2	1	1	
Average	1	1	1	1.25	1.5	1.25	1.166667

Desire items Game 1	P1	P2	P3	P4	P5	P6	
Wanting (Dr)	2	5	2	1	5	1	
Desire (Dr)	3	6	4	1	3	1	
Craving (Dr)	1	4	1	1	1	1	
Longing (Dr)	1	2	1	1	1	1	
Average	1.75	4.25	2	1	2.5	1	2.083333

Desire items Game 2	P1	P2	P3	P4	P5	P6	
Wanting (Dr)	1	1	4	1	4	3	
Desire (Dr)	2	1	4	1	4	3	
Craving (Dr)	1	5	1	1	1	1	
Longing (Dr)	1	3	1	1	4	2	
Average	1.25	2.5	2.5	1	3.25	2.25	2.125

Desire items Game 3	P1	P2	P3	P4	P5	P6	
Wanting (Dr)	1	1	3	1	4	5	
Desire (Dr)	1	5	3	1	4	3	
Craving (Dr)	1	2	1	1	1	1	
Longing (Dr)	1	1	1	1	3	1	
Average	1	2.25	2	1	3	2.5	1.958333

Desire items Game 4	P1	P2	P3	P4	P5	P6	
Wanting (Dr)	1	3	4	1	1	2	
Desire (Dr)	1	3	3	2	3	1	
Craving (Dr)	1	2	1	1	1	1	
Longing (Dr)	1	1	1	1	4	1	
Average	1	2.25	2.25	1.25	2.25	1.25	1.708333

Desire items Game 5	P1	P2	P3	P4	P5	P6	
Wanting (Dr)	1	1	2	3	1	1	
Desire (Dr)	1	1	4	3	1	1	
Craving (Dr)	1	1	1	1	3	1	
Longing (Dr)	1	1	1	3	2	1	
Average	1	1	2	2.5	1.75	1	1.541667

Desire items Game 6	P1	P2	P3	P4	P5	P6	
Wanting (Dr)	1	1	4	1	1	1	
Desire (Dr)	2	3	2	1	1	1	
Craving (Dr)	2	1	1	1	1	1	
Longing (Dr)	1	1	1	1	1	1	
Average	1.5	1.5	2	1	1	1	1.333333

Relaxation items Game 1	P1	P2	P3	P4	P5	P6	
Easygoing (R)	3	4	5	5	6	3	
Chilled out (R)	4	3	3	6	6	5	
Calm (R)	3	3	5	5	4	5	
Relaxation (R)	2	2	2	6	4	4	
Average	3	3	3.75	5.5	5	4.25	4.083333

Relaxation items Game 2	P1	P2	P3	P4	P5	P6	
Easygoing (R)	2	3	3	6	6	2	
Chilled out (R)	1	2	2	6	6	1	
Calm (R)	2	2	3	4	6	4	
Relaxation (R)	1	2	2	5	4	2	
Average	1.5	2.25	2.5	5.25	5.5	2.25	3.208333

Relaxation items Game 3	P1	P2	P3	P4	P5	P6	
Easygoing (R)	3	4	2	3	5	1	
Chilled out (R)	1	2	3	5	6	5	
Calm (R)	2	3	4	4	5	5	
Relaxation (R)	1	2	2	4	5	5	
Average	1.75	2.75	2.75	4	5.25	4	3.416667

Relaxation items Game 4	P1	P2	P3	P4	P5	P6	
Easygoing (R)	1	6	2	4	5	1	
Chilled out (R)	1	5	2	3	5	1	
Calm (R)	1	6	3	4	6	3	
Relaxation (R)	2	5	2	4	6	3	
Average	1.25	5.5	2.25	3.75	5.5	2	3.375

Relaxation items Game 5	P1	P2	P3	P4	P5	P6	
Easygoing (R)	1	2	3	2	6	1	
Chilled out (R)	1	4	2	2	6	1	
Calm (R)	1	1	5	2	1	2	
Relaxation (R)	1	3	2	2	5	1	
Average	1	2.5	3	2	4.5	1.25	2.375

Relaxation items Game 6	P1	P2	P3	P4	P5	P6	
Easygoing (R)	3	6	3	5	5	1	
Chilled out (R)	1	4	4	5	2	2	
Calm (R)	3	6	5	2	2	2	
Relaxation (R)	1	6	1	3	1	2	
Average	2	5.5	3.25	3.75	2.5	1.75	3.125

Happiness items Game 1	P1	P2	P3	P4	P5	P6	
Happy (H)	2	3	4	4	2	5	
Satisfaction (H)	3	1	3	5	4	3	
Enjoyment (H)	3	3	4	5	3	3	
Liking (H)	2	2	3	2	3	2	
Average	2.5	2.25	3.5	4	3	3.25	3.083333

Happiness items Game 2	P1	P2	P3	P4	P5	P6	
Happy (H)	3	5	3	3	3	3	
Satisfaction (H)	3	4	3	6	5	4	
Enjoyment (H)	3	4	4	5	3	1	
Liking (H)	2	1	1	1	3	1	
Average	2.75	3.5	2.75	3.75	3.5	2.25	3.083333

Happiness items Game 3	P1	P2	P3	P4	P5	P6	
Happy (H)	2	5	3	3	5	2	
Satisfaction (H)	2	5	4	2	3	1	
Enjoyment (H)	2	5	3	3	2	2	
Liking (H)	1	4	3	2	2	1	
Average	1.75	4.75	3.25	2.5	3	1.5	2.791667

Happiness items Game 4	P1	P2	P3	P4	P5	P6	
Happy (H)	1	1	3	4	1	2	
Satisfaction (H)	2	5	4	2	4	3	
Enjoyment (H)	4	4	4	3	3	2	
Liking (H)	4	1	4	2	2	1	
Average	2.75	2.75	3.75	2.75	2.5	2	2.75

Happiness items Game 5	P1	P2	P3	P4	P5	P6	
Happy (H)	1	2	4	2	1	1	
Satisfaction (H)	2	4	4	2	3	1	
Enjoyment (H)	3	1	4	4	1	1	
Liking (H)	2	3	3	2	3	1	
Average	2	2.5	3.75	2.5	2	1	2.291667

Happiness items Game 6	P1	P2	P3	P4	P5	P6	
Happy (H)	3	4	4	5	2	2	
Satisfaction (H)	5	5	3	3	1	3	
Enjoyment (H)	5	4	3	5	1	3	
Liking (H)	4	4	1	2	1	2	
Average	4.25	4.25	2.75	3.75	1.25	2.5	3.125

	Game 1 (Guess the Bubble)	Game 2 (enter the bubble time)	Game 3 (enter the bubble data)	Game 4 (Guess the data)	Game 5 (Critical View)	Game 6 (Guess the next)
Anger	1.5	1.125	1.125	1.75	2.25	1.5
Disgust	1	1	1	1.333333333	1.416666667	1.208333333
Fear	1.125	1.25	1.041666667	1.083333333	1.416666667	1.166666667
Anxiety	1.666666667	1.75	1.541666667	1.708333333	2.041666667	1.708333333
Sadness	1.291666667	1.25	1.166666667	1.208333333	1.5	1.166666667
Desire	2.083333333	2.125	1.958333333	1.708333333	1.541666667	1.333333333
Relaxation	4.083333333	3.208333333	3.416666667	3.375	2.375	3.125
Happiness	3.083333333	3.083333333	2.791666667	2.75	2.291666667	3.125

	Game 1 (Guess the Bubble)	Game 2 (enter the bubble time)	Game 3 (enter the bubble data)	Game 4 (Guess the data)	Game 5 (Critical View)	Game 6 (Guess the next)
Anger	1.50	1.13	1.13	1.75	2.25	1.50
Disgust	1.00	1.00	1.00	1.33	1.42	1.21
Fear	1.13	1.25	1.04	1.08	1.42	1.17
Anxiety	1.67	1.75	1.54	1.71	2.04	1.71
Sadness	1.29	1.25	1.17	1.21	1.50	1.17
Desire	2.08	2.13	1.96	1.71	1.54	1.33
Relaxation	4.08	3.21	3.42	3.38	2.38	3.13
Happiness	3.08	3.08	2.79	2.75	2.29	3.13

Appendix M
Game Descriptions

Game 1: Enter the Bubble

This game is played with two duo's. The goal is to enter a filter bubble for X % by performing actions on the BeYou feed. Every action a duo performs costs a specific amount of data that has to be put in the 'black box'.

The duo who reaches the bubble with the most data still in possession wins. So, it's not about who reaches the bubble the fastest, but who does so most strategically. However, there is a time limit to each round.

If a duo thinks they have reached their bubble they can check the percentage. But they have to be careful since this can only be done twice in each round. When this is done, the other duo also sees the percentage. When both duo's entered the bubble, the team with most data in possession wins. 4 rounds of this game will be played.

Possible actions:

No data: **→ 0%**

- Scroll

1 data: **→ 5%**

- Like
- Comment
- Not interested

2 data: **→ 10%**

- Share
- (un)follow
- "watch" Hashtag (click that you interact, without moving away from feed)

3 data: **→15%**

- Rewatch (2 times)
- 1 added data to rewatch again:
    - watch 3 times: 4 data
    - watch four times: 5 data. (Players need to watch/wait this time)

Each duo splits up in 2 roles that switch in each round:

- Data keeper: The player who watches and controls the data. Also puts the data into the black box.
- Interaction player: The player who performs the (inter)actions on the platform.

Data is stored in a "black box" that needs to be opened after each round to count the amount of data that each duo has given away to reach to bubble.

Each round has a winner (the duo with most data in possession) or can result in a draw (same amount of data). After 4 rounds one of the duo's has won or it is a complete draw.

Duo's take along their data from the last round to the final game: Social Media battle. The duo that wins the last round, has strategically played the best, with least amount of data. So they have a disadvantage at the end game, giving the team that has lost (less understanding of how the algorithm works) an advantage at the final game.

Game goal:

Explore the use of an algorithm, see how fast and which behavior gets one into a filter bubble.

Focus on knowledge: Learners understand how an algorithm on social media works; what data is collected and how this leads to personalized content.

Objectives:

1. 1. I know that algorithms are used in a variety of applications, platforms and services

2. I understand how algorithms work

4. I know how to influence algorithmic operations

Game 2: Guess the Data & Video

This game is played with the same duos against each other.
The goal is to think as an algorithm and guess what data an algorithm has in its possession to have created the feed they are watching.

Players need to guess the correct data for several categories and place a data category on the playing board. They can choose from a list of 10 data categories. If a duo has put 6 different types of data on the board, the game is paused and the information is checked. When at least 5 are correct, that duo win this round. When checked, the other duo also sees whether the chosen information of the categories is correct.

This game is played in 4 rounds, (the four created bubbles in game 1). After each round, the duo's see 4 videos from which they correctly need to place one within the feed they have just watched.

Possible Categories:
- Gender
- Age
- Location
- Nationality
- Personality
- Interests
- Political View
- Relationship status
- Education/Career
- Feeling/Emotion

Each round has one duo as the winner (the duo that has 5 categories correct the fastest).
The duo that wins most rounds wins the game, but it can also result in a draw.

After 4 rounds, the players can change the chosen videos that belong within each of the feeds.

When a draw happens, the result will be determined by placing the correct videos within each feed. When both duo's do have these correct, and this happens to be a draw as well, the game ends in overall draw. If one duo has this correct, that duo is the winner of the game.

The winner duo takes along the correct amount of data from the last round to the final game.
If the result is a total draw, no duo has won so neither duo receives data from the last game. However: An additional 3 data tokens can be won and moved along to the final game by having the videos for each feed correct, (so that is not always the winner of the game). This means in the case of a total draw, both duo's receive the additional 3 data tokens.

Game Goal

Compare algorithms/feeds with that of classmates or other people.

Focus on Knowledge: Learners see the result of personalized content, learn that other people see completely different things.

Objectives:

1. I know that algorithms are used in a variety of applications, platforms and services
3. I know how to be critical towards algorithms and their workings.

Game 3: Social Media Battle

In Social Media Battle, two duo's compete: one as users navigating a social media platform and the other as the company of a new social media platform: BeYou, that controls control the algorithms.

The user duo explores the personal feed of BeYou, performing actions like liking, commenting, and sharing, each costing data tokens. Their goal is to first reach a 90% filter bubble in round 1 and then reduce it to 10% in round 2.

The company starts with the 'like algorithm' and duo updates their algorithm such that they can collect data, aiming to gather all data of the user duo by the end of the second round. They start with the Like Algorithm and can acquire additional updates as the game progresses, winning round 1 when owning half the updates.

A duo wins the game when they achieve their goal for both rounds. If each duo wins one round the game results in a draw.

Both duos can reach their goal by taking turns pressing the button, moving their pawns on the game board, landing on a position that determines whether to draw a questions or action card. Correct answers allow the user duo to perform an action on the platform or the company duo to earn update percentages, which can be used to update their algorithm and collect more data from the user. Action cards can either benefit or negatively impact a duo.

Starting amount of data for user duo: XX
starting algorithm for company duo: Like algorithm

User duo: can have an advantage through earlier games in which they received data.

Company duo: can exchange (pre existing) data they have earned in earlier games for percentage updates for algorithms. This cannot be done in the game itself.
1 data tokens= XX percent update.

Game goal:

Test the knowledge and skills which have been learned throughout the experience by playing the game: Social Media Battle

Objectives:

Knowledge:

1. I know that algorithms are used in a variety of applications, platforms and services
2. I understand how algorithms work
3. I know how to be critical towards algorithms and their workings
4. I know how to influence algorithmic operations

Skill:

1. I will use the knowledge to be aware of algorithms in daily life
2. I create a better understanding of algorithmic working
3. I will create critical thoughts about the use of algorithmic operations
4. I apply the knowledge to influence algorithmic operations

Appendix N
Arduino Code

```
#include <Adafruit_NeoPixel.h>
#ifdef __AVR__
#include <avr/power.h>  // Required for 16 MHz Adafruit Trinket
#endif

#define PIN 14  // pin on which the LEDs are connected to the board

#define NUMPIXELS 20  // Popular NeoPixel ring size

Adafruit_NeoPixel pixels(NUMPIXELS, PIN, NEO_RGBW + NEO_KHZ800);

#define DELAYVAL 500  // Time (in milliseconds) to pause between pixels

const int buttonPin1 = 12;  // the number of the pushbutton pin
const int buttonPin2 = 13;
const int ledPin = LED_BUILTIN;  // the number of the LED pin

int currentbuttonstate1 = 0;
int lastbuttonstate1 = 0;

int currentbuttonstate2 = 0;
int lastbuttonstate2 = 0;

long PrevRandNumb1;
long NewRandNumb1;
long PrevRandNumb2;
long NewRandNumb2;

enum states {
  IDLE_STATE,
  COMPARE_STATE,
  SMB_STATE
} currentState;

//BLYNK
/* Fill-in information from Blynk Device Info here */
#define BLYNK_TEMPLATE_ID "TMPL49bKWrHrW"
#define BLYNK_TEMPLATE_NAME "Compare Game"
#define BLYNK_AUTH_TOKEN "mQo-3nvCZWqP58_qe3hdGmG_zuWn5W3y"

/* Comment this out to disable prints and save space */
#define BLYNK_PRINT Serial

#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>

// Your WiFi credentials.
// Set password to "" for open networks.
char ssid[] = "Nothing phone (1) Yorn";
char pass[] = "gekkigheid";
```

```
int LedValue1 = 0;
int LedValue2 = 0;

// This function is called every time the device is connected to the
Blynk.Cloud
BLYNK_CONNECTED() {
  // Change Web Link Button message to "Congratulations!"
  Blynk.setProperty(V3, "offImageUrl", "https://static-
image.nyc3.cdn.digitaloceanspaces.com/general/fte/congratulations.png");
  Blynk.setProperty(V3, "onImageUrl", "https://static-
image.nyc3.cdn.digitaloceanspaces.com/general/fte/congratulations_pressed.p
ng");
  Blynk.setProperty(V3, "url", "https://docs.blynk.io/en/getting-
started/what-do-i-need-to-blynk/how-quickstart-device-was-made");
}

void(*resetFunc) (void) = 0;

void setup() {
  // put your setup code here, to run once:
  Serial.begin(115200);
  randomSeed(analogRead(0));
  pinMode(ledPin, OUTPUT);
  digitalWrite(ledPin, HIGH);
  pinMode(buttonPin1, INPUT_PULLUP);
  pinMode(buttonPin2, INPUT_PULLUP);
  pixels.begin();  // INITIALIZE NeoPixel strip object (REQUIRED)
  pixels.setBrightness(150);
  pixels.clear();
  Blynk.begin(BLYNK_AUTH_TOKEN, ssid, pass);
}

// This function is called every time the Virtual Pin 0 state changes
BLYNK_WRITE(V7) {
  // Set incoming value from pin V0 to a variable
  int value = param.asInt();

  if (value == 1) {
    pixels.setPixelColor(7, 255, 0, 0);
    pixels.show();
    LedValue1 = LedValue1 + 1;
  } else {
    pixels.setPixelColor(7, 255, 255, 255);
    pixels.show();
    LedValue1 = LedValue1 - 1;
  }
}

BLYNK_WRITE(V8) {
  // Set incoming value from pin V0 to a variable
  int value = param.asInt();

  if (value == 1) {
    pixels.setPixelColor(8, 255, 0, 0);
    pixels.show();
    LedValue1 = LedValue1 + 1;
  } else {
    pixels.setPixelColor(8, 255, 255, 255);
    pixels.show();
    LedValue1 = LedValue1 - 1;
  }
```

```
}

BLYNK_WRITE(V9) {
  // Set incoming value from pin V0 to a variable
  int value = param.asInt();

  if (value == 1) {
    pixels.setPixelColor(9, 255, 0, 0);
    pixels.show();
    LedValue1 = LedValue1 + 1;
  } else {
    pixels.setPixelColor(9, 255, 255, 255);
    pixels.show();
    LedValue1 = LedValue1 - 1;
  }
}


BLYNK_WRITE(V11) {
  // Set incoming value from pin V0 to a variable
  int value = param.asInt();

  if (value == 1) {
    pixels.setPixelColor(11, 255, 0, 0);
    pixels.show();
    LedValue1 = LedValue1 + 1;
  } else {
    pixels.setPixelColor(11, 255, 255, 255);
    pixels.show();
    LedValue1 = LedValue1 - 1;
  }
}

BLYNK_WRITE(V12) {
  // Set incoming value from pin V0 to a variable
  int value = param.asInt();

  if (value == 1) {
    pixels.setPixelColor(12, 255, 0, 0);
    pixels.show();
    LedValue1 = LedValue1 + 1;
  } else {
    pixels.setPixelColor(12, 255, 255, 255);
    pixels.show();
    LedValue1 = LedValue1 - 1;
  }
}

BLYNK_WRITE(V13) {
  // Set incoming value from pin V0 to a variable
  int value = param.asInt();

  if (value == 1) {
    pixels.setPixelColor(13, 255, 0, 0);
    pixels.show();
    LedValue1 = LedValue1 + 1;
  } else {
    pixels.setPixelColor(13, 255, 255, 255);
    pixels.show();
    LedValue1 = LedValue1 - 1;
  }
```

```
}

BLYNK_WRITE(V10) {
  // Set incoming value from pin V0 to a variable
  int value = param.asInt();

  if (value == 1) {
    pixels.setPixelColor(7, 255, 255, 255);
    pixels.setPixelColor(8, 255, 255, 255);
    pixels.setPixelColor(9, 255, 255, 255);
    pixels.setPixelColor(10, 0, 0, 0);
    pixels.setPixelColor(11, 255, 255, 255);
    pixels.setPixelColor(12, 255, 255, 255);
    pixels.setPixelColor(13, 255, 255, 255);
    pixels.show();
    LedValue1 = 0;
  }
}



BLYNK_WRITE(V25) {
  // Set incoming value from pin V0 to a variable
  int value = param.asInt();

  if (value == 1) {
    pixels.setPixelColor(7, 255, 255, 255);
    pixels.setPixelColor(8, 255, 255, 255);
    pixels.setPixelColor(9, 255, 255, 255);
    pixels.setPixelColor(10, 0, 0, 0);
    pixels.setPixelColor(11, 255, 255, 255);
    pixels.setPixelColor(12, 255, 255, 255);
    pixels.setPixelColor(13, 255, 255, 255);
    pixels.setPixelColor(17, 255, 255, 255);
    pixels.setPixelColor(18, 255, 255, 255);
    pixels.setPixelColor(19, 255, 255, 255);
    pixels.setPixelColor(0, 0, 0, 0);
    pixels.setPixelColor(1, 255, 255, 255);
    pixels.setPixelColor(2, 255, 255, 255);
    pixels.setPixelColor(3, 255, 255, 255);
    pixels.show();
    LedValue1 = 0;
    LedValue2 = 0;
  }
}


BLYNK_WRITE(V0) {
  // Set incoming value from pin V0 to a variable
  int value = param.asInt();

  if (value == 1) {
    pixels.setPixelColor(17, 255, 255, 255);
    pixels.setPixelColor(18, 255, 255, 255);
    pixels.setPixelColor(19, 255, 255, 255);
    pixels.setPixelColor(0, 0, 0, 0);
    pixels.setPixelColor(1, 255, 255, 255);
    pixels.setPixelColor(2, 255, 255, 255);
    pixels.setPixelColor(3, 255, 255, 255);
    pixels.show();
    LedValue2 = 0;
```

```
  }
}


// This function is called every time the Virtual Pin 0 state changes
BLYNK_WRITE(V17) {
  // Set incoming value from pin V0 to a variable
  int value = param.asInt();

  if (value == 1) {
    pixels.setPixelColor(17, 255, 0, 0);
    pixels.show();
    LedValue2 = LedValue2 + 1;
  } else {
    pixels.setPixelColor(17, 255, 255, 255);
    pixels.show();
    LedValue2 = LedValue2 - 1;
  }
}

BLYNK_WRITE(V18) {
  // Set incoming value from pin V0 to a variable
  int value = param.asInt();

  if (value == 1) {
    pixels.setPixelColor(18, 255, 0, 0);
    pixels.show();
    LedValue2 = LedValue2 + 1;
  } else {
    pixels.setPixelColor(18, 255, 255, 255);
    pixels.show();
    LedValue2 = LedValue2 - 1;
  }
}

BLYNK_WRITE(V19) {
  // Set incoming value from pin V0 to a variable
  int value = param.asInt();

  if (value == 1) {
    pixels.setPixelColor(19, 255, 0, 0);
    pixels.show();
    LedValue2 = LedValue2 + 1;
  } else {
    pixels.setPixelColor(19, 255, 255, 255);
    pixels.show();
    LedValue2 = LedValue2 - 1;
  }
}

BLYNK_WRITE(V101) {
  // Set incoming value from pin V0 to a variable
  int value = param.asInt();

  if (value == 1) {
    pixels.setPixelColor(1, 255, 0, 0);
    pixels.show();
    LedValue2 = LedValue2 + 1;
  } else {
    pixels.setPixelColor(1, 255, 255, 255);
    pixels.show();
```

```
    LedValue2 = LedValue2 - 1;
  }
}

BLYNK_WRITE(V2) {
  // Set incoming value from pin V0 to a variable
  int value = param.asInt();


  if (value == 1) {
    pixels.setPixelColor(2, 255, 0, 0);
    pixels.show();
    LedValue2 = LedValue2 + 1;
  } else {
    pixels.setPixelColor(2, 255, 255, 255);
    pixels.show();
    LedValue2 = LedValue2 - 1;
  }
}

BLYNK_WRITE(V3) {
  // Set incoming value from pin V0 to a variable
  int value = param.asInt();

  if (value == 1) {
    pixels.setPixelColor(3, 255, 0, 0);
    pixels.show();
    LedValue2 = LedValue2 + 1;
  } else {
    pixels.setPixelColor(3, 255, 255, 255);
    pixels.show();
    LedValue2 = LedValue2 - 1;
  }
}


BLYNK_WRITE(V26) {
  // Set incoming value from pin V0 to a variable
  int value = param.asInt();

  if (value == 1) {

    pixels.setPixelColor(0, 0, 0, 0);
    pixels.show();
  }
}

BLYNK_WRITE(V27) {
  // Set incoming value from pin V0 to a variable
  int value = param.asInt();

  if (value == 1) {

    pixels.setPixelColor(10, 0, 0, 0);
    pixels.show();
  }
}
```

```
void loop() {
  // read the state of the pushbutton value:

  lastbuttonstate1 = currentbuttonstate1;
  delay(200);
  currentbuttonstate1 = digitalRead(buttonPin1);

  lastbuttonstate2 = currentbuttonstate2;
  delay(200);
  currentbuttonstate2 = digitalRead(buttonPin2);

  Serial.println("Button 1 = ");
  Serial.println(currentbuttonstate1);


  Serial.println("Button 2 = ");
  Serial.println(currentbuttonstate2);

  handleState();
}

void handleState() {

  switch (currentState) {
    case IDLE_STATE:
      idle_state();
      break;

    case COMPARE_STATE:
      Compare_Mode();
      break;

    case SMB_STATE:
      SMB_Mode();
      break;
  }
}



void idle_state() {
  Serial.println("Device is in Idle State");

  pixels.setPixelColor(0, 0, 0, 255);
  pixels.setPixelColor(5, 0, 0, 255);
  pixels.setPixelColor(10, 0, 0, 255);
  pixels.setPixelColor(15, 0, 0, 255);
  pixels.show();

  if (lastbuttonstate1 == 1 && currentbuttonstate1 == 0 ) {
    currentState = COMPARE_STATE;
    Serial.println("Device is going to compare game state");
    pixels.clear();
    pixels.setPixelColor(0, 0, 0, 255);
    pixels.setPixelColor(10, 0, 0, 255);
    pixels.show();
    delay(2000);
    pixels.setPixelColor(0, 0, 0, 0);
    pixels.setPixelColor(10, 0, 0, 0);
```

```
    pixels.show();
    handleState();
  }
  if (lastbuttonstate2 == 1 && currentbuttonstate2 == 0) {
    currentState = SMB_STATE;
    Serial.println("Device is going to SMB game state");
    pixels.clear();
    pixels.setPixelColor(5, 0, 0, 255);
    pixels.setPixelColor(15, 0, 0, 255);
    pixels.show();
    delay(2000);
    pixels.setPixelColor(5, 0, 0, 0);
    pixels.setPixelColor(15, 0, 0, 0);
    pixels.show();
    handleState();
  }
}


void Compare_Mode() {

  Blynk.run();
  Serial.println("The LedValue 1 =");
  Serial.println(LedValue1);
  Serial.println("The LedValue 2 =");
  Serial.println(LedValue2);

  if (LedValue1 == 6) {
    D10wins();
  }

  if (LedValue2 == 6) {
    d0wins();
  }

  if (lastbuttonstate1 == 1 && currentbuttonstate1 == 0 && lastbuttonstate2
== 1 && currentbuttonstate2 == 0) {
    resetFunc();
  }
}

void SMB_Mode() {


  // check if the pushbutton is pressed. If it is, the buttonState is HIGH:
  if (currentbuttonstate2 == 1) {  //User Player, so random number 1
    PrevRandNumb1 = NewRandNumb1;
    pixels.setPixelColor(PrevRandNumb1, pixels.Color(0, 0, 0));

    NewRandNumb1 = PrevRandNumb1 + random(1, 10);

    if (NewRandNumb1 > 19) {
      NewRandNumb1 = NewRandNumb1 - 19;
    }

    Serial.println(PrevRandNumb1);
    Serial.println(NewRandNumb1);
    if (NewRandNumb1 > PrevRandNumb1) {
      for (int i = PrevRandNumb1; i < NewRandNumb1; i++) {
        pixels.setPixelColor(i, 0, 255, 255);
        pixels.show();
```

```
    delay(200);
    pixels.setPixelColor(i, 0, 0, 0);
    pixels.show();
  }
  pixels.setPixelColor(NewRandNumb1, 0, 255, 255, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(NewRandNumb1, 0, 0, 0, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(NewRandNumb1, 0, 255, 255, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(NewRandNumb1, 0, 0, 0, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(NewRandNumb1, 0, 255, 255, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(NewRandNumb1, 0, 0, 0, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(NewRandNumb1, 0, 255, 255, 0);
  pixels.show();
}

if (NewRandNumb1 < PrevRandNumb1) {
  for (int i = PrevRandNumb1; i < NUMPIXELS; i++) {
    pixels.setPixelColor(i, 0, 255, 255);
    pixels.show();
    delay(200);
    pixels.setPixelColor(i, 0, 0, 0);
    pixels.show();
  }
  for (int i = 0; i < NewRandNumb1; i++) {
    pixels.setPixelColor(i, 0, 255, 255);
    pixels.show();
    delay(200);
    pixels.setPixelColor(i, 0, 0, 0);
    pixels.show();
  }
  pixels.setPixelColor(NewRandNumb1, 0, 255, 255, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(NewRandNumb1, 0, 0, 0, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(NewRandNumb1, 0, 255, 255, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(NewRandNumb1, 0, 0, 0, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(NewRandNumb1, 0, 255, 255, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(NewRandNumb1, 0, 0, 0, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(NewRandNumb1, 0, 255, 255, 0);
  pixels.show();
```

```
    }

  } else {
    // turn LED off:
  }

  if (currentbuttonstate1 == 1) {
    PrevRandNumb2 = NewRandNumb2;
    pixels.setPixelColor(PrevRandNumb2, pixels.Color(0, 0, 0));

    NewRandNumb2 = PrevRandNumb2 + random(1, 10);

    if (NewRandNumb2 > 19) {
      NewRandNumb2 = NewRandNumb2 - 19;
    }

    Serial.println(PrevRandNumb2);
    Serial.println(NewRandNumb2);

    if (NewRandNumb2 > PrevRandNumb2) {
      for (int i = PrevRandNumb2; i < NewRandNumb2; i++) {
        pixels.setPixelColor(i, 255, 0, 0);
        pixels.show();
        delay(200);
        pixels.setPixelColor(i, 0, 0, 0);
        pixels.show();
      }
      pixels.setPixelColor(NewRandNumb2, 255, 0, 0, 0);
      pixels.show();
      delay(100);
      pixels.setPixelColor(NewRandNumb2, 0, 0, 0, 0);
      pixels.show();
      delay(100);
      pixels.setPixelColor(NewRandNumb2, 255, 0, 0, 0);
      pixels.show();
      delay(100);
      pixels.setPixelColor(NewRandNumb2, 0, 0, 0, 0);
      pixels.show();
      delay(100);
      pixels.setPixelColor(NewRandNumb2, 255, 0, 0, 0);
      pixels.show();
      delay(100);
      pixels.setPixelColor(NewRandNumb2, 0, 0, 0, 0);
      pixels.show();
      delay(100);
      pixels.setPixelColor(NewRandNumb2, 255, 0, 0, 0);
      pixels.show();
    }

    if (NewRandNumb2 < PrevRandNumb2) {
      for (int i = PrevRandNumb2; i < NUMPIXELS; i++) {
        pixels.setPixelColor(i, 255, 0, 0);
        pixels.show();
        delay(200);
        pixels.setPixelColor(i, 0, 0, 0);
        pixels.show();
      }
      for (int i = 0; i < NewRandNumb2; i++) {
        pixels.setPixelColor(i, 255, 0, 0);
        pixels.show();
        delay(200);
```

```
        pixels.setPixelColor(i, 0, 0, 0);
        pixels.show();
      }
      pixels.setPixelColor(NewRandNumb2, 255, 0, 0, 0);
      pixels.show();
      delay(100);
      pixels.setPixelColor(NewRandNumb2, 0, 0, 0, 0);
      pixels.show();
      delay(100);
      pixels.setPixelColor(NewRandNumb2, 255, 0, 0, 0);
      pixels.show();
      delay(100);
      pixels.setPixelColor(NewRandNumb2, 0, 0, 0, 0);
      pixels.show();
      delay(100);
      pixels.setPixelColor(NewRandNumb2, 255, 0, 0, 0);
      pixels.show();
      delay(100);
      pixels.setPixelColor(NewRandNumb2, 0, 0, 0, 0);
      pixels.show();
      delay(100);
      pixels.setPixelColor(NewRandNumb2, 255, 0, 0, 0);
      pixels.show();
    }

  } else {
    // turn LED off:
  }

  delay(200);

  if (lastbuttonstate1 == 1 && currentbuttonstate1 == 0 && lastbuttonstate2
== 1 && currentbuttonstate2 == 0) {
    resetFunc();
  }
}

void D10wins() {
  pixels.setPixelColor(10, 255, 0, 0);
  pixels.setPixelColor(0, 0, 255, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(10, 0, 0, 0);
  pixels.setPixelColor(0, 0, 0, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(10, 255, 0, 0);
  pixels.setPixelColor(0, 0, 255, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(10, 0, 0, 0);
  pixels.setPixelColor(0, 0, 0, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(10, 255, 0, 0);
  pixels.setPixelColor(0, 0, 255, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(10, 0, 0, 0);
  pixels.setPixelColor(0, 0, 0, 0);
  pixels.show();
```

```
  delay(100);
  pixels.setPixelColor(10, 255, 0, 0);
  pixels.setPixelColor(0, 0, 255, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(10, 0, 0, 0);
  pixels.setPixelColor(0, 0, 0, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(10, 255, 0, 0);
  pixels.setPixelColor(0, 0, 255, 0);
  pixels.show();
  delay(300);
  pixels.setPixelColor(10, 0, 0, 0);
  pixels.setPixelColor(0, 0, 0, 0);
  pixels.show();
  delay(300);
  pixels.setPixelColor(10, 255, 0, 0);
  pixels.setPixelColor(0, 0, 255, 0);
  pixels.show();
  delay(300);
  pixels.setPixelColor(10, 0, 0, 0);
  pixels.setPixelColor(0, 0, 0, 0);
  pixels.show();
  delay(300);
  pixels.setPixelColor(10, 255, 0, 0);
  pixels.setPixelColor(0, 0, 255, 0);
  pixels.show();
  delay(300);
  pixels.setPixelColor(10, 0, 0, 0);
  pixels.setPixelColor(0, 0, 0, 0);
  pixels.show();
  delay(300);
  pixels.setPixelColor(10, 255, 0, 0);
  pixels.setPixelColor(0, 0, 255, 0);
  pixels.show();
  LedValue1 = 0;
}

void d0wins() {
  pixels.setPixelColor(0, 255, 0, 0);
  pixels.setPixelColor(10, 0, 255, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(0, 0, 0, 0);
  pixels.setPixelColor(10, 0, 0, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(0, 255, 0, 0);
  pixels.setPixelColor(10, 0, 255, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(0, 0, 0, 0);
  pixels.setPixelColor(10, 0, 0, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(0, 255, 0, 0);
  pixels.setPixelColor(10, 0, 255, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(0, 0, 0, 0);
```

```
  pixels.setPixelColor(10, 0, 0, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(0, 255, 0, 0);
  pixels.setPixelColor(10, 0, 255, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(0, 0, 0, 0);
  pixels.setPixelColor(10, 0, 0, 0);
  pixels.show();
  delay(100);
  pixels.setPixelColor(0, 255, 0, 0);
  pixels.setPixelColor(10, 0, 255, 0);
  pixels.show();
  delay(300);
  pixels.setPixelColor(0, 0, 0, 0);
  pixels.setPixelColor(10, 0, 0, 0);
  pixels.show();
  delay(300);
  pixels.setPixelColor(0, 255, 0, 0);
  pixels.setPixelColor(10, 0, 255, 0);
  pixels.show();
  delay(300);
  pixels.setPixelColor(0, 0, 0, 0);
  pixels.setPixelColor(10, 0, 0, 0);
  pixels.show();
  delay(300);
  pixels.setPixelColor(0, 255, 0, 0);
  pixels.setPixelColor(10, 0, 255, 0);
  pixels.show();
  delay(300);
  pixels.setPixelColor(0, 0, 0, 0);
  pixels.setPixelColor(10, 0, 0, 0);
  pixels.show();
  delay(300);
  pixels.setPixelColor(0, 255, 0, 0);
  pixels.setPixelColor(10, 0, 255, 0);
  pixels.show();
  LedValue2 = 0;
}
```

Appendix O – Playing rules

Behind the Feed: een leerervaring over social media algoritmes (NL)

Introductie

Een splinternieuw social media platform staat op het punt de wereld te veroveren: BeYou. De makers hebben een grote droom: het grootste platform worden met de beste persoonlijke feed voor iedere gebruiker. Maar er is één probleem... ze weten niet hoe ze dit perfecte algoritme moeten bouwen.

In deze leerervaring duiken jullie als duo in de fascinerende wereld van social media algoritmes. Door drie interactieve spellen te spelen tegen een ander duo leren jullie hoe algoritmes werken, welke data platforms verzamelen, hoe persoonlijke feeds ontstaan, en welke impact dit alles kan hebben – zowel voor jou als gebruiker, als voor de samenleving. Wie weet kunnen jullie de makers helpen met het ontwikkelen van het algoritme van BeYou, of kijk je als toekomstig gebruiker juist kritisch naar wat dit betekent voor je social media-ervaring.

Kom in een Bubbel

In het eerste spel ontdekken jullie hoe algoritmes werken en hoe ze jou in een filterbubbel kunnen plaatsen. Leer hoe platforms keuzes voor je maken zonder dat je het doorhebt.

Raad de Data & Video

Kruip in de huid van een algoritme! Raad de data die bij verschillende persoonlijke feeds horen, maak persoonlijke aanbevelingen en vergelijk de invloed van deze feeds. Weet jij de data te raden en de juiste video aan te bevelen?

Social Media Battle

Zet al je kennis en vaardigheden in. Werk mee aan het algoritme van BeYou of kies ervoor om als kritische gebruiker het platform slim te gebruiken. Jij bepaalt de strategie!

Tijdens deze spellen ontdek je hoe algoritmes werken en word je je bewust van de invloed die ze kunnen hebben op jou en op anderen. Je bouwt kennis en vaardigheden op die je helpen om social media op een slimme en bewuste manier te gebruiken. Wie weet word jij wel de volgende algoritme-expert – of zorg je ervoor dat social media platforms minder grip op jou krijgen.

Ben jij er klaar voor om algoritmisch geletterd te worden?

Spelregels Kom in een Bubbel

Inleiding

Om bij te kunnen dragen aan het ontwikkelen van het algoritme van BeYou hebben jullie kennis nodig van de werking van algoritmes in social media. In dit spel duiken jullie in een social media algoritme en ontdekken jullie hoe platforms persoonlijke feeds creëren. Door strategisch data in te zetten, proberen jullie een filterbubbel te bereiken terwijl jullie zo veel mogelijk data behouden. Het draait niet alleen om snelheid, maar vooral om slimme keuzes. Ben jij klaar om het algoritme te slim af te zijn?

Speldoel

Kom voor X% in een filterbubbel door acties uit te voeren op de Social Media feed en behoud zoveel mogelijk data binnen de beschikbare tijd.

Leerdoelen:

1. Begrijpen hoe algoritmes op social media werken.
2. Inzicht krijgen in welke data wordt verzameld en hoe dit leidt tot gepersonaliseerde content.
3. Leren hoe eigen gedrag de werking van algoritmes beïnvloedt.

Spelverloop

Het spel wordt gespeeld in 4 rondes, waarbij ieder duo het doel heeft om in elke ronde een nieuwe filter bubbel te bereiken. Elk duo heeft twee rollen en wisselt iedere ronde van rol:

Data Bewaarder: Houdt toezicht op de beschikbare data en plaatst de ingezette data in de “black box’.

Interactie Uitvoerder: Voert de acties uit op de feed om de filterbubbel te bereiken.

Tijdens een ronde:

- Ieder duo krijgt het onderwerp van de bubbel voorafgaand aan iedere ronde te zien.
- Duo’s proberen na de start tegelijkertijd in een filterbubbel terecht te komen binnen de tijd.
- Bij iedere video op de feed kies je mogelijke acties van verschillende datawaarde om voortgang te maken richting de filterbubbel. (Meerdere acties mogelijk bij elke video)
- Beide teams mogen maximaal twee keer per ronde kijken of ze de filterbubbel hebben bereikt. Let op: hierbij zien jullie tegenstanders ook hun voortgangspercentage.
- Het spel stopt als de tijd om is.

Elke ronde heeft een winnaar of eindigt in een gelijkspel. Het winnende duo is het duo dat als eerste in de filterbubbel terecht is gekomen én dit zelf checkt. Hebben beide duo’s de bubbel bereikt? Dan wint het duo met de meeste data nog in bezit heeft. Een ronde eindigt in een gelijk spel als beide duo’s in een bubbel terecht zijn gekomen en dezelfde hoeveelheid data nog in bezit hebben.

Spelinhoud

- **Spelbord:** Het spelbord inclusief de “Black Box” waar de data tokens in worden gedaan na het uitvoeren van een actie.
- **Social Media Feed:** de simulatie feed waarop acties worden uitgevoerd.
- **Data tokens:** De data die in de ‘Black Box” wordt gedaan bij het uitvoeren van de acties op de feed.

Voorbereiding

1. Open de 'Behind the Feed' webapplicatie en start het spel Kom in een Bubbel
2. Zet de 'Black Box' in het midden van het spelbord en zet je telefoon tegen de houder.
3. Bepaal wie begint als Data Bewaarder en Interactie Uitvoerder. Wissel na elke ronde.
4. Verdeel de data tokens
5. Start het spel
6. Haal na iedere ronde de data uit de 'Black Box" voordat de volgende ronde start.

Spelregels

1. De Interactie Uitvoerder voert de acties uit op de social media feed om in de juiste filterbubbel te komen.
2. De Data Bewaarder registreert de datakosten bij elke actie en stopt deze in de 'Black Box'.
3. Duo's mogen maximaal twee keer per ronde kijken of ze de filterbubbel hebben bereikt.
4. Checkt een duo het percentage en hebben zij de filterbubbel bereikt en het andere duo niet, dan wint het duo wat de filterbubbel heeft bereikt.
5. Als beide duo's hun filterbubbel hebben bereikt, wordt het aantal resterende data geteld. Het duo met de meeste data nog in bezit wint de ronde.
6. Bij een gelijke stand (beide duo's hebben de filterbubbel bereikt met dezelfde hoeveelheid data) wordt de ronde als gelijkspel beschouwd.
7. De duo's noteren hun overwinning.

Acties & Kosten

Je kan de volgende acties uitvoeren op de feed:

0 data tokens:

- Scroll

1 data token:

- Like
- Comment
- Markeren als 'niet interessant'

2 data tokens:

- Delen
- Volgen/Ontvolgen
- Interactie

3 data tokens:

- Opnieuw Kijken
    - Nóg een keer kijken (3x = 4 data tokens)
    - Nóg een keer kijken (4x = 5 data tokens)

Einde van het spel

Na vier rondes wordt de eindstand opgemaakt. Het duo met de meeste gewonnen rondes wint het spel.

Het verliezende team neemt de data in de "Black Box' van de laatste ronde mee naar de volgende spellen.

Bij een gelijke stand nemen beide teams de data in de "Black Box' van de laatste ronde mee naar de volgende spellen.

Vragen en Antwoorden

Wat als niemand de filterbubbel bereikt binnen de tijd?

Deze ronde eindigt zonder winnaar.

Mag je meerdere acties uitvoeren bij dezelfde video?

Ja, maar houd rekening met de toenemende datakosten voor deze acties.

Tips voor Spelen

- Werk samen en bespreek een strategie.
- Denk vooruit: soms is het beter om minder data in te zetten om later een voordeel te hebben.
- Experimenteer met verschillende acties om te begrijpen welke het meeste effect hebben.

Spelregels Raad de Data & Video

Om een kritische gebruiker van BeYou te kunnen worden is het nodig om de impact van algoritmes en persoonlijke feeds te weten. In dit spel zijn jullie het algoritme: Hoe denkt een algoritme? Wat weet het van een gebruiker? Door samen te werken en strategisch na te denken, proberen jullie de juiste datacategorieën te raden en een nieuwe video aan te bevelen en ga je verschillende feeds vergelijken. Wie kan het beste denken als een algoritme?

Speldoel

Denk als een algoritme, raad welke gegevens horen bij een persoonlijke feed en wijs de bijbehorende video correct toe aan de feed.

Leerdoelen:

- Begrijpen hoe algoritmes een profiel maken op basis van gebruikersdata.
- Inzien dat algoritmes verschillende feeds creëren op basis van verschillende gebruikersdata.
- Leren kritisch te kijken naar hoe algoritmes werken en wat zij van je weten.

Spelverloop

Het spel wordt gespeeld in 4 rondes. Elk duo probeert in elke ronde zes datacategorieën correct te raden die bij het profiel horen van de gepersonaliseerde feed die ze bekijken. Na het raden van de data categorieën wijst ieder duo één van de vier getoonde video's toe die als aanbeveling aan de feed in deze ronde

Tijdens een ronde:

- Duo's scrollen door de feed van een social mediagebruiker.
- Bespreek en raad de data binnen de 9 beschikbare datacategorieën.
- Schrijf de datacategorie op en de door jullie geraden gegevens, en plaats een data token op het spelbord.
- Als een duo zes categorieën heeft geplaatst, wordt het spel gepauzeerd en de data bij de bijbehorende categorieën gecontroleerd. Let op: ook het ander duo ziet of deze correct zijn.
- Bij vijf correct geraden categorieën wint dat duo deze ronde.
- Aan het einde van iedere ronde kiest ieder duo één van de vier video's om aan deze feed aan te bevelen.

Na de laatste ronde kunnen duo's hun keuzes voor de aanbevolen video's bij iedere feed herzien om de juiste video's aan de juiste feed aan te bevelen.

Spelinhoud

- **Spelbord**: Voor het plaatsen van datacategorieën en het plaatsen van de telefoon tegen de houder.
- **Social Media Feed:** de simulatie van de persoonlijke feeds.
- **Data tokens:** De data die op het spelbord worden gelegd bij het raden van de datacategorieën.

Lijst met datacategorieën:

- Gender
- Leeftijd
- Locatie
- Nationaliteit
- Persoonlijkheid
- Interesses
- Politieke voorkeur
- Relatiestatus
- Gevoel/Emotie

Voorbereiding

1. Open de 'Behind the Feed' webapplicatie en start het spel Raad de Data & Video.
2. Zet de 'Black Box' in het midden van het spelbord en zet je telefoon tegen de houder.
3. Zorg dat je als duo 6 data tokens hebt.
4. Zorg dat je de datacategorieën weet en gebruik zo nodig pen en papier om deze te noteren met het raden.

Spelregels

1. Duo's bekijken een persoonlijke feed en raden data uit een van de categoriën dat bij het profiel hoort van deze feed en plaatsen deze op hun speelbord.
2. Een ronde wordt gepauzeerd wanneer een duo zes categorieën heeft geraden en geplaatst.
3. Controleer de keuzes:
    a. Beide duo's zien of de geraden categorieën van dit duo correct zijn.
    b. Bij minimaal vijf correcte categorieën wint dat duo de ronde.
4. Duo's noteren hun overwiningen.
5. Aan het einde van de ronde kiezen beide duo's één van de vier video's en koppelen deze aan de feed die ze in die ronde bekeken hebben.
6. Na vier rondes kunnen duo's hun video aanbevelingen wijzigen.

Einde van het spel

Het duo dat de meeste rondes wint met het raden van de data, is de winnaar.

De winnaar stop de hoeveelheid correct geraden data (5 of 6) uit de laatste ronde in de 'Black Box' om mee te nemen naar het volgende spel.

Bij een gelijke stand wordt de winnaar bepaald door de correcte aanbevelingen van de video's voor elke feed.

Als een duo alle aanbevelingen goed heeft stoppen zij 3 data tokens in de 'Black Box' om mee te nemen naar het volgende spel.

Als er een totale gelijkstand is, dus in gelijke stand in overwinningen en juiste aanbevelingen, eindigt het spel in een gelijkspel en wordt er geen data van de laatste ronde meegenomen naar het volgend spel. Beide duo's kunnen nog wel drie extra data tokens meenemen als ze alle video's correct hebben aanbevolen.

Vragen en Antwoorden

Wat gebeurt er als een duo niet 5 categorieën goed hebben om te winnen?

Dit duo haalt de foutieve hoeveelheid data van het spelbord en probeert het opnieuw. Deze ronde gaat verder.

Kunnen dezelfde categorie meerdere keren geraden worden?

Ja, maar niet elke categorie kan meerdere keren worden geraden.

Tips voor spelen

- Ga voor je gevoel, je eerste ingeving is meestal goed.
- Spreek niet te hard voordat je je tegenstander op ideeën brengt.
-

Spelregels Social Media Battle

Inleiding

In Social Media Battle komt alles samen. Je hebt eerder geleerd hoe algoritmes werken, welke data ze verzamelen en hoe dit je feed, jou en zelfs de maatschappij kan beïnvloeden. Nu is het tijd om je kennis en vaardigheden in de praktijk te brengen. Het is tijd voor de ultieme uitdaging! Je speelt als een duo dat helpt het algoritme van BeYou te ontwikkelen, of je probeert om als kritische gebruiker je feed te beheren. Welke duo weet de Social Media Battle te winnen?

Speldoel

Test je kennis en vaardigheden over algoritmes door het optimaliseren van een social media feed of door het beheren van een algoritme.

- **Gebruikersduo**: Verken het platform, kom in een filter bubbel, en breek er weer uit door de juiste acties uit te voeren op het platform. Maar pas op, elke actie kost data!
- **Bedrijfsduo**: Update het BeYou algoritme en verzamel alle data van de gebruiker.

Spelverloop

Het spel bestaat uit twee rondes:

1. **In de bubbel komen**
2. **Uit de bubbel komen**

Elke ronde kan worden gewonnen door het gebruikersduo of het bedrijfsduo.

Spelinhoud

- Speelbord, Gebruiker pion & Bedrijf Pion
- Vraagkaartjes, Actiekaartjes, Updatekaartjes & een Informatiekaart
- Data tokens
- 'Black Box' & 'Button Box'
- BeYou platform (spel 3: 'Social Media Battle' in de webapplicatie)

Voorbereiding

1. Verdeel de rollen van de duo's: het gebruikersduo of het bedrijfsduo.
2. Open de 'Behind the Feed' webapplicatie op één telefoon en start het spel Social Media Battle.
3. Haal de 'Black Box' van het spelbord en haal de data hieruit.
    a. Het gebruikersduo krijgt deze hoeveelheid data boven op de starthoeveelheid.
    b. Het bedrijfsduo kan deze hoeveelheid data inwisselen voor update percentage (1 data token = 10 % update) Dit kan niet tijdens het spel.
4. Plaats het spelbord in het midden en leg de telefoon in het midden van het bord.
5. Leg alle kaarten in juiste stapeltjes op tafel. Schud indien nodig.
6. Gebruikerduo: pak X datatokens en bekijk de informatiekaart voor de kosten van elke actie.
7. Bedrijfduo: bekijk alle beschikbare updates en pak het 'Like Algoritme'. Met dit algoritme start je het spel.
8. Start het spel. Het bedrijfsduo begint.

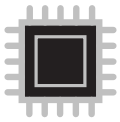
Vraagpunt

Spelregels

1. **Beurtverdeling**:

- Duo's drukken op de juiste knop en verplaatsen hun pion over het bord naar de juiste locatie.
- Bij het landen op een vraagpunt pak je een vraagkaartje, lees je de vraag voor en beantwoord je deze. Bij het landen op een actiepunt trek je een actiekaartje en voer je de actie uit.
- Bij het goed beantwoorden van een vraag, mag het gebruikerduo één of meerdere acties uitvoeren op het platform of ontvangt het bedrijfsduo een updatepercentage.
- Bij een fout antwoord gebeurt er niets.

Actiepunt



2. **Acties uitvoeren op BeYou**:
    - Elke actie die het gebruikerduo uitvoert op het platform kost een bepaalde hoeveelheid data. Deze staan op de informatiekaart aangegeven. Geef het bedrijfsduo de juiste hoeveelheid data na het uitvoeren van een actie. Het bedrijfsduo kan de “Black Box” gebruiken om de data in te doen in iedere ronde.
3. **Ronde 1: In de bubbel komen**:
    - Het gebruikerduo wint als ze een bubbel van minimaal 90% hebben bereikt.
    - Het bedrijfsduo wint als ze de helft van de updates hebben verzameld.
4. **Ronde 2: Uit de bubbel komen**:
    - Het gebruikersduo wint als ze de bubbel hebben verkleind tot 10% of minder.
    - Het bedrijfsduo wint als ze alle data van de gebruiker hebben verzameld. Het algoritme kan in deze ronde nog steeds worden geüpdatet om meer data te krijgen van het gebruikersduo.

Acties op het platform

Het gebruikers duo kan de volgende acties uitvoeren op het platform:

- Like
- Markeren als ‘niet interessant’
- Comment
- Delen
- Interactie (hashtag bekijken)
- Volgen/Ontvolgen
- Opnieuw Kijken

Algoritme updates:

Het bedrijfsduo kan de volgende updates voor het algoritme verzamelen:

- Like Algoritme (in bezit bij de start van het spel)
- Comment Algoritme
- Delen Algoritme
- Volg Algoritme
- Kijktijd Algoritme
- Interactie Algoritme
- Niet-interessant Algoritme

Einde van het spel

Een ronde eindigt als één van de duo's hun doel heeft bereikt van de desbetreffende ronde. Het spel eindigt zodra één van de duo's hun doel heeft bereikt in de tweede. Een duo wint het spel als ze beide rondes hebben gewonnen, of het spel eindigt in een gelijkspel als elk duo één ronde heeft gewonnen. Het winnende duo heeft zijn strategie en kennis van social media algoritmes het beste ingezet.

Vragen en Antwoorden

- **Wat zijn data tokens?** Data tokens vertegenwoordigen de hoeveelheid data die een gebruiker genereert en afstaat door acties op het platform uit te voeren.
- **Wat zijn algoritme updates?** Algoritme updates optimaliseren de gepersonaliseerde feed en hiermee dus ook het vermogen van het bedrijf om data van de gebruikers te verzamelen.
- **Hoe werkt de bubbelmeter?** De bubbelmeter geeft aan hoeveel procent de gebruiker in een filter bubbel zit. Het doel van het gebruikersduo is om deze eerst boven 90% te krijgen (ronde 1) en vervolgens weer naar 10% of minder te verlagen (ronde 2).

Tips voor Spelen

- Elke video speelt maar 1 x af, tenzij je voor de actie opnieuw kijken kiest. Scroll pas verder als je in een volgende beurt een actie mag uitvoeren en let goed op bij het bekijken.
- Werk goed samen met je partner en ontwikkel een strategie.
- Gebruik je kennis van algoritmes en social media om de vragen goed te beantwoorden.
- Let op de acties van het andere duo en pas je strategie daarop aan.

Behind the Feed: a learning experience on social media algorithms (EN)

Introduction

A brand-new social media platform is about to take the world by storm: BeYou. The creators have a big dream: to become the largest platform with the best personal feed for every user. But there's one problem... they don't know how to build this perfect algorithm.

In this learning experience, you and a partner will dive into the fascinating world of social media algorithms. By playing three interactive games against another duo, you will learn how algorithms work, what data platforms collect, how personal feeds are created, and the potential impacts this can have – both for you as a user and for society. Who knows, you might be able to help the creators develop BeYou's algorithm or, as a future user, critically examine what this means for your social media experience.

Enter the Bubble

In the first game, you will discover how algorithms work and how they can place you in a filter bubble. Learn how platforms make choices for you without you even realizing it.

Guess the Data & Video

Step into the shoes of an algorithm! Guess the data that belongs to various personal feeds, make personalized recommendations, and compare the influence of these feeds. Can you guess the correct data and recommend the right video?

Social Media Battle

Put all your knowledge and skills to the test. Help develop BeYou's algorithm or choose to be a critical user and use the platform smartly. You control the strategy!

During these games, you will discover how algorithms work and become aware of the influence they can have on you and others. You'll build knowledge and skills to use social media in a smart and conscious way. Who knows, you might become the next algorithm expert – or ensure social media platforms have less control over you.

Are you ready to become algorithmically literate?

Game Rules: Get Into a Bubble

Introduction

To help contribute to the development of BeYou's algorithm, you need to understand how social media algorithms work. In this game, you'll dive into a social media algorithm and discover how platforms create personal feeds. By strategically using data, you'll try to reach a filter bubble while retaining as much data as possible. It's not just about speed, but especially about making smart choices. Are you ready to outsmart the algorithm?

Objective

Get X% into a filter bubble by performing actions on the Social Media feed and retaining as much data as possible within the available time.

Learning Objectives

- Understand how algorithms work on social media.
- Gain insight into what data is collected and how it leads to personalized content.
- Learn how your behavior influences the functioning of algorithms.

Game Flow

The game is played in 4 rounds, with each pair aiming to reach a new filter bubble in each round. Each pair has two roles and switches roles every round:

Data Keeper: Monitors the available data and places the used data in the "black box."

Interaction Executor: Performs actions on the feed to reach the filter bubble.

During a round:

- Each pair receives the subject of the bubble before each round.
- Pairs try to get into a filter bubble within the time limit.
- For every video on the feed, you choose actions with different data values to progress toward the filter bubble (multiple actions possible for each video).
- Both teams may check their progress twice per round to see if they've reached the filter bubble. Be aware: you'll also see your opponent's progress percentage.
- The game stops when the time runs out.

Each round has a winner or ends in a draw. The winning pair is the one that reaches the filter bubble first and checks it. If both pairs reach the bubble, the one with the most data left wins the round. If both pairs are in the bubble with the same amount of data left, the round ends in a draw.

Game Content

- Game Board: The board with the "Black Box" where the data tokens are placed after performing an action.
- Social Media Feed: The simulated feed where actions are performed.
- Data Tokens: The data placed in the "Black Box" after actions are performed on the feed.

Preparation

1. Open the 'Behind the Feed' web application and start the game Get Into a Bubble.
2. Place the 'Black Box' in the center of the game board and place your phone in the holder.
3. Decide who starts as the Data Keeper and Interaction Executor. Switch after each round.
4. Distribute the data tokens.
5. Start the game.
6. After each round, remove the data from the 'Black Box' before starting the next round.

Game Rules

1. The Interaction Executor performs actions on the social media feed to reach the correct filter bubble.
2. The Data Keeper registers the data costs for each action and places them in the 'Black Box.'
3. Pairs may check their progress up to two times per round.
4. If a pair checks and reaches the filter bubble before the other, that pair wins.
5. If both pairs reach the filter bubble, the number of remaining data tokens is counted. The pair with the most data left wins.
6. In the event of a tie (both pairs reach the bubble with the same amount of data), the round is a draw.
7. Pairs note when they win a round.

Actions & Costs

You can perform the following actions on the feed:

0 data tokens:

- Scroll

1 data token:

- Like
- Comment
- Mark as 'not interesting'

2 data tokens:

- Share
- Follow/Unfollow
- Interact

3 data tokens:

- Rewatch
    - Watch again (3x = 4 data tokens)
    - Watch again (4x = 5 data tokens)

End of the Game

After four rounds, the final score is tallied. The pair with the most rounds won wins the game. The losing team takes the data from the “Black Box” of the last round into the next games. In the event of a tie, both teams take the data from the “Black Box” of the last round into the next games.

Questions & Answers

What if no one reaches the filter bubble within the time?

This round ends without a winner.

Can you perform multiple actions on the same video?

Yes, but keep in mind the increasing data costs for these actions.

Tips for Playing

- Work together and discuss a strategy.
- Think ahead: sometimes it’s better to spend less data now to have an advantage later.
- Experiment with different actions to understand which ones have the most effect.

Game Rules: Guess the Data & Video

Introduction

To become a critical user of BeYou, it's important to understand the impact of algorithms and personalized feeds. In this game, you are the algorithm: How does an algorithm think? What does it know about a user? By working together and thinking strategically, you'll try to guess the correct data categories and recommend a new video while comparing different feeds. Who can think like an algorithm the best?

Objective

Think like an algorithm, guess the data that belongs to a personal feed, and correctly assign the corresponding video to the feed.

Learning Objectives

- Understand how algorithms create a profile based on user data.
- Realize that algorithms create different feeds based on different user data.
- Learn to critically assess how algorithms work and what they know about you.

Game Flow

The game is played in 4 rounds. Each pair tries to correctly guess six data categories for the personalized feed they are viewing. After guessing the data categories, each pair assigns one of the four displayed videos as a recommendation for the feed in that round.

During a round:

- Pairs scroll through the feed of a social media user.
- Discuss and guess the data within the 10 available data categories.
- Write down the data categories and the guessed data, placing a data token on the game board.
- When a pair has placed six categories, the game is paused, and the data for the corresponding categories is checked. Note: both pairs will see if their guesses are correct.
- If five categories are guessed correctly that pair wins the round.
- At the end of each round, each pair chooses one of the four videos to recommend for the feed they viewed in that round.

Game Content

- Game Board: For placing data categories and the phone against the holder.
- Social Media Feed: The simulation of personal feeds.
- Data Tokens: The data placed on the game board when guessing the data categories.

List of Data Categories

- Gender
- Age
- Location
- Nationality
- Personality
- Interests
- Political preference
- Relationship status
- Education/Career
- Emotion/Feeling

Preparation

1. Open the 'Behind the Feed' web application and start the game Guess the Data & Video.
2. Place the 'Black Box' in the center of the game board and place your phone in the holder.
3. Make sure each pair has 6 data tokens.
4. Make sure you know the data categories and use pen and paper to note them while guessing

Game rules

1. Pairs view a personal feed and guess data from one of the categories that belong to the profile of this feed. They place the guessed data category on their game board.
2. A round is paused when a pair has guessed and placed six categories.
3. Check the choices:
    a. Both pairs see if the guessed categories are correct.
    b. The pair with at least five correct categories wins the round.
4. Pairs record their victories.
5. At the end of the round, both pairs choose one of the four videos and match it to the feed they viewed in that round.
6. After four rounds, pairs can modify their video recommendations.

End of the Game

The pair with the most rounds won by guessing the data correctly is the winner.

The winning pair places the number of correct data guesses (5 or 6) from the last round into the "Black Box" to take with them to the next game.

In the event of a tie, the winner is determined by the correct video recommendations for each feed.

If a pair has correctly recommended all videos, they place 3 data tokens in the "Black Box" to take with them to the next game.

If there is a complete tie, meaning equal wins and correct recommendations, the game ends in a draw, and no data from the last round is carried over to the next game. Both pairs can still take 3 extra data tokens if they have correctly recommended all the videos.

Questions and Answers

What happens if a pair does not get 5 categories correct to win?

The pair removes the incorrect data from the game board and tries again. This round continuous.

Can the same category be guessed multiple times?

Yes, but not every category can be guessed multiple times.

Game Rules: Social Media Battle

Introduction

In Social Media Battle, everything comes together. You have previously learned how algorithms work, what data they collect, and how this affects your feed, you, and even society. Now it's time to put your knowledge and skills into practice. The ultimate challenge awaits! You play as a duo helping to develop the BeYou algorithm, or you try to manage your feed as a critical user. Which duo will win the Social Media Battle?

Goal of the Game

Test your knowledge and skills about algorithms by either optimizing a social media feed or managing an algorithm.

User Duo: Explore the platform, enter a filter bubble, and break out by performing the right actions on the platform. But be careful, every action costs data!

Company Duo: Update the BeYou algorithm and collect all the user data.

Game Flow

The game consists of two rounds:

1. Entering the bubble
2. Breaking out of the bubble

Each round can be won by either the user duo or the company duo.

Game Content

- Game board, User token & Company token
- Question cards, Action cards, Update cards & Information card
- Data tokens
- 'Black Box' & 'Button Box'
- BeYou platform (Game 3: 'Social Media Battle' in the web application)

Preparation

1. Assign roles to the duos: user duo or company duo.
2. Open the 'Behind the Feed' web application on one phone and start the game "Social Media Battle."
3. Take the 'Black Box' from the game board and remove the data from it.
    a. The user duo receives this amount of data in addition to the starting amount.
    b. The company duo can exchange this amount of data for an update percentage (1 data token = 10% update). This cannot be done during the game.
4. Place the game board in the center and put the phone in the middle of the board.
5. Place all cards in their correct piles on the table. Shuffle if necessary.

6. User duo: take X data tokens and review the information card for the cost of each action.
7. Company duo: review all available updates and pick the 'Like Algorithm.' With this algorithm, you start the game.
8. Start the Game. The Company Duo begins.

Game Rules

1. Turn Sequence:
- Duos press the correct button and move their token to the correct location on the board.
- When landing on a question point, take a question card, read the question aloud, and answer it. When landing on an action point, draw an action card and perform the action.
- If the user duo answers a question correctly, they can perform an action on the platform, or the company duo receives an update percentage.
- If the answer is incorrect, nothing happens.

2. Performing Actions on BeYou:

Every action performed by the user duo on the platform costs a certain amount of data. This is specified on the information card. Give the company duo the correct amount of data after performing an action. The company duo can use the "Black Box" to store the data each round.

3. Round 1: Entering the Bubble:
- The user duo wins if they reach a bubble of at least 90%.
- The company duo wins if they have collected half of the updates.

4. Round 2: Breaking Out of the Bubble:
- The user duo wins if they reduce the bubble to 10% or less.
- The company duo wins if they have collected all the user data. The algorithm can still be updated in this round to gather more data from the user duo.

Actions on the Platform

The user duo can perform the following actions on the platform:

- Like
- Mark as 'Not Interested'
- Comment
- Share
- Interaction (view hashtag)
- Follow/Unfollow
- Rewatch

Algorithm Updates:

The company duo can collect the following updates for the algorithm:

- Like Algorithm (owned at the start of the game)
- Comment Algorithm
- Share Algorithm
- Follow Algorithm
- Watch Time Algorithm
- Interaction Algorithm
- Not Interested Algorithm

End of the Game

A round ends when one of the duos reaches their goal for that round. The game ends when one of the duos achieves their goal in the second round. A duo wins the game if they win both rounds, or the game ends in a draw if each duo wins one round. The winning duo has best applied their strategy and knowledge of social media algorithms.

Questions and Answers

What are data tokens? Data tokens represent the amount of data a user generates and gives away by performing actions on the platform.

What are algorithm updates? Algorithm updates optimize the personalized feed and thus enhance the company's ability to collect data from the users.

How does the bubble meter work? The bubble meter shows the percentage of the user in a filter bubble. The goal of the user duo is to first get it above 90% (round 1) and then reduce it to 10% or less (round 2).

Tips for Playing

- Each video only allows one action, think carefully and discuss which action you want to take!
- Scrolling is not an action you can perform.
- Each video plays only once. Scroll only when you can perform an action in the next turn, and pay close attention while watching.
- Work well with your partner and develop a strategy.
- Use your knowledge of algorithms and social media to answer the questions correctly.
- Keep an eye on the actions of the other duo and adjust your strategy accordingly.

Behind the Feed

een Leerervaring over Social Media Algoritmes

Spelregelboekje

Introductie

Een splinternieuw social media platform staat op het punt de wereld te veroveren: BeYou. De makers hebben een grote droom: het grootste platform worden met de beste persoonlijke feed voor iedere gebruiker. Maar er is één probleem... ze weten niet hoe ze dit perfecte algoritme moeten bouwen.

In deze leerervaring duiken jullie als duo in de fascinerende wereld van social media algoritmes. Door drie interactieve spellen te spelen tegen een ander duo leren jullie hoe algoritmes werken, welke data platforms verzamelen, hoe persoonlijke feeds ontstaan, en welke impact dit alles kan hebben – zowel voor jou als gebruiker, als voor de samenleving. Wie weet kunnen jullie de makers helpen met het ontwikkelen van het algoritme van BeYou, of kijk je als toekomstig gebruiker juist kritisch naar wat dit betekent voor je social media-ervaring.

Kom in een Bubbel

In het eerste spel ontdekken jullie hoe algoritmes werken en hoe ze jou in een filterbubbel kunnen plaatsen. Leer hoe platforms keuzes voor je maken zonder dat je het doorhebt.

Raad de Data & Video

Kruip in de huid van een algoritme! Raad de data die bij verschillende persoonlijke feeds horen, maak persoonlijke aanbevelingen en vergelijk de invloed van deze feeds. Weet jij de data te raden en de juiste video aan te bevelen?

Social Media Battle

Gebruiker vs Bedrijf

Zet al je kennis en vaardigheden in. Werk mee aan het algoritme van BeYou of kies ervoor om als kritische gebruiker het platform slim te gebruiken. Jij bepaalt de strategie!

Tijdens deze spellen ontdek je hoe algoritmes werken en word je je bewust van de invloed die ze kunnen hebben op jou en op anderen. Je bouwt kennis en vaardigheden op die je helpen om social media op een slimme en bewuste manier te gebruiken. Wie weet word jij wel de volgende algoritme-expert – of zorg je ervoor dat social media platforms minder grip op jou krijgen.

Ben jij er klaar voor om algoritmisch geletterd te worden?

-Kom-in-een-Bubbel→

Om bij te kunnen dragen aan het ontwikkelen van het algoritme van BeYou hebben jullie kennis nodig van de werking van algoritmes in social media. In dit spel duiken jullie in een social media algoritme en ontdekken jullie hoe platforms persoonlijke feeds creëren. Door strategisch data in te zetten, proberen jullie een filterbubbel te bereiken terwijl jullie zo veel mogelijk data behouden. Het draait niet alleen om snelheid, maar vooral om slimme keuzes. Ben jij klaar om het algoritme te slim af te zijn?

Speldoel

Kom voor 90% in een filterbubbel door acties uit te voeren op de Social Media feed en behoud zoveel mogelijk data binnen de beschikbare tijd.

Leerdoelen

- Begrijpen hoe algoritmes op social media werken.
- Inzicht krijgen in welke data wordt verzameld en hoe dit leidt tot gepersonaliseerde content.
- Leren hoe eigen gedrag de werking van algoritmes beïnvloedt.

Spelverloop

Het spel wordt gespeeld in 4 rondes, waarbij ieder duo het doel heeft om in elke ronde een nieuwe filter bubbel te bereiken. Elk duo heeft twee rollen en wisselt iedere ronde van rol:

Data Bewaarder: Houdt toezicht op de beschikbare data en plaatst de ingezette data in de “black box’.

Interactie Uitvoerder: Voert de acties uit op de feed om de filterbubbel te bereiken.

Tijdens een ronde:

- Ieder duo krijgt het onderwerp van de bubbel voorafgaand aan iedere ronde te zien.
- Duo’s proberen na de start tegelijkertijd in een filterbubbel terecht te komen binnen de tijd.
- Bij iedere video op de feed kies je mogelijke acties van verschillende datawaarde om voortgang te maken richting de filterbubbel. (Meerdere acties mogelijk bij elke video)
- Beide teams mogen maximaal twee keer per ronde kijken of ze de filterbubbel hebben bereikt. Let op: hierbij zien jullie tegenstanders ook hun voortgangspercentage.
- Het spel stopt als de tijd om is.

Elke ronde heeft een winnaar of eindigt in een gelijkspel. Het winnende duo is het duo dat als eerste in de filterbubbel terecht is gekomen én dit zelf checkt. Hebben beide duo’s de bubbel bereikt? Dan wint het duo met de meeste data nog in bezit heeft. Een ronde eindigt in een gelijk spel als beide duo’s in een bubbel terecht zijn gekomen en dezelfde hoeveelheid data nog in bezit hebben.

Spelbenodigdheden

- Spelbord: Het spelbord inclusief de “Black Box” waar de data tokens in worden gedaan na het uitvoeren van een actie.
- Mobiele telefoon: 2 mobiele telefoons, voor elk duo één.
- Behind the Feed site Webapplicatie voor de leerervaring. Start ‘Kom in een bubbel’.
- Data tokens: De data die in de ‘Black Box” wordt gedaan bij het uitvoeren van acties op de feed.

Data token:

Voorbereiding

1. Open de ‘Behind the Feed’ webapplicatie en start het spel Kom in een Bubbel
2. Zet de ‘Black Box’ in het midden van het spelbord en zet je telefoon tegen de houder.
3. Bepaal wie begint als Data Bewaarder en Interactie Uitvoerder. Wissel na elke ronde.
4. Verdeel de data tokens
5. Start het spel
6. Haal na iedere ronde de data uit de ‘Black Box” voordat de volgende ronde start.

Spelregels

- De Interactie Uitvoerder voert de acties uit op de social media feed om in de juiste filterbubbel te komen.
- De Data Bewaarder registreert de datakosten bij elke actie en stopt deze in de ‘Black Box’.
- Duo’s mogen maximaal twee keer per ronde kijken of ze de filterbubbel hebben bereikt.
- Checkt een duo het percentage en hebben zij de filterbubbel bereikt en het andere duo niet, dan wint het duo wat de filterbubbel heeft bereikt.
- Als beide duo’s hun filterbubbel hebben bereikt, wordt het aantal resterende data geteld. Het duo met de meeste data nog in bezit wint de ronde.
- Bij een gelijke stand (beide duo’s hebben de filterbubbel bereikt met dezelfde hoeveelheid data) wordt de ronde als gelijkspel beschouwd.
- De duo’s noteren hun overwinning.

Acties & Kosten

Je kan de volgende acties uitvoeren op de feed:

0 data tokens:
- Scroll

2 data tokens:
- Delen
- Volgen/Ontvolgen
- Interactie

1 data token:
- Like
- Comment
- Markeren als 'niet interessant'

3 of meer data tokens:
- Opnieuw Kijken
  - Nóg een keer kijken (3x = 4 data tokens)
  - Nóg een keer kijken (4x = 5 data tokens)

Einde van het spel

Na vier rondes wordt de eindstand opgemaakt. Het duo met de meeste gewonnen rondes wint het spel.
Het verliezende team neemt de data in de "Black Box' van de laatste ronde mee naar de volgende spellen.
Bij een gelijke stand nemen beide teams de data in de "Black Box' van de laatste ronde mee naar de volgende spellen.

Vragen en Antwoorden

- **Wat als niemand de filterbubbel bereikt binnen de tijd?**

Deze ronde eindigt zonder winnaar.

- **Mag je meerdere acties uitvoeren bij dezelfde video?**

Ja, maar houd rekening met de toenemende datakosten voor deze acties.

Tips voor Spelen

- Werk samen en bespreek een strategie.
- Denk vooruit: soms is het beter om minder data in te zetten om later een voordeel te hebben.
- Experimenteer met verschillende acties om te begrijpen welke het meeste effect hebben.

Raad de Data & Video?

Om een kritische gebruiker van BeYou te kunnen worden is het nodig om de impact van algoritmes en persoonlijke feeds te weten. In dit spel zijn jullie het algoritme: Hoe denkt een algoritme? Wat weet het van een gebruiker? Door samen te werken en strategisch na te denken, proberen jullie de juiste datacategorieën te raden en een nieuwe video aan te bevelen en ga je verschillende feeds vergelijken. Wie kan het beste denken als een algoritme?

Speldoel

Denk als een algoritme, raad welke gegevens horen bij een persoonlijke feed en wijs de bijbehorende video correct toe aan de feed.

Leerdoelen
- Begrijpen hoe algoritmes een profiel maken op basis van gebruikersdata.
- Inzien dat algoritmes verschillende feeds creëren op basis van verschillende gebruikersdata.
- Leren kritisch te kijken naar hoe algoritmes werken en wat zij van je weten.

Spelverloop

Het spel wordt gespeeld in 4 rondes. Elk duo probeert in elke ronde zes datacategorieën correct te raden die bij het profiel horen van de gepersonaliseerde feed die ze bekijken. Na het raden van de data categorieën wijst ieder duo één van de vier getoonde video's toe die als aanbeveling aan de feed in deze ronde

- Na de laatste ronde kunnen duo's hun keuzes voor de aanbevolen video's bij iedere feed herzien om de juiste video's aan de juiste feed aan te bevelen.

Tijdens een ronde:

- Duo's scrollen door de feed van een social mediagebruiker.
- Bespreek en raad de data binnen de 10 beschikbare datacategorieën.
- Schrijf de datacategorie op en de door jullie geraden gegevens, en plaats een data token op het spelbord.
- Als een duo zes categorieën heeft geplaatst, wordt het spel gepauzeerd en de data bij de bijbehorende categorieën gecontroleerd. Let op: ook het ander duo ziet of deze correct zijn.
- Bij vijf correct geraden categorieën wint dat duo deze ronde.
- Aan het einde van iedere ronde kiest ieder duo één van de vier video's om aan deze feed aan te bevelen.

Spelbenodigdheden

- Spelbord: Het spelbord waar de data tokens op worden geplaats, inclusief de "Black Box" voor de telefoonstandaarden.
- Mobiele telefoon: 2 mobiele telefoons, voor elk duo één.
- Behind the Feed site Webapplicatie voor de leerervaring. Start 'Raad de Data & Video'.
- Data tokens: De data die op het spelbord worden geplaatst bij het raden van de datacategorieën.

Datacategorieën

- Gender
- Leeftijd
- Locatie
- Nationaliteit
- Persoonlijkheid
- Interesses
- Politieke voorkeur
- Relatiestatus
- Gevoel/Emotie

Voorbereiding

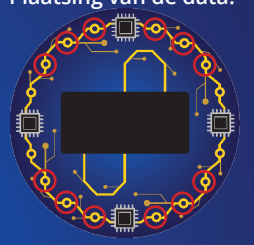
1. Open de 'Behind the Feed' webapplicatie en start het spel Raad de Data & Video.
2. Zet de 'Black Box' in het midden van het spelbord en zet je telefoon tegen de houder.
3. Zorg dat je als duo 6 data tokens hebt.
4. Zorg dat je de datacategorieën weet en gebruik zo nodig pen en papier om deze te noteren met het raden.

Spelregels

- Duo's bekijken een persoonlijke feed en raden data uit een van de categorieën dat bij het profiel hoort van deze feed en plaatsen deze op het spelbord.
- Een ronde wordt gepauzeerd wanneer een duo zes categorieën heeft geraden en geplaatst.
- Controleer de keuzes:
  a. Beide duo's zien of de geraden categorieën van dit duo correct zijn.
  b. Bij minimaal vijf correcte categorieën wint dat duo de ronde.
- Duo's noteren hun overwinningen.
- Aan het einde van de ronde kiezen beide duo's één van de vier video's en koppelen deze aan de feed die ze in die ronde bekeken hebben.
- Na vier rondes kunnen duo's hun video aanbevelingen wijzigen.

Plaatsing van de data:

Duo 1:



Duo 2:

Einde van het spel

Het duo dat de meeste rondes wint met het raden van de data, is de winnaar.
De winnaar stop de hoeveelheid correct geraden data (5 of 6) uit de laatste ronde in de 'Black Box' om mee te nemen naar het volgende spel.
Bij een gelijke stand wordt de winnaar bepaald door de correcte aanbevelingen van de video's voor elke feed.
Als een duo alle aanbevelingen goed heeft stoppen zij 3 data tokens in de 'Black Box' om mee te nemen naar het volgende spel.
Als er een totale gelijkstand is, dus in gelijke stand in overwinningen en juiste aanbevelingen, eindigt het spel in een gelijkspel en wordt er geen data van de laatste ronde meegenomen naar het volgend spel. Beide duo's kunnen nog wel drie extra data tokens meenemen als ze alle video's correct hebben aanbevolen.

Vragen en Antwoorden

- **Wat gebeurt er als een duo geen 5 categorieën goed heeft om de ronde te winnen?**

Dit duo haalt de foutieve hoeveelheid data van het spelbord en probeert het opnieuw. Deze ronde gaat verder.

- **Kunnen dezelfde categorie meerdere keren geraden worden?**

Ja, maar niet elke categorie kan meerdere keren worden geraden.

Tips voor Spelen

- Ga voor je gevoel, je eerste ingeving is meestal goed.
- Spreek niet te hard voordat je je tegenstander op ideeën brengt.

Social Media Battle

Gebruiker vs Bedrijf

In Social Media Battle komt alles samen. Je hebt eerder geleerd hoe algoritmes werken, welke data ze verzamelen en hoe dit je feed, jou en zelfs de maatschappij kan beïnvloeden. Nu is het tijd om je kennis en vaardigheden in de praktijk te brengen. Het is tijd voor de ultieme uitdaging! Je speelt als een duo dat helpt het algoritme van BeYou te ontwikkelen, of je probeert om als kritische gebruiker je feed te beheren. Welke duo weet de Social Media Battle te winnen?

Speldoel

Test je kennis en vaardigheden over algoritmes door het optimaliseren van een social media feed of door het beheren van een algoritme.

Gebruikersduo: Verken het platform, kom in een filter bubbel, en breek er weer uit door de juiste acties uit te voeren op het platform. Maar pas op, elke actie kost je data!

Bedrijfsduo: Update je algoritme en verzamel hiermee alle data van de gebruiker.

Spelverloop

Het spel bestaat uit twee rondes:

1. In de bubbel komen
2. Uit de bubbel komen

Elke ronde kan worden gewonnen door het gebruikersduo of het bedrijfsduo.

Spelbenodigdheden

- Spelbord, Gebruiker pion & Bedrijf Pion
- Vraagkaartjes, Actiekaartjes, Updatekaartjes & een Informatiekaart
- Data tokens
- 'Black Box' & 'Button Box'
- BeYou platform (spel 3: 'Social Media Battle' in de webapplicatie)

Voorbereiding

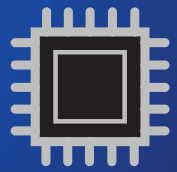
1. Verdeel de rollen van de duo's: het gebruikersduo of het bedrijfsduo.
2. Open de 'Behind the Feed' webapplicatie op één telefoon en start het spel Social Media Battle.
3. Haal de 'Black Box' van het spelbord en haal de data hieruit.
   a. Het gebruikersduo krijgt deze hoeveelheid data boven op de starthoeveelheid.
   b. Het bedrijfsduo kan deze hoeveelheid data inwisselen voor update percentage (1 data token = 10 % update) Dit kan niet tijdens het spel.
4. Plaats het spelbord in het midden en leg de telefoon in het midden van het bord.
5. Leg alle kaarten in juiste stapeltjes op tafel. Schud indien nodig.
6. Gebruikerduo: pak X datatokens en bekijk de informatiekaart voor de kosten van elke actie.
7. Bedrijfduo: bekijk alle beschikbare updates en pak het 'Like Algoritme'. Met dit algoritme start je het spel.
8. Start het spel. Het bedrijfsduo begint.

Spelregels

Beurtverdeling:

- Duo's drukken op de juiste knop en verplaatsen hun pion over het bord naar de juiste locatie.
- Bij het landen op een vraagpunt pak je een vraagkaartje, lees je de vraag voor en beantwoord je deze. Bij het landen op een actiepunt trek je een actiekaartje en voer je de actie uit.
- Bij het goed beantwoorden van een vraag, mag het gebruikerduo één of meerdere actie uitvoeren op het platform of ontvangt het bedrijfsduo een updatepercentage.
- Bij een fout antwoord gebeurt er niets.

Vraagpunt: 

Actiepunt: 

Acties uitvoeren op BeYou:

- Elke actie die het gebruikerduo uitvoert op het platform kost een bepaalde hoeveelheid data. Deze staan op de informatiekaart aangegeven. Geef het bedrijfsduo de juiste hoeveelheid data na het uitvoeren van een actie.

Ronde 1: In de bubbel komen:

- Het gebruikerduo wint als ze een bubbel van minimaal 90% hebben bereikt.
- Het bedrijfsduo wint als ze de helft van de updates hebben verzameld.

Ronde 2: Uit de bubbel komen:

- Het gebruikersduo wint als ze de bubbel hebben verkleind tot 10% of minder.
- Het bedrijfsduo wint als ze alle data van de gebruiker hebben verzameld. Het algoritme kan in deze ronde nog steeds worden geüpdatet om meer data te krijgen van het gebruikersduo.

Acties op het platform

Het gebruikers duo kan de volgende acties uitvoeren op het platform:

0 data tokens:	1 data token:	2 data tokens:	3 data tokens:
Scroll	Like	Share	Opnieuw Kijken
	Niet Interessant	(ont)volgen	
	Comment	# Interactie	

Algoritme updates:

Het bedrijfsduo kan de volgende updates voor het algoritme verzamelen:

- Like Algoritme (in bezit bij de start van het spel)
- Comment Algoritme
- Share Algoritme
- Volg Algoritme
- Kijktijd Algoritme
- Interactie Algoritme
- Niet-interessant Algoritme

Einde van het spel

Een ronde eindigt als één van de duo's hun doel heeft bereikt van de desbetreffende ronde. Het spel eindigt zodra één van de duo's hun doel heeft bereikt in de tweede ronde. Een duo wint het spel als ze beide rondes hebben gewonnen, of het spel eindigt in een gelijkspel als elk duo één ronde heeft gewonnen. Het winnende duo heeft zijn strategie en kennis van social media algoritmes het beste ingezet.

Vragen en Antwoorden

- **Wat zijn data tokens?**

Data tokens vertegenwoordigen de hoeveelheid data die een gebruiker genereert en afstaat door acties op het platform uit te voeren.

- **Wat zijn algoritme updates?**

Algoritme updates optimaliseren de gepersonaliseerde feed en hiermee dus ook het vermogen van het bedrijf om data van de gebruikers te verzamelen.

- **Hoe werkt de bubbelmeter?**

De bubbelmeter geeft aan hoeveel procent de gebruiker in een filter bubbel zit. Het doel van het gebruikersduo is om deze eerst boven 90% te krijgen (ronde 1) en vervolgens weer naar 10% of minder te verlagen (ronde 2).

Tips voor Spelen

- Elke video speelt maar 1 x af, tenzij je voor de actie opnieuw kijken kiest. Scroll pas verder als je in een volgende beurt een actie mag uitvoeren en let goed op bij het bekijken.
- Werk goed samen met je partner en ontwikkel een strategie.
- Gebruik je kennis van algoritmes en social media om de vragen goed te beantwoorden.
- Let op de acties van het andere duo en pas je strategie daarop aan.

Appendix P - Vragen Social Media Battle

Het spel bevat makkelijke, gematigde en moeilijke vragen van de volgende categorieën:

1. Makkelijke vragen
   - Waar of Niet Waar (actie: 1 data token, update 20%) (20)
   - Meerkeuze vragen (actie: 1 data token, update 20%) (20)

2. Middelmatige vragen
   - Koppel vragen (actie: 2 data tokens, update 40%) (5)
   - Rangschik vragen (actie: 2 data tokens, update 40%) (5)

3. Moeilijke vragen
   - Open vragen (actie: 3 data tokens, update 50%)
     - Scenario gebaseerde vragen (5)
     - Algoritmische analyse vragen (5)
     - Kritisch denken vragen (5)

Informatiekaart voor het spel:

Datakosten per uit te voeren actie:

1 data token : → 5%
- Like
- Comment
- Niet interessant
-

2 data tokens: → 10%
- Delen
- Volgen of Ontvolgen
- Hashtag 'bekijken' (aantikken betekent dat interactie heeft plaatsgevonden)

3 data tokens: → 15%
- Opnieuw Kijken

Algoritmes:
Kosten 0%:
- Like algoritme

Kosten 100%
- Comment Algoritme
- Niet interessant Algoritme

Kosten 200%
- Delen Algoritme
- Volg Algoritme
- Interactie Algoritme

Kosten 300%
- Kijktijd Algoritme

Totale kosten: 1100%. Te behalen % met ALLE vragen: 1950%

Makkelijke vragen

Waar of Niet Waar vragen

1. Het aanbevelingen algoritme van YouTube kijkt naar beschikbare gegevens van een gebruiker, zoals geslacht, leeftijd, taal en locatie, om video's voor te stellen. (Waar)

2. Het algoritme van Snapchat kijkt alleen maar naar interacties met vrienden om video's aan te bevelen. (Niet Waar)

3. Het algoritme van Facebook laat content zien op basis van je interacties en gedrag op het platform, hoe relevant het voor je is en hoe nieuw een post is. (Waar)

4. Het algoritme van TikTok kijkt niet naar je apparaat of accountinstellingen om content te personaliseren. (Niet Waar)

5. Snapchat verzamelt je interacties met het platform, je apparaat informatie en je locatiegegevens om de content die je ziet te personaliseren. (Waar)

6. Het algoritme van Instagram kijkt alleen maar naar likes, reacties en de content die je deelt om de content te personaliseren. (Niet Waar)

7. Het algoritme van TikTok zorgt voor verschillende soorten filmpjes op de 'For You' door af en toe filmpjes van makers met minder volgers te laten zien, waardoor je wordt aangemoedigd om nieuwe content te verkennen. (Waar)

8. Het algoritme van YouTube kan onbedoeld een filter bubbel erger maken door vooral video's aan te bevelen die vergelijkbaar zijn met wat je eerder hebt bekeken. (Waar)

9. Het algoritme van TikTok stelt gebruikers in staat om voorkeuren voor bepaalde content aan te geven. (Waar)

10. Het algoritme van YouTube werkt filterbubbels tegen door af en toe video's van kanalen met tegenovergestelde standpunten of perspectieven voor te stellen. (Niet waar)

11. Het algoritme van TikTok houdt rekening met metadata (gegevens van een filmpje zoals de hashtags en de muziek) en je interacties hiermee om content te personaliseren. (Waar)

Added in update

12. Het algoritme van Instagram houdt rekening met de tijd die je besteedt aan het bekijken van een bericht. (Waar)

13. Een filterbubbel ontstaat doordat algoritmen content aanbevelen die anders is dan je interesses. (Niet Waar)

14. Je locatie kan door sociale media-algoritmen worden gebruikt om advertenties te personaliseren. (Waar)

15. Het algoritme van TikTok zou iemands stemming kunnen beïnvloeden door content te laten zien die inspeelt op emoties. (Waar)

16. Algoritmes op sociale media zijn ontworpen om gebruikers tevreden te maken. Antwoord: (Niet Waar)

17. Je interacties met vrienden op sociale media hebben geen invloed op de inhoud die je ziet. (Niet Waar)

18. Sociale mediaplatforms gebruiken algoritmes om winst te maken door persoonlijke advertenties te laten zien. (Waar)

19. Een algoritme dat je interacties analyseert, kan het verschil maken tussen positieve en negatieve emoties in je reacties en gedrag om persoonlijke content aan te bieden. (Waar)

20. Algoritmen op sociale media maken geen gebruik van machine learning om voorspellingen te doen over welke content je waarschijnlijk interessant zult vinden. (Niet Waar)

Meerkeuze vragen:

21. Wat is het belangrijkste doel van algoritmes op sociale media?
    a) Verbeteren van de privacy van gebruikers
    b) Zorgen dat het platform meer wordt gebruikt
    c) Zorgen dat er meer inkomsten komen uit advertentie's
    d) Zorgen dat het platform minder wordt gebruikt.

22. Welk sociaal media platform gebruikt het algoritme van de "For You"-pagina om content te personaliseren?
    a) YouTube
    b) Snapchat
    c) Instagram
    d) TikTok

23. Welke term beschrijft dat gebruikers bijna alleen maar content zien die hun bestaande overtuigingen en meningen versterkt?
    a) Sociale invloed
    b**) Filter bubbel**
    c) Gegevens privacy
    d) Feed

24. Hoe zorgen algoritmes voor filterbubbels op sociale media?
    a) Door heel verschillende content in je feed te laten zien.
    b) Door content van heel verschillende bronnen voorrang te geven.
    c) Door content alleen maar te personaliseren op basis van gegevens van gebruikers
    d) Door content aan te bevelen die overeenkomt met de bestaande interesses van gebruikers.

25. Wat is het onderliggende doel van sociale media bedrijven?
    a) Advertenties weergeven
    b) Het verbeteren van privacy van gebruikers
    c) Winst maken
    d) Het opbouwen van een gemeenschap

26. Welke gegevens gebruiken algoritmes om content te personaliseren op sociale media?
    a) Apparaatinstellingen (zoals taal en locatie)
    b) Gebruikersinteracties (zoals likes, shares en profielen waarmee je interactie hebt)
    c) Gebruikersgegevens (zoals geslacht en leeftijd)
    d) Alle antwoorden zijn correct

27. Wat is een social media algoritme?
    a) Een reeks instructies of regels om content voor gebruikers te filteren, rangschikken en aan te bieden.
    b) Een specifieke post op sociale media
    c) Gegevens die wordt gebruikt om gepersonaliseerde content aan te bieden
    d) Een reeks instructies of regels dat alleen maar gegevens van gebruikers verzameld

28. Welk social media platform is het meest bekritiseerd voor het versterken en het verspreiden van misinformatie en nepnieuws?
    a) TikTok
    b) Snapchat
    c) YouTube
    d) Facebook

29. Welke term hoort bij de volgende definitie:
    Het proces van een algoritme om content aan te bevelen op basis van voorkeuren, gegevens en gedrag van een gebruiker?
    a) Personalisatie
    b) Standaardisatie
    c) Diversificatie
    d) Beïnvloeden

30. Wat is een mogelijk gevolg van filter bubbels op social media platforms?
    a) Toename van verschillende content in je feed
    b) Verbeterde gebruikers privacy
    c) Versterking van bestaande overtuigingen en meningen
    d) Vermindering van betrokkenheid van gebruikers

31. Wat is een mogelijk maatschappelijk gevolg van filter bubbels?
    a) **Polarisatie**
    b) Social Media verslaving
    c) FOMO (Fear Of Missing Out)
    d) Verspreiding van correct nieuws

Added in update

32. Wat is een van de redenen waarom filterbubbels problematisch kunnen zijn?
    a) Ze tonen je enkel nieuwe informatie.
    b) Ze beperken de toegang tot verschillende perspectieven.
    c) Ze zorgen ervoor dat je minder tijd op sociale media doorbrengt.
    d) Ze blokkeren advertenties.

33. Hoe bepalen sociale media-algoritmen voornamelijk de voorgestelde content?
    a) Door je reactie op willekeurige video's en posts te analyseren.
    b) Door rekening te houden met de tijd die je naar specifieke content kijkt.
    c) Door uitsluitend naar je leeftijd en locatie te kijken.
    d) Door oude content van een jaar geleden aan te bevelen.

34. Waarvoor worden algoritmes in sociale media gebruikt?
    a) Om gebruikers op het platform te houden en zo meer inkomsten te krijgen via gerichte advertenties.
    b) Om gebruikers minder actief te maken op het platform.
    c) Om inhoud willekeurig weer te geven en zo meer inkomsten te krijgen via willekeurige advertenties.
    d) Om de privacy van gebruikers te verbeteren.

35. Welke strategie kan helpen om een filterbubbel te vermijden?
    a) Het volgen van meer profielen die jouw overtuigingen delen.
    b) Het actief zoeken naar content met verschillende perspectieven.
    c) Het verwijderen van alle persoonlijke gegevens.
    d) Het gebruiken van slechts één sociale mediaplatform.

36. Wat betekent de term 'bias' in de context van algoritmes?
    a) Een bewuste fout gemaakt door programmeurs.
    b) Een systematische voorkeur of afwijking in hoe een algoritme data verwerkt.
    c) Een fout die ontstaat wanneer algoritmes geen data hebben om mee te werken.
    d) Een voorkeur van gebruikers die niet door het algoritme wordt beïnvloed.

37. Wat is een ethische uitdaging van het gebruik van algoritmes in sociale media?
    a) Ze verhogen de efficiëntie van dataverwerking.
    b) Ze kunnen bijdragen aan de verspreiding van desinformatie.
    c) Ze zorgen ervoor dat gebruikers minder tijd besteden op het platform.
    d) Ze beschermen de privacy van gebruikers volledig.

38. Wat kan er gebeuren als een algoritme te veel afhankelijk is van historische gegevens?
    a) Het creëert een 'bias' door trends uit het verleden te versterken die in deze data verscholen zitten.
    b) Het maakt nauwkeurige voorspellingen over de toekomst op basis van deze data.
    c) Het voorkomt dat gebruikers gepersonaliseerde content zien.
    d) Het verwijdert niet relevante content uit de database.

39. Hoe zouden sociale mediaplatforms ervoor kunnen zorgen dat hun algoritmes minder filterbubbels creëren?
    a) Door algoritmes te verwijderen uit hun systemen.
    b) Door gebruikers alleen willekeurige content te laten zien.
    c) Door algoritmen te ontwerpen die ook content tonen die niet aansluit bij geanalyseerde interesses en/of perspectieven.
    d) Door alleen data te gebruiken van één specifieke interactie.

40. Wat doet een social media algoritme om een gebruiker op het platform te houden?
    a) Het toont content die volledig willekeurig is.
    b) Het analyseert je gedrag en biedt content aan die je langer laat scrollen of kijken.
    c) Het beperkt de hoeveelheid gepersonaliseerde aanbevelingen in je feed.
    d) Het verwijdert automatisch content waar je veel interactie mee hebt.

Middelmatige vragen

Koppel Vragen

41. Maak de juiste combinaties:
    a) TikTok 1. Reels
    b) YouTube 2. Startpagina
    c) Instagram 3. "For You"-pagina
    d) Facebook 4. Spotlight
    e) Snapchat 5. Aanbevolen video's

Antwoord : A3, B5, C1, D2, E4

    a) TikTok 3. "For You"-pagina
    b) YouTube 5. Aanbevolen video's
    c) Instagram 1. Reels
    d) Facebook 2. Startpagina
    e) Snapchat 4. Spotlight

42. Koppel de term aan de juiste definitie:
    a) Filter bubbel 1. Een reeks instructies of regels om een probleem op te lossen of een taak te voltooien.
    b) Algoritme 2. Een proces dat content aanbeveelt op basis van voorkeuren van individuele gebruikers.
    c) Personalisatie 3. Het verzamelen, analyseren en gebruik van informatie van gebruikers door algoritmes

    D) Gegevensgebruik 4. Wat online voorkomt dat gebruikers content aanbevolen krijgen die bestaande overtuigingen en meningen versterkt

Antwoord: A4, B1, C2, D3,

    a) Filter bubbel 4. Wat online voorkomt dat gebruikers content aanbevolen krijgen die bestaande overtuigingen en meningen versterkt
    b) Algoritme 1. Een reeks instructies of regels om een probleem op te lossen of een taak te voltooien.
    c) Personalisatie 2. Een proces dat content aanbeveelt op basis van voorkeuren van individuele gebruikers.
    D) Gegevensgebruik 3. Het verzamelen, analyseren en gebruik van informatie van gebruikers door algoritmes

43. Maak de juiste combinaties:
    a) Gebruikersinteracties 1. Taal, apparaattype, IP-adressen, geïnstalleerde apps.
    b) Gebruikersgedrag 2. Gebruikersgegevens, door jou gevolgd, jou volgend
    c) Apparaat informatie 3. Likes, reacties, delen, opgeslagen content
    d) Profielinformatie 4. Kijktijd, aantikgedrag

Antwoord: A3, B4, C1, D2

    a) Gebruikersinteracties 3. Likes, reacties, delen, opgeslagen content
    b) Gebruikersgedrag 4. Kijktijd, aantikgedrag
    c) Apparaat informatie 1. Taal, apparaattype, IP-adressen, geïnstalleerde apps.
    d) Profielinformatie 2. Gebruikersgegevens, door jou gevolgd, jou volgend

44. Maak de juiste combinaties:
    a) TikTok 1. Tijdsgebonden foto's en video's
    b) Instagram 2. Korte video's
    c) YouTube 3. Hoogwaardige foto’s en video’s
    d) Snapchat 4. Lange(re) video's

Antwoord: A2, B3, C4, D1

    a) TikTok 2. Korte video's
    b) Instagram 3. Hoogwaardige foto’s en video’s
    c) YouTube 4. Lange(re) video's
    d) Snapchat 1. Tijdsgebonden foto's en video's

Added in update

45. Koppel het type aanbeveling aan de situatie:
    a) Content gebaseerd op interesses 1. Suggesties na het online zoeken naar een specifiek product.
    b) Content gebaseerd op locatie 2. Advertenties voor restaurants in jouw stad.
    c) Content gebaseerd op je netwerk 3. Posts van vrienden die vaak worden geliket.
    d) Content gebaseerd op gedrag 4. Video’s over reizen na interactie met reisblogs.

Antwoord: A4, B2, C3, D1

    a) Content gebaseerd op interesses 4. Video’s over reizen na interactie met reisblogs.
    b) Content gebaseerd op locatie 2. Advertenties voor restaurants in jouw stad.
    c) Content gebaseerd op je netwerk 3. Posts van vrienden die vaak worden geliket.
    d) Content gebaseerd op gedrag 1. Suggesties na het online zoeken naar een specifiek product.

Rangschik vragen: Zet de nummers op de juiste volgorde:

46. Hoe personaliseren algoritmes content op social media:

1. Lever gepersonaliseerde content aan gebruikers
2. Creëer aanbevelingen voor gepersonaliseerde content
3. Verzamel gebruikersgegevens en gedrag
4. Analyseer gebruikersgedrag

Antwoord: 3, 4, 2, 1

3. Verzamel gebruikersgegevens

4. Analyseer gebruikersgedrag

2. Creëer aanbevelingen voor gepersonaliseerde content

1. Lever gepersonaliseerde content aan gebruikers

47. Hoe kunnen algoritmes impact hebben op de social media ervaring van gebruikers:

1. Het algoritme verzamelt en analyseert gegevens, en past de aanbevolen content aan.
2. De gebruiker besteedt meer tijd op het platform.
3. De feed past nog beter bij de interesses van de gebruiker.
4. De gebruiker heeft interactie met content op het platform

Antwoord: 4,1,3,2

4 De gebruiker heeft interactie met content op het platform

1 Het algoritme verzamelt en analyseert gegevens, en past de aanbevolen content aan

3 De feed past nog beter bij de interesses van de gebruiker

2 De gebruiker besteedt meer tijd op het platform.

48. Hoe komen de gevolgen van filter bubbels tot stand:

1. Gebruikers hebben minder interactie met diverse en tegenstrijdige content
2. Gebruikers krijgen gepersonaliseerde inhoud
3. De content wordt nog meer gepersonaliseerd
4. De diversiteit in perspectieven, standpunten en soort content in de feed neemt hiermee af

Antwoord: 2,4,1,3

2 Gebruikers krijgen gepersonaliseerde inhoud

4 De diversiteit in perspectieven, standpunten en soort content in de feed neemt af

1 Gebruikers hebben minder interactie met diverse en tegenstrijdige content

3 De content wordt nog meer gepersonaliseerd

49. Hoe krijgt een gebruiker een gepersonaliseerde advertentie te zien:

1. De social media app toont advertenties voor nieuwe sneakers en schoenenwinkels.
2. De gebruiker zoekt online naar iets, zoals 'nieuwe sneakers'.
3. Het algoritme gebruikt deze gegevens om advertenties met betrekking tot sneakers te vinden.
4. De sociale media-app krijgt en analyseert informatie van deze zoekopdracht .

Antwoord: 2,4,3,1

2 De gebruiker zoekt online naar iets, zoals 'nieuwe sneakers'.

4 De sociale media-app krijgt en analyseert informatie van deze zoekopdracht .

3 Het algoritme gebruikt deze gegevens om advertenties met betrekking tot sneakers te vinden.

1 De social media app toont advertenties voor nieuwe sneakers en schoenenwinkels.

Added in update

50. Rangschikvraag: Hoe kun je vast blijven zitten in een negatieve filterbubbel?

1 Het algoritme merkt dat je veel interactie hebt met bepaalde content die negatieve emoties oproept.

2 Het algoritme beveelt meer van deze content aan om je langer op het platform te houden

3 Het algoritme denkt dat deze interacties een voorkeur voor soortgelijke content aangeeft.

4 Je blijft ernaar kijken omdat het je emotionele toestand beïnvloedt, wat de filter bubbel erger maakt.

Antwoord: 1, 3, 2 4

1 Het algoritme merkt dat je veel interactie hebt met bepaalde content die negatieve emoties oproept.

3 Het algoritme denkt dat deze interacties een voorkeur voor soortgelijke content aangeeft.

2 Het algoritme beveelt meer van deze content aan om je langer op het platform te houden

4 Je blijft ernaar kijken omdat het je emotionele toestand beïnvloedt, wat de filter bubbel erger maakt.

Moeilijke vragen

Scenario gebaseerde vragen

51. Mark is muzikant en gebruikt Instagram om nieuwe muziek te ontdekken en andere muzikanten te ontmoeten, maar zijn feed staat vol met andere content. Hoe komt dit?

    Antwoord:

    Mark zijn interactie met deze andere content is hoger dan de content met muziek, waardoor het algoritme van Instagram deze content voorstelt.

52. Rachel is liefhebber van eten en ontdekt graag verschillende gerechten op Pinterest. Maar haar aanbevelingen zijn alleen maar pins van dezelfde paar foodbloggers. Wat veroorzaakt deze aanbevelingen waardoor Rachel geen andere content of gerechten ziet?

    Mogelijke antwoorden:
    - Eerdere interacties met deze specifieke foodbloggers,
    - Haar pin-gedrag
    - Het algoritmes van Pinterest

53. Max vindt politiek leuk en leest er graag over op Facebook. Maar zijn feed bestaat voornamelijk uit artikelen en berichten waar hij het mee eens is en ziet amper andere perspectieven en meningen. Wat kan hij doen om ook artikelen met andere perspectieven en meningen te zien?

    Mogelijke antwoorden:
    - Actief op zoek gaan naar artikelen met diverse standpunten
    - Personen of accounts zoeken en volgen met andere perspectieven en meningen

54. Jake is een fitnessliefhebber en kijkt er veel over op TikTok. Zijn "For You" bevat bijna alleen maar filmpjes met onrealistische lichaamsstandaarden. Dit maakt hem onzeker en ontevreden met zijn eigen lichaam. Wat kan hij doen om een lichaam positievere feed te krijgen?

    Mogelijke antwoorden:
    - Accounts ontvolgen die ideale lichaamsstandaarden promoten
    - Deze videos op zijn feed markeren als ‘niet interessant’.
    - Actief zoeken naar lichaamspositieve content en deze video’s leuk vinden,
    - Accounts volgen die lichaamspositieve content maken

55. Hoelang duurt het voordat het TikTok-algoritme je leert kennen en gepersonaliseerde content laat zien na het aanmaken van een nieuw profiel?

    Antwoord:

    Binnen 30 minuten tot 2 uur weet TikTok je interesses en ontvang je op basis hiervan gepersonaliseerde inhoud.

Algoritmische analyse vragen

56. Beschrijf het proces van het TikTok-algoritme om gepersonaliseerde filmpjes aan te bevelen op de "For You"-pagina van een gebruiker.

Antwoord:

1. Een gebruiker levert data door TikTok te gebruiken
2. Het algoritme verzamelt en analyseert deze data en bepaalt de interesses van de gebruiker
3. Op basis hiervan worden filmpjes aanbevolen die binnen deze interesses vallen en vergelijkbaar zijn met filmpjes waarmee een gebruiker eerder interactie mee heeft gehad

Een beschrijving waarin de drie stappen (data genereren, verzamelen & analyseren, filmpjes aanbevelen) worden benoemd wordt als correct gezien.

57. Jullie zijn het Youtube-algoritme. Een gebruiker kijkt vaker naar video's over wetenschap, technologie en gaming, maar kijkt nu naar een filmpje met uitleg over het natuurkunde huiswerk. Wat voor video zou je als eerste aanbevelen?

Mogelijke antwoorden:

- Een video over een andere natuurkunde vraag, die lijkt op deze vraag (of uit hetzelfde boek).
- Een video van hetzelfde kanaal als de video waar nu naar wordt gekeken.

De gebruiker kijkt een uitleg dus is het waarschijnlijk er behoefte is aan een andere uitleg video, in plaats van het bekijken van een wetenschappelijke documentaire of een video over gamen.

58. Jullie zijn het TikTok algoritme. Op basis van het profiel hieronder, wat voor soort advertentie zou je aanbevelen?

    Gebruikersgegevens: 25-jarige man, Nederlands
    Meest bezochte locaties: Eindhoven, Utrecht, Amsterdam
    Top hashtags in gelikete video's: 1. #Gym 2. #Sports 3. #Food 4. #Gaming 5. #Money
    Meest gedeelde video's: 1. Gymoefeningen 3. Hondenvideo's 3. Geld besparen

    Mogelijke antwoorden:
    - Een sportschool in Eindhoven, Utrecht of Amsterdam

    Door een advertentie te selecteren die past bij het profiel en de interesses van de gebruiker, adviseert het algoritme een advertentie waarop de gebruiker waarschijnlijk zal gaan klikken.

59. Jullie zijn het Facebook algoritme. Op basis van het profiel hieronder, wat voor soort nieuwsartikel zou je aanbevelen op de Facebook-feed van deze gebruiker?

    Gebruikersgegevens: 57-jarige man, Nederlands
    Locatie: Limburg, Nederland
    Meest gelikete inhoud: 1. Landbouw 2. Politiek 3. Humor 4. Reizen
    Meest interactie met: BoerBurgerBeweging, Farmers Defence Force, Youp van ‘t Hek

    Antwoord:
    - Een nieuwsartikel over politiek met betrekking tot boeren of waarin de BBB wordt genoemd.

60. Welke data gebruikt een algoritme om content aan te blijven bevelen als een gebruiker abrupt stopt met interacties op sociale media, zoals het liken of reageren?

    Mogelijke Antwoorden:
    - Kijktijd
    - Gebruikersgegevens (profiel)
    - Activiteit op internet
    - Kijkgeschiedenis

Kritisch denken vragen

61. Hoe kan gepersonaliseerde content mogelijk positieve en negatieve gevoelens van gebruikers beïnvloeden? Beschrijf dit voor zowel de positieve en negatieve gevoelens.

Antwoord:

Positief: door een gevoel van tevredenheid te geven door inhoud aan te bieden die overeenkomt met de interesses van de gebruiker.

Negatief: doordat het algoritme denkt dat een gebruiker negatieve content leuk vindt, en het platform een filter bubbel creëert die negatieve inhoud blijft aanbevelen.

Als het antwoord ongeveer overeenkomt met het bovenstaande wordt het gezien als correct.

62. Hoe kunnen gepersonaliseerde content en filter bubbels bijdragen aan polarisatie? (Polarisatie = het versterken van tegenstellingen tussen partijen of bevolkingsgroepen)

Antwoord: Door gebruikers informatie te tonen die overeenkomt met hun bestaande overtuigingen en voorkeuren wat mogelijk standpunten versterkt en blootstelling aan andere perspectieven en meningen beperkt.

Als het antwoord ongeveer overeenkomt met het bovenstaande wordt het gezien als correct.

63. Hoe kunnen gepersonaliseerde advertenties het koopgedrag van gebruikers beïnvloeden?

Antwoord: Doordat de advertenties afgestemd zijn op voorkeuren en interesses stimuleert het mogelijk de beslissingen tot kopen en worden er misschien meer of sneller aankopen gedaan.

Als het antwoord ongeveer overeenkomt met het bovenstaande wordt het gezien als correct.

64. Hoe kunnen algoritmes in sociale media de mentale gezondheid en het welzijn van gebruikers beïnvloeden, met name onder jongere doelgroepen?

Antwoord:

Positief: door content aan te bieden die aansluit bij hun interesses en een gevoel van sociale verbondenheid geeft of ondersteuning biedt bij de uitdagingen waarmee jongeren worstelen.

Negatief: door content aan te bieden die negatieve gevoelens bevatten of negatieve sensatie of emotioneel triggerende content bevat, wat kan leiden tot gevoelens van eenzaamheid, angst, of zelfs depressie.

Als het antwoord ongeveer overeenkomt met het bovenstaande wordt het gezien als correct.

65. Hoe kun je als individu bewust omgaan met de invloed van algoritmes op social media?

    Mogelijke antwoorden:
    - Door kritisch te zijn op de content die je bekijkt en hoe dit jou mogelijk beïnvloedt.
    - Door te weten hoe algoritmes werken en waarom je bepaalde content krijgt.
    - Door actief diverse bronnen te zoeken en je voorkeuren in te stellen.
    - Door het delen van persoonlijke data te minimaliseren.

Appendix Q - Answer booklet & Updated Game cards

Social Media Battle

Gebruiker V/S Bedrijf

Antwoordenboekje

Waar of Niet Waar Vragen

1. Waar	6. Niet Waar	11.Waar	16. Niet Waar
2. Niet Waar	7. Waar	12. Waar	17. Niet Waar
3. Waar	8. Waar	13. Niet Waar	18. Waar
4. Niet Waar	9. Waar	14. Waar	19. Waar
5. Waar	10. Niet Waar	15. Waar	20. Niet Waar

Meerkeuze vragen

21. B	26. D	31. A	36. B
22. D	27. A	32. B	37. B
23. B	28. D	33. B	38. A
24. D	29. A	34. A	39. C
25. C	30. A	35. B	40. B

Koppel vragen

41. A3, B5, C1, D2, E4

a) TikTok	3. “For You”-pagina
b) YouTube	5. Aanbevolen video’s
c) Instagram	1. Reels
d) Facebook	2. Startpagina
e) Snapchat	4. Spotlight

42. A4, B1, C2, D3

a) Filter bubbel	4. Wat online voorkomt dat gebruikers content aanbevolen krijgen die bestaande overtuigingen en meningen versterkt
b) Algoritme	1. Een reeks instructies of regels om een probleem op te lossen of een taak te voltooien.
c) Personalisatie	2. Een proces dat content aanbeveelt op basis van voorkeuren van individuele gebruikers.
D) Gegevensgebruik	3. Het verzamelen, analyseren en gebruik van informatie van gebruikers door algoritmes

43. A3, B4, C1, D2

a) Gebruikersinteracties	3. Likes, reacties, delen, opgeslagen content
b) Gebruikersgedrag	4. Kijktijd, aantikgedrag
c) Apparaat informatie	1. Taal, apparaattype, IP-adressen, geïnstalleerde apps.
d) Profielinformatie	2. Gebruikersgegevens, door jou gevolgd, jou volgend

44. A2, B3, C4, D1

a) TikTok	2. Korte video's
b) Instagram	3. Hoogwaardige foto's en video's
c) YouTube	4. Lange(re) video's
d) Snapchat	1. Tijdsgebonden foto's en video's

45. A4, B2, C3, D1

a) Content gebaseerd op interesses	4. Video's over reizen na interactie met reisblogs.
b) Content gebaseerd op locatie	2. Advertenties voor restaurants in jouw stad.
c) Content gebaseerd op je netwerk	3. Posts van vrienden die vaak worden geliket.
d) Content gebaseerd op gedrag	1. Suggesties na het online zoeken naar een specifiek product.

Rangschik Vragen

46. 3, 4, 2, 1

3. Verzamel gebruikersgegevens
4. Analyseer gebruikersgedrag
2. Creëer aanbevelingen voor gepersonaliseerde content
1. Lever gepersonaliseerde content aan gebruikers

47. 4,1,3,2

4. De gebruiker heeft interactie met content op het platform
1. Het algoritme verzamelt en analyseert gegevens, en past de aanbevolen content aan
3. De feed past nog beter bij de interesses van de gebruiker
2. De gebruiker besteedt meer tijd op het platform.

48. 2,4,1,3

2. Gebruikers krijgen gepersonaliseerde inhoud
4. De diversiteit in perspectieven, standpunten en soort content in de feed neemt af
1. Gebruikers hebben minder interactie met diverse en tegenstrijdige content
3. De content wordt nog meer gepersonaliseerd

49. 2,4,3,1

2. De gebruiker zoekt online naar iets, zoals 'nieuwe sneakers'.
4. De sociale media-app krijgt en analyseert informatie van deze zoekopdracht .
3. Het algoritme gebruikt deze gegevens om advertenties met betrekking tot sneakers te vinden.
1. De social media app toont advertenties voor nieuwe sneakers en schoenenwinkels.

50. 1, 3, 2, 4

1. Het algoritme merkt dat je veel interactie hebt met bepaalde content die negatieve emoties oproept.
3. Het algoritme denkt dat deze interacties een voorkeur voor soortgelijke content aangeeft.
2. Het algoritme beveelt meer van deze content aan om je langer op het platform te houden
4. Je blijft ernaar kijken omdat het je emotionele toestand beïnvloedt, wat de filter bubbel erger maakt.

Scenario Gebaseerde vragen

51. Mark zijn interactie met deze andere content is hoger dan de content met muziek, waardoor het algoritme van Instagram deze content voorstelt.

52. Mogelijke antwoorden:
- Eerdere interacties met deze specifieke foodbloggers,
- Haar pin-gedrag
- Het algoritmes van Pinterest

53. Mogelijke antwoorden:
- Actief op zoek gaan naar artikelen met diverse standpunten
- Personen of accounts zoeken en volgen met andere perspectieven en meningen

54. Mogelijke antwoorden:
- Accounts ontvolgen die ideale lichaamsstandaarden promoten
- Deze videos op zijn feed markeren als 'niet interessant'.
- Actief zoeken naar lichaamspositieve content en deze video's leuk vinden,
- Accounts volgen die lichaamspositieve content maken

55. Binnen 30 minuten tot 2 uur weet TikTok je interesses en ontvang je op basis hiervan gepersonaliseerde inhoud.

Algoritmische Analyse Vragen

56.
1. Een gebruiker levert data door TikTok te gebruiken
2. Het algoritme verzamelt en analyseert deze data en bepaalt de interesses van de gebruiker
3. Op basis hiervan worden filmpjes aanbevolen die binnen deze interesses vallen en vergelijkbaar zijn met filmpjes waarmee een gebruiker eerder interactie mee heeft gehad

Een beschrijving waarin de drie stappen (data genereren, verzamelen & analyseren, filmpjes aanbevelen) worden benoemd wordt als correct gezien.

57. Mogelijke antwoorden:
- Een video over een andere natuurkunde vraag, die lijkt op deze vraag (of uit hetzelfde boek).
- Een video van hetzelfde kanaal als de video waar nu naar wordt gekeken.

De gebruiker kijkt een uitleg dus is het waarschijnlijk er behoefte is aan een andere uitleg video, in plaats van het bekijken van een wetenschappelijke documentaire of een video over gamen.

58. Mogelijke antwoorden:
- Een sportschool in Eindhoven, Utrecht of Amsterdam

Door een advertentie te selecteren die past bij het profiel en de interesses van de gebruiker, adviseert het algoritme een advertentie waarop de gebruiker waarschijnlijk zal gaan klikken.

59. Een nieuwsartikel over politiek met betrekking tot boeren of waarin de BBB wordt genoemd.

60. Mogelijke Antwoorden:
- Kijktijd
- Gebruikersgegevens (profiel)
- Activiteit op internet
- Kijkgeschiedenis

Kritisch Denken Vragen

61.
Positief: door een gevoel van tevredenheid te geven door inhoud aan te bieden die overeenkomt met de interesses van de gebruiker.

Negatief: doordat het algoritme denkt dat een gebruiker negatieve content leuk vindt, en het platform een filter bubbel creëert die negatieve inhoud blijft aanbevelen.

Als het antwoord ongeveer overeenkomt met het bovenstaande wordt het gezien als correct.

62. Door gebruikers informatie te tonen die overeenkomt met hun bestaande overtuigingen en voorkeuren wat mogelijk standpunten versterkt en blootstelling aan andere perspectieven en meningen beperkt.

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Als het antwoord ongeveer overeenkomt met het bovenstaande wordt het gezien als correct.

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Positief: door content aan te bieden die aansluit bij hun interesses en een gevoel van sociale verbondenheid geeft of ondersteuning biedt bij de uitdagingen waarmee jongeren worstelen.

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65. Mogelijke antwoorden:
- Door kritisch te zijn op de content die je bekijkt en hoe dit jou mogelijk beïnvloedt.
- Door te weten hoe algoritmes werken en waarom je bepaalde content krijgt.
- Door actief diverse bronnen te zoeken en je voorkeuren in te stellen.
- Door het delen van persoonlijke data te minimaliseren.

UPDATE

UPDATE

UPDATE

Informatiekaart

UPDATE

UPDATE

UPDATE

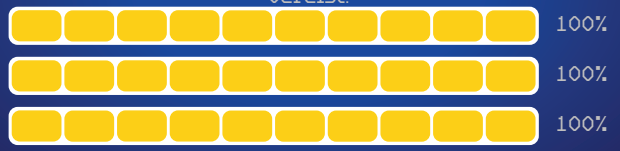
UPDATE

Kijktijd Algoritme

Het algoritme gebruikt de volgende data om persoonlijke aanbevelingen te kunnen doen:

Hoe vaak en hoe lang gebruikers naar bepaalde content kijken. Opbrengst: 3 data tokens.

Vereist:



Delen Algoritme

Het algoritme gebruikt de volgende data om persoonlijke aanbevelingen te kunnen doen:

Of een video wordt gedeeld, en bij welke content dit gebeurt
Opbrengst: 2 data tokens.

Vereist:

Interactie Algoritme

Het algoritme gebruikt de volgende data om persoonlijke aanbevelingen te kunnen doen:

Interacties van gebruikers, zoals zoeken en welke profielen, hashtags en muziek worden bekeken. Opbrengst: 2 data tokens.

Vereist:

Informatiekaart

Het bedrijf krijgt een bepaalde hoeveelheid data voor elke actie die de gebruiker doet:

Like	1 data token
Comment	1 data token
Niet Interessant	1 data token
Delen	2 data tokens
Volgen/Ontvolgen	2 data tokens
Interactie	2 data tokens
Opnieuw Kijken	3 data tokens

Comment Algoritme

Het algoritme gebruikt de volgende data om persoonlijke aanbevelingen te kunnen doen:

Comments die een gebruiker bekijkt, leuk vindt, op reageert, zelf plaatst en bij welke content dit gebeurt. Opbrengst: 1 data token.

Vereist:

Volg Algoritme

Het algoritme gebruikt de volgende data om persoonlijke aanbevelingen te kunnen doen:

Welke profielen gebruikers volgen. Opbrengst: 2 data tokens.

Vereist:

Like Algoritme

Het algoritme gebruikt de volgende data om persoonlijke aanbevelingen te kunnen doen:

Of een video wordt geliket, en bij welke content dit gebeurt. Opbrengst: 1 data token.

Vereist:

Niet Interessant Algoritme

Het algoritme gebruikt de volgende data om persoonlijke aanbevelingen te kunnen doen:

Welke content gebruikers markeren als niet interessant. Opbrengst: 1 data token.

Vereist:

ACTIE
BEDRIJF

ACTIE
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ACTIE
BEDRIJF

Storing

Het bedrijf heeft een storing.

Sla de volgende beurt over.

Storing

Het bedrijf heeft een storing.

Ontvang 2 beurten geen data van de gebruiker.

Update

Het platform krijgt een visuele update.

Speel een extra beurt.

Data lek

Concurrerende platformen hebben een data lek. Het platform krijgt hierdoor veel nieuwe gebruikers.

Ontvang 2 beurten dubbele hoeveelheid data van de gebruiker.

Verward algoritme

Het algoritme is in de war door de verschillende data en kan geen duidelijke interesses bepalen.

Ontvang 1 beurt geen data van de gebruiker.

Update

Het platform krijgt een visuele update.

Ontvang 2 beurten dubbele hoeveelheid data van de gebruiker.

Data lek

Het bedrijf heeft een data lek dat moet worden gefixt.

Ontvang 2 beurten geen data van de gebruiker.

Bug

In het algoritme zit een 'bug' en het werkt niet zoals zou moeten.

Ontvang 1 beurt geen data van de gebruiker.

Negativiteit

Het platform is negatief in het nieuws gekomen en verliest gebruikers.

Sla een beurt over

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BEDRIJF

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Nieuwe werknemer

Het bedrijft heeft een nieuwe softwareontwikkelaar en die versnelt de ontwikkeling.

Ontvang 60% update

Nieuw kantoor

Het bedrijf heeft een nieuw, groter kantoorpand

Ontvang 2 beurten dubbele hoeveelheid data van de gebruiker.

Uitbreiding

Het platform is nu ook gelanceerd in de VS

Ontvang 2 beurten dubbele hoeveelheid data van de gebruiker.

Stagiair

Het bedrijf heeft software-ontwikkelaarsstudenten als stagiairs

Ontvang 20% update.

Ziekte

Er heerst een griepgolf in het bedrijf en veel werknemers zijn ziek.

Ontvang 2 beurten 1 data minder voor elke stap van de gebruiker.

Virus

Er is een computervirus gevonden op een van de computers van het bedrijf.

Ontvang 1 beurt geen data van de gebruiker.

Gehackt

Het bedrijf is gehackt.

Sla de volgende beurt over.

Populair

Het bedrijf is in het nieuws geweest en het platform stijgt in populariteit.

Speel een extra beurt.

Mijlpaal

Het platform heeft een miljoen gebruikers.

Speel een extra beurt.

ACTIE
GEBRUIKER

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GEBRUIKER

Like

Een vriend gebruikt je telefoon en liket een video op jouw feed.

Like de volgende video.

Like

Je telefoon viel uit je hand en je hebt per ongeluk een video geliket.

Like de volgende video.

Comment

Je wilt meedoen aan een winactie op het platform, maar je moet wel iemand taggen.

Comment op de volgende video.

Comment

Een video in je feed vraagt om een reactie in de comments.

Comment op de volgende video.

Share

Je vindt een video zo leuk dat je deze deelt met je eigen volgers.

Deel de volgende video.

Share

Je ziet een video die je aan een vriend herinnert en je stuurt het naar deze persoon.

Deel de volgende video

Ontvolgen

Je ziet dat je veel mensen volgt die je helemaal niet kent.

Ontvolg het profiel dat de volgende video heeft gemaakt (indien mogelijk).

Volgen

Je komt een account tegen waarvan je de video's leuk vindt.

Volg het profiel dat de volgende video heeft gemaakt.

Kijk Opnieuw

Je wordt afgeleid en laat ongemerkt een video meerdere keren afspelen.

Bekijk de volgende video opnieuw.

ACTIE
GEBRUIKER

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ACTIE
GEBRUIKER

Kijk Opnieuw

Je bent gefascineerd door een video en bekijkt hem opnieuw.

Bekijk de volgende video opnieuw.

Hashtag

Een video gaat over een trending onderwerp dat je interesseert.

Bekijk de hashtag van de volgende video

Instellingen

Je hebt je privacy voorkeuren aangepast in de instellingen.

Geef 1 ronde het bedrijf geen data.

Onhandig

Je hebt je telefoon laten vallen. Deze is kapot en je kunt het platform nu niet gebruiken.

Sla de volgende beurt over.

Instellingen

Je hebt nieuwe app-instellingen niet gelezen, en zomaar op akkoord geklikt.

Geef het bedrijf voor 2 rondes dubbele hoeveelheid data.

Niet Interessant

Je vindt bepaalde onderwerpen in video's echt niet leuk.

Markeer de volgende video als 'niet interessant'.

Nieuwe Mobiel

Je hebt een nieuwe mobiel en deze is veel sneller.

Speel een extra beurt.

Kwijt

Je bent je mobiel kwijt en kunt het platform niet gebruiken.

Sla de volgende beurt over.

Vrienden

Je hebt nieuwe vrienden gemaakt via het platform.

Speel een extra beurt.

VRAAG

Goed geantwoord?

Gebruiker: Voer een actie uit ter waarde van max. 1 data token op het platform.

Bedrijf: Ontvang het volgende update percentage:

20%

VRAAG

Goed geantwoord?

Gebruiker: Voer een actie uit ter waarde van max. 1 data token op het platform.

Bedrijf: Ontvang het volgende update percentage:

20%

VRAAG

Goed geantwoord?

Gebruiker: Voer een actie uit ter waarde van max. 2 data tokens op het platform.

Bedrijf: Ontvang het volgende update percentage:

40%

VRAAG

Goed geantwoord?

Gebruiker: Voer een actie uit ter waarde van max. 2 data tokens op het platform.

Bedrijf: Ontvang het volgende update percentage:

40%

VRAAG

Goed geantwoord?

Gebruiker: Voer een actie uit ter waarde van max. 1 data token op het platform.

Bedrijf: Ontvang het volgende update percentage:

20%

VRAAG

Goed geantwoord?

Gebruiker: Voer een actie uit ter waarde van max. 1 data token op het platform.

Bedrijf: Ontvang het volgende update percentage:

20%

Waar of Niet Waar

Het algoritme van YouTube dat video's aanbeveelt, kijkt naar beschikbare gegevens van een gebruiker, zoals geslacht, leeftijd, taal en locatie, om video's voor te stellen.

1

Waar of Niet Waar

Je locatie kan door sociale media-algoritmen worden gebruikt om advertenties te personaliseren.

14

Koppelen

Maak de juiste combinaties:

A: TikTok
C: Youtube
B: Instagram
D: Facebook
E: Snapchat

1: Reels
2: Startpagina
3: For You
4: Spotlight
5: Aanbevolen videos

41

Koppelen

Koppel de term aan de juiste definitie:

A: Filter Bubbel
B: Personalisatie
C: Algoritme
D: Gegevensgebruik

1: Een reeks instructies of regels om een probleem op te lossen of een taak te voltooien.
2: Een proces dat content aanbeveelt op basis van voorkeuren van individuele gebruikers.
3: Het verzamelen, analyseren en gebruik van informatie van gebruikers door algoritmes.
4: Een online omgeving waarin gebruikers content aanbevolen krijgen die bestaande overtuigingen en meningen versterkt.

42

Meerkeuze

Wat is het belangrijkste doel van algoritmes op sociale media?

A: Verbeteren van de privacy van gebruikers

B: Zorgen dat het platform meer wordt gebruikt

C: Zorgen dat er meer inkomsten komen uit advertentie's

D: Zorgen dat het platform minder wordt gebruik

21

Meerkeuze

Wat is een mogelijk maatschappelijk gevolg van filter bubbels?

A: Polarisatie

B: Social Media verslaving

C: FOMO (Fear Of Missing Out)

D: Verspreiding van correct nieuws

31

VRAAG

Goed geantwoord?

Gebruiker: Voer een actie uit ter waarde van max. 3 data tokens op het platform.

Bedrijf: Ontvang het volgende update percentage:

VRAAG

Goed geantwoord?

Gebruiker: Voer een actie uit ter waarde van max. 3 data tokens op het platform.

Bedrijf: Ontvang het volgende update percentage:

VRAAG

Goed geantwoord?

Gebruiker: Voer een actie uit ter waarde van max. 2 data tokens op het platform.

Bedrijf: Ontvang het volgende update percentage:

VRAAG

Goed geantwoord?

Gebruiker: Voer een actie uit ter waarde van max. 2 data tokens op het platform.

Bedrijf: Ontvang het volgende update percentage:

VRAAG

Goed geantwoord?

Gebruiker: Voer een actie uit ter waarde van max. 3 data tokens op het platform.

Bedrijf: Ontvang het volgende update percentage:

VRAAG

Goed geantwoord?

Gebruiker: Voer een actie uit ter waarde van max. 3 data tokens op het platform.

Bedrijf: Ontvang het volgende update percentage:

Kritisch Denken

Hoe kan gepersonaliseerde content mogelijk positieve en negatieve gevoelens van gebruikers beïnvloeden? Beschrijf dit voor zowel de positieve en negatieve gevoelens.

61

Algoritmische Analyse

Jullie zijn het Youtube-algoritme. Een gebruiker kijkt vaker naar video's over wetenschap, technologie en gaming, maar kijkt nu naar een filmpje met uitleg over het natuurkunde huiswerk. Wat voor video zou je als eerste aanbevelen?

57

Rangschikken

Zet de volgende nummers in de juiste volgorde.
Hoe personaliseren algoritmes content op social media?

1. Lever gepersonaliseerde content aan gebruikers
2. Creëer aanbevelingen voor gepersonaliseerde content
3. Verzamel gebruikersgegevens en gedrag
4. Analyseer gebruikersgedrag

46

Rangschikken

Zet de volgende nummers in de juiste volgorde.
Hoe krijgt een gebruiker een gepersonaliseerde advertentie te zien:

1. De social media app toont advertenties voor nieuwe sneakers en schoenenwinkels.
2. De gebruiker zoekt online naar iets, zoals 'nieuwe sneakers'.
3. Het algoritme gebruikt deze gegevens om advertenties met betrekking tot sneakers te vinden.
4. De sociale media-app krijgt en analyseert informatie van deze zoekopdracht .

49

Scenario

Mark is muzikant en gebruikt Instagram om nieuwe muziek te ontdekken en andere muzikanten te ontmoeten, maar zijn feed staat vol met andere content. Hoe komt dit?

51

Scenario

Je maakt een nieuw profiel aan op TikTok. Hoelang duurt het voordat het algoritme je leert kennen en gepersonaliseerde content laat zien?

55

VRAAG

Goed geantwoord?

Gebruiker: Voer een actie uit ter waarde van max. 3 data tokens op het platform.

Bedrijf: Ontvang het volgende update percentage:

VRAAG

Goed geantwoord?

Gebruiker: Voer een actie uit ter waarde van max. 3 data tokens op het platform.

Bedrijf: Ontvang het volgende update percentage:

Kritisch Denken

Hoe kunnen gepersonaliseerde advertenties het koopgedrag van gebruikers beïnvloeden?

63

Algoritmische Analyse

Jullie zijn het TikTok algoritme. Op basis van het profiel hieronder, wat voor soort advertentie zou je aanbevelen?

Gebruikersgegevens:
25-jarige man, Nederlands

Meest bezochte locaties:
Eindhoven, Utrecht, Amsterdam

Top hashtags in gelikete video's:
1. #Gym 2. #Sports 3. ood 4. #Gaming 5. #Money

Meest gedeelde video's:
1. Gymoefeningen 3. Hondenvideo's 3. Geld bespar

58

Appendix R

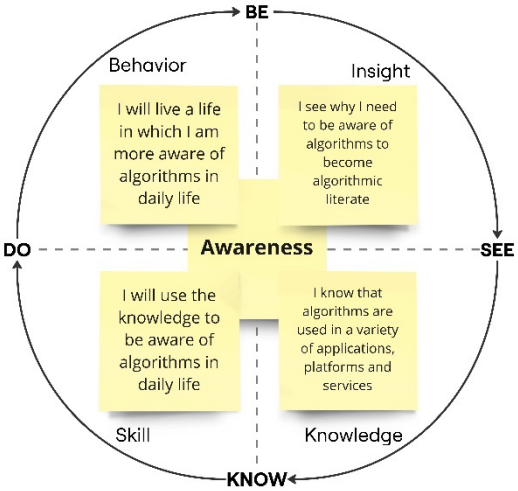
Learning Experience Explanation & Guidelines

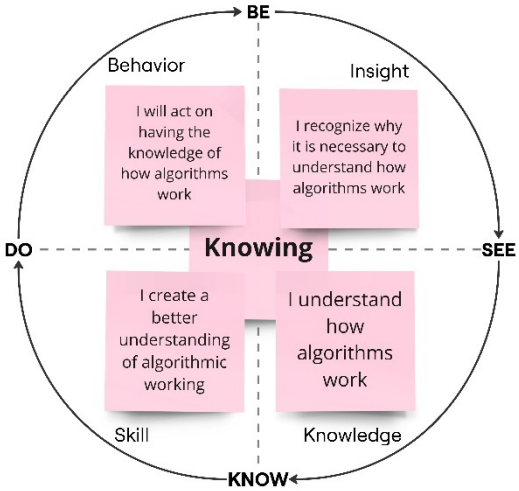
This document contains guidelines for further development and implementation of Behind the Feed, a learning experience on social media algorithms. Guidelines for each phase are created based on the learning goals and objectives of these phases, while also considering the content in the games that are played in the experience.

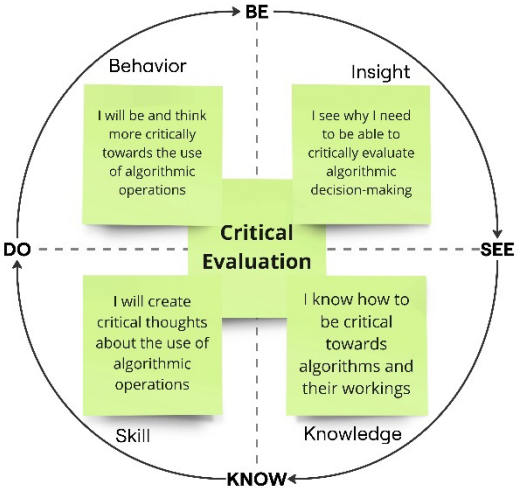
Behind the Feed aims to enhance algorithmic literacy regarding social media algorithms in students aged 12 to 16 years old. It does so by addressing the following learning goals, based on the definition of algorithmic literacy:

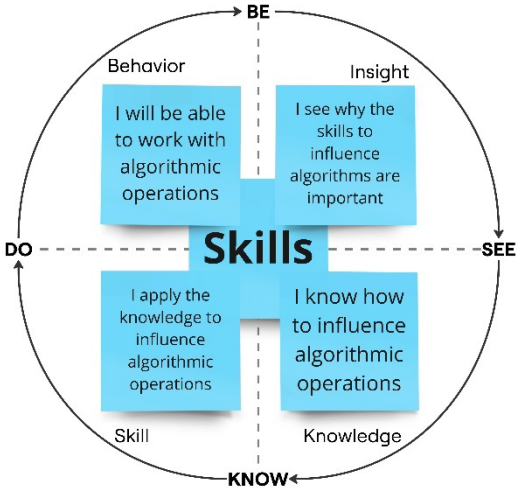
(1) being **aware** of the use of algorithms in online applications, platforms, and services (social media). (**Awareness**)
(2) being able to **critically evaluate** algorithmic decision-making; (**Critical evaluation**)
(3) having the **skills** to cope with or influence algorithmic operations. (**Skills**)

Learning objectives, aligned with the four quadrants of the experiential learning model (Insight, knowledge, skills and behavior), were formulated for each of these learning goals.









Behind the feed supports these objectives in the following way:

The learning experience supports **awareness** of social media algorithms by:
- Providing **insight** in why it is important to be aware of the use of algorithms in social media
- Providing **knowledge** on the use of algorithms in social media
- Providing **skills** to recognize the use of algorithms in social media
- Providing ways (**behavior**) to incorporate being aware of algorithms in social media in real-life situations.

The learning experience supports **understanding** social media algorithms by:
- Providing **insight** in why it is important to understand algorithms in social media
- Providing **knowledge** on how algorithms in social media work
- Providing **skills** to apply the knowledge of algorithms in social media
- Providing ways (**behavior**) to incorporate the understanding of social media algorithms in real-life situations.

The learning experience supports **critical evaluation** of social media algorithms by:
- Providing insight in why it is important to critically evaluate social media algorithms.
- Providing knowledge on how to critically evaluate social media algorithms
- Providing skills to apply this knowledge and thus to critically evaluate social media algorithms
- Providing ways (**behavior**) to incorporate critically evaluating social media algorithms in real-life situations.

The learning experience supports **skills** to deal with social media algorithms by:
- Providing **insight** in why it is important to have the skills to deal with social media algorithms.
- Providing **knowledge** on how to deal with social media algorithms
- Providing **skills** to apply this knowledge, thus the skills to deal with social media algorithms
- Providing ways (**behavior**) to incorporate the skills to deal with social media algorithms in real-life situations.

The experience follows these stages of experiential learning in a total of 5 phases: Introduction, Explore, Compare, Test and Conclusion. Learning material and Discussions are used to dive deeper into the learning goals of the games, to evaluate students learning and to transfer their knowledge to real life situations. Each phase will be described, and guidelines will be given for further development and implementation.

1. Introduction

Duration: 1 lesson.

Content: In an interactive lesson, students learn the basics of social media algorithms, the possible consequences and influences personalization has and why being algorithmic literate is crucial. They are also introduced to games and the story throughout.

Through an interactive lesson, students are introduced to the history and basic principles of social media algorithms, the potential consequences and influences of personalization, and the importance of developing algorithmic literacy. Additionally, they are introduced to the accompanying games and overarching narrative.

Learning Objectives:

- I see why I need to be aware of algorithms to become algorithmic literate (Awareness)
- I recognize why it is necessary to understand how algorithms work (Knowing)
- I see why the skills to influence algorithms are important (Skills)
- I see why I need to be able to critically evaluate algorithmic decision making (Critical Evaluation)

Narrative:

A brand-new social media platform is about to take the world by storm: BeYou. The creators have a big dream: to become the largest platform with the best personal feed for every user. But there's one problem... they don't know how to build this perfect algorithm.

In this learning experience, you and a partner will dive into the fascinating world of social media algorithms. By playing three interactive games against another duo, you will learn how algorithms work, what data platforms collect, how personal feeds are created, and the potential impacts this can have – both for you as a user and for society. Who knows, you might be able to help the creators develop BeYou's algorithm or, as a future user, critically examine what this means for your social media experience.

Guidelines

The objective of the introduction is to introduce students to the history, principles, and impacts of social media algorithms to foster an understanding of algorithmic literacy and setting the stage for the learning experience and accompanying games. Content of this introduction should contain:

1. Introduction to Algorithms:
- Define "algorithm" in simple terms.
- Discuss everyday examples of algorithms (e.g., search engines, online shopping).

2. Algorithms in Social Media:
- Explain/discuss briefly (experiences) how algorithms personalize content on social media.
- Introduce recommendation systems and their role in personalizing user experiences.

3. Goals of Social Media Companies:
- Highlight the primary goal: generating revenue through ads, thus keeping users engaged.
- Discuss used strategies to keep users engaged, including content personalization.

4. Role of Algorithms:
- Explain how algorithms help social media platforms achieve their goals.
- Describe the evolution of social media algorithms (from chronological to interest-based, then emotion-based feeds).

5. Consequences of Algorithms:
- Explore both positive (e.g., personalized content) and negative (e.g., misinformation, echo chambers) outcomes.
- Briefly explain impacts on individuals (e.g., mental health) and society (e.g., polarization).

6. Introduction to Filter Bubbles:
- Define filter bubbles and their significance.
- Set the stage for learning more about algorithms through the games.

Interactive Elements:

While it is an introduction lesson, including explanations, use discussions, visual aids, and relevant examples to make the content relatable and engaging for students. Important is to introduce the games and overarching narrative, linking them to the lesson topics.

Helpful Resources for visuals:

- The Social Dilemma (Netflix)
- The Great Hack (Netflix)
- WSJ's TikTok Algorithm Investigation

2. Explore

2.1 Enter the Bubble

Duration: 1 lesson

Content: In the game Enter the Bubble, students engage in creating personalized feeds by interacting on a simulated social media feed while strategically managing the data they share. This game allows students to explore the functioning of social media algorithms, understand how specific behaviors influence personalized results, and reflect on the data they share.

Learning objectives:

- I know that algorithms are used in a variety of applications, platforms and services. (Awareness)
- I understand how (social media) algorithms work. (Knowing)
- I know how to influence algorithmic operations. (Skills)

Narrative:

To help contribute to the development of BeYou's algorithm, you need to understand how social media algorithms work. In this game, you'll dive into a social media algorithm and discover how platforms create personal feeds. By strategically using data, you'll try to reach a filter bubble while retaining as much data as possible. It's not just about speed, but especially about making smart choices. Are you ready to outsmart the algorithm?

Guidelines

The objective of this stage in the explore phase is to play the game Enter the Bubble. First, verbally explain the game while also making use of visuals. Mention to pay attention to aspects that are important for the following stage, the use of learning material. During gameplay, support students when help is needed and have some discussions during gameplay. Emphasize after the 4 rounds to keep track of the score with use of the Black Box.

2.2 Use of Learning Material

Duration: 0.5 – 3 lessons

Content: Through the use of learning material, students dive deeper into the topic and learning goals of the game 'Enter the Bubble'.

Learning Objectives:

- I will use the knowledge to be aware of algorithms in daily life (Awareness)
- I create a better understanding of algorithmic working (Knowing)
- I apply the knowledge to influence algorithmic operations (Skills)

Guidelines:

The type of learning material will be created and implemented according to preferences of schools, aligning with educational levels of students. The duration of this phase will be aligned accordingly. The learning material should dive deeper into the three addressed learning goals (awareness, knowing and skills) following the experiential learning model. Therefore, learning material should focus on the application of learnings in the previous stage, supporting the skills objective of these learning goals.

Example learning material:

- Work sheets with questions on the algorithm in the game, including questions to compare it in relation to algorithms in existing social media (individual).
- Project in which a video has to be made in which students explain what has been learned by applying it to existing social media algorithms (group based).

2.3 Class Discussion

Duration: 0.5 lesson

Content: Through interactive class discussions, students reflect on their experiences with Enter the Bubble, what has been learned through playing the game and through the use of the learning material.

Learning Objectives:

- I will live a life in which I am more aware of algorithms in daily life (awareness)
- I will act on having the knowledge of how algorithms work (knowing)
- .I will be able to work with algorithmic operations (skills)

Guidelines:

The discussion methods will be decided and implemented according to preferences of schools, aligning with educational levels of students. . The discussion should dive deeper into the three addressed learning goals (awareness, knowing and skills), following the experiential learning model. Therefore, the discussion must focus on transferring learnings into real life situations, supporting the behavior objective of these learning goals.

Example questions and statements:

Questions

- What kind of data did the algorithm in this game collect or what behavior influenced the creation of the personalized feed? How do you experience this on the social media you use?
- How did you think the algorithm operated in this game?
- What kind of data did this algorithm collect to create, or what influenced the creation of the personal feed?
- On which social media do you experience this personalization the most, and why?
- How do you currently deal with personalized results you do not like?

Statement:

- I am happy with how algorithms in social media currently lead to personalized results. Why or why not?
- I will rethink how I operate on social media to consciously influence what I will see. Why/how?
- I am shocked by the amount of data that is collected by the social media I am using.

3. Compare

3.1 Guess the Data & Video

Duration: 1 lesson

Content: In Guess the Data & Video, students analyze the created feeds in the previous game by thinking like an algorithm. They need to determine what data corresponds to a user with a created personalized feed and predict which video an algorithm might recommend to this user. It uncovers how algorithms create profiles based on data and shows the impact personalized feeds can have.

Learning objectives:

- I know that algorithms are used in a variety of applications, platforms and services . (Awareness)
- I know how to be critical towards algorithms and their workings (Critical Evaluation)

Narrative:

To become a critical user of BeYou, it's important to understand the impact of algorithms and personalized feeds. In this game, you are the algorithm: How does an algorithm think? What does it know about a user? By working together and thinking strategically, you'll try to guess the correct data categories and recommend a new video while comparing different feeds. Who can think like an algorithm the best?

Guidelines:

The objective of this phase in the compare stage is to play the game Guess the Data & Video. First, verbally explain the game while also making use of visuals. Mention to pay attention to aspects that are important for the following stage, the use of learning material. During gameplay, support students when help is needed and have some discussions during gameplay. Emphasize after the 4 rounds to keep track of the score with use of the Black Box.

3.2 Use of Learning Material

Duration: 0.5 – 3 lessons

Content: Through the use of learning material, students dive deeper into the topic and learning goals of the game Guess the Data & Video.

Learning Objectives:

- I will use the knowledge to be aware of algorithms in daily life (Awareness)
- I will create critical thoughts about the use of algorithmic operations (Critical Evaluation)

Guidelines:

The type of learning material will be created and implemented according to preferences of schools, aligning with educational levels of students. The duration of this phase will be aligned accordingly. The learning material should dive deeper into the two addressed learning goals (awareness, critical evaluation) following the experiential learning model. Therefore, learning material should focus on the application of learnings in the previous stage, supporting the skills objective of these learning goals.

Example learning material:

- Quiz with questions on the different feeds in this game and how they possibly impact an individual or society (individual or group based).
- Project in which students need to create a concept of an ethical social media platform and present the outcome (group based).

3.3 Class Discussion

Duration: 0.5 lesson

Content: Through interactive class discussions, students reflect on their experiences with Guess the Data & Video, what has been learned through playing the game and through the use of the learning material.

Learning Objectives:

- I will live a life in which I am more aware of algorithms in daily life. (Awareness)
- I will be and think more critically towards the use of algorithmic operations. (Critical Evaluation)

Guidelines:

The discussion methods will be decided and implemented according to preferences of schools, aligning with educational levels of students. The discussion should dive deeper into the two addressed learning goals (awareness, critical evaluation), following the experiential learning model. Therefore, the discussion must focus on transferring the learning into real life situations, supporting the behavior objective of these learning goals.

Example questions and statements:

Questions

- Who wants to share their experience in this game? What did you think of seeing other feeds than your own?
- What are possible influences of the feeds in this game on an individual level? And on a societal level?
- Has anyone experienced personalized content they did not like in their feed and how did they deal with that?
- Has anyone experienced that the algorithm incorrectly 'thought' you liked something by showing you videos about it, but you did not? (Biases)

Statement:

- Social Media Companies are responsible for any negative influence that their personalization algorithms can have on individuals.
- Social Media companies should do more about their influence on a societal level, such as on politics.
- Giving people the option to 'wipe' their feed and start from scratch is the best social media companies can do.

4. Test (Social Media Battle: User vs. Company)

Duration: 1 -2 lessons

Content: In Social Media Battle, students are challenged with applying their knowledge and skills in an extended and engaging game. Each duo takes the role of either critical users aiming to retain their data or as a social media company working to update their algorithms to gather this user data.

Learning Objectives:

Knowledge:

- I know that algorithms are used in a variety of applications, platforms and services (awareness)
- I understand how algorithms work. (Knowing)
- I know how to be critical towards algorithms and their workings (Critical evaluation)
- I know how to influence algorithmic operations. (Skills)

Skills:

- I will use the knowledge to be aware of algorithms in daily life. (Awareness)
- I create a better understanding of algorithmic working. (Knowing)
- I will create critical thoughts about the use of algorithmic operations. (Critical Evaluation)
- I apply the knowledge to influence algorithmic operations. (Skills)

Narrative:

In Social Media Battle, everything comes together. You have previously learned how algorithms work, what data they collect, and how this affects your feed, you, and even society. Now it's time to put your knowledge and skills into practice. The ultimate challenge awaits! You play as a duo helping to develop the BeYou algorithm, or you try to manage your feed as a critical user. Which duo will win the Social Media Battle?

Guidelines:

The objective of this stage is to play the game Social Media Battle. First, verbally explain the game while also making use of visuals. Emphasize to apply what has been learned throughout the experience and to start with collecting and handing in rewards won in previous games During gameplay, support students when help is needed and have some discussions during gameplay.

5. Conclude

Duration: 0.5 lesson

Content: – In this last and concluding part a class discussion takes place on students their experience of the final game and the complete learning experience, allowing them to reflect on their social media use in the future.

Learning Objectives:

- I will live a life in which I am more aware of algorithms in daily life (Awareness)
- I will act on having the knowledge of how algorithms work (Knowing)
- I will be and think more critically towards the use of algorithmic operations (Critical evaluation)
- I will be able to work with algorithmic operations (Skills)

Guidelines:

The objective of the concluding stage is to conclude the learning experience in a group discussion by reflecting on playing Social Media Battle, and on the whole learning experience, stimulated by questions and statements. The discussion addresses all learning goals (awareness, critical evaluation), following the experiential learning model. Therefore, the discussion must focus on transferring the learning into real life situations, supporting the behavior objective of all learning goals.

Moreover, tips and tricks on personalization settings for several social media platforms should be given, and additional learning material should be advised, such as watching full documentaries referred to in the learning experience.

Example questions and statements:

Question:

- How are you going to critically address personalized content that you see on social media that you do not like?

Statement:

- I am going to consciously think about my behavior on social media to ensure I see content I like.

Guidelines overview/summary. Zoom for readability of each cell.

Phase	1	2			3			4	5
Element	Introduction (1 lesson)	Exploring Algorithm (1 lesson)	Use of Learning Material (0.5 - 3 lessons)	Class Discussion (0.5 lesson)	Comparing Algorithms (1 lesson)	Use of Learning Material (0.5 - 3 lessons)	Class Discussion (0.5 lesson)	Social Media Battle (1.5 lessons)	Closing (Discussion) (0.5 lessons)
Description	An interactive introduction on algorithms in social media	Exploring the use of an algorithm, seeing how fast and which behaviour gets one into a filter bubble through playing the game: **Enter the Bubble**.	Use of learning material to dive deeper into how algorithms work.	A reflective discussion with the class about what was experienced and learned through playing the game and the use of the learning material.	Comparing existing algorithms/feeds to see and learn other people see different things through playing the game: **Guess the data & video.**	Use of learning material to dive deeper into the possible consequences of different bubbles.	A reflective discussion with the class about what was experienced and learned through playing the game and the use of the learning material.	Test the knowledge and skills which have been learned throughout the experience by playing the game: **Social Media Battle**	Closing the learning experience by discussing the game and overall experience with the class
Learning Goal/objectives	Get **Insight** on why it is important to become **aware of**, gain **knowledge** on the working of, having **skills** to deal with, and to be **critical** on algorithms in social media.	Gain **Knowledge** on **being aware** of the use of algorithms, **knowing** how they work and having **skills** to influence them.	Gain **Skills** by applying the knowledge on **being aware** of the use of algorithms, **knowing** how they work and having **skills** to influence them.	Learn the **behavior** to be **aware** of the use of algorithms, **knowing** how they work and gaving the **skills** to influence them	Gain **kowledge** on **being aware** of the use of algorithms and the ability to **be critical** towards their operations.	Gain **skills** by applying the knowledge on **being aware** of the use of algorithms, and the ability to **be critical** towards their operations.	Learn the **behavior** to be **aware** of the use of algorithms, and to **be critical** towards their operations.	Test the **knowledge & skills** on being **aware** of the use of algorithms in social media, **knowing** how they work, the ability to **be critical** toward them and the **skills** to deal with or influence them.	Learn the **behavior** to be **aware** of the use of algorithms in social media, act on **knowing** how they work, to **be critical** toward them and using the **skills** to deal with or influence them.
(Discrete) Emotions	Shocked repulsed Eagerness Disgust Desire	Explorative Excited Curious Desire Happiness	Content Relaxation	Confidence Safety Relaxation Happiness	Shocked Surprised Compassion Disgust Desire Happiness	Content Relaxation	Belonging Confidence Relaxation Happiness	Excited Joyful Happy Happiness Desire	Satisfied Happy Happiness

Content	• What is an algorithm?
	• Where do we see algorithms?
	  • Leading the introduction to recommendation systems & Social Media
	• The goal of social media companies (money, thus advertisements, thus keeping users on the app)
	• Their strategies to do so
	• How algorithms play a role
	• History of algorithms in social media (chronological feed, interest based, emotions based)
	• Consequences (positive & negative)
	  • Individual & societal level
	  • Leading to the introduction of filter bubbles and exploring the algorithm part
	
	Helpful Sources:
	
	The Social Dilemma (Netflix)
	The Great Hack (Netflix)
	TikTok algorithm (https://www.wsj.com/video/investigation-how-tiktok-algorithm-figures-out-your-deepest-desires/DADACF48-CE1D-48D5-A674-6692E7FA67FC)
		• Explanation of the game:
		  • In the explanation, it is mentioned to pay attention to [aspect related to learning material]
		
		• Playing the game (4 rounds)
		
		• Keeping track of the score with use of the design.
			Implementation of learning material, put together in collaboration with the school the experience will be given to.
			
			Example learning material:
			
			Group based:
			
			• Quiz/Questions
			Answer the questions (on work sheets) about the algorithm in this game, and how it is related to algorithms in social media they use.
			
			• Argument:
			Think of and describe a possible algorithm for implementation in social media that is better in your eyes. What features does this algorithm have, and why is it better?
			
			Individually:
			
			• Reflection
			Write a short reflection about 200 words what you have learned through playing this game.
			
			• Video
			Create a short explanation video with your phone that contains what you have learned from the game.
				Discussing several questions and/or statements like:
				
				Questions:
				
				• How did you think the algorithm operated in this game?
				
				• What kind of data did this algorithm collect to create, or what influenced the creation of the personal feed?
				
				• On which social media do you experience this personalization the most, and why?
				
				• How do you currently deal with personalized results you do not like?
				
				Statements:
				
				• I am happy with the algorithms in social media that lead to personalized results.
				
				• I will rethink how I operate on social media to consciously influence what I will see.
				
				• I am shocked by the amount of data that is collected by the social media I am using.
					• Explanation of the game:
					  • In the explanation, it is mentioned to pay attention to [aspect related to learning material]
					
					• Playing the game (4 rounds)
					
					• Keeping track of the score with use of the design.
						Implementation of learning material, put together in collaboration with the school the experience will be given to.
						
						Example learning material:
						
						Group based:
						
						• Quiz/Questions
						Answer the questions (on work sheets) about the feeds in this game, and how they possibly can influence an individual and/or society.
						
						• Argument:
						Think of a way and argument for this way of how social media companies can have a recommendation system without requiring and modelling user data.
						
						Individually:
						
						• Reflection
						Write a short reflection about 200 words what you have learned through playing this game.
						
						• Video
						Create a short explanation video with your phone that contains what you have learned from the game.
							Discussing several questions and/or statements like:
							
							Questions:
							
							• Who wants to share their experience in this game? What did you think of seeing other feeds than your own?
							
							• What are possible influences of the feeds in this game on an individual level? And on a societal level?
							
							• Has anyone experienced personalized content they did not like in their feed and how did they deal with that?
							
							• Has anyone experienced that the algorithm incorrectly 'thought'you liked something by showing you videos about it, but you did not? (Biases)
							
							Statements:
							
							• Social Media Companies are responsible for any negative influence that their personalization algorithms can have on individuals.
							
							• Social Media companies should do more about their influence on a societal level, such as on politics.
							
							• Giving people the option to 'wipe' their feed and start from scratch is the best social media companies can do.
								• Explanation of the game:
								  • In the explanation, it is mentioned that everything they have learned is put to the test with playing this game.
								
								• Playing the game (consisting of 2 rounds)
								  • If possible, play the game twice and switch roles.
									Closing the learning experience with concluding questions like:
									
									• What is the thing you have learned through this experience that will stick with you the most?
									
									• How are you critically going to address the personalized content that you see on social media?
									
									• Who is going to think about their actions and how they might influence what you see on social media from now on, and why?
									
									And tips on personalization settings like:
									
									• Where you can find personalization settings.
									• Where you can switch from feed (chronological on Instagram for example)
									• Where to refresh your feed.
									
									Tips for more :
									
									Documentaries:
									The Social Dilemma (Netflix)
									The Great Hack (Netflix)
									VPRO Tegenlicht: Verslaafd aan het Algoritme (https://www.vpro.nl/programmas/tegenlicht/kijk/afleveringen/2017-2018/verslaafd-aan-het-algoritme.html)

Appendix S

Protocol and Results Expert meeting

Playtesting at Movezlab

This document contains the questions and the results of a test session for the learning experience and series of games with several experts on digital resilience as part of the Final Master Project of Yorn Thijssen at Eindhoven University of Technology. In total 5 experts joined the meeting, of which 4 of them played the game and 1 of them observed. Information was given about te creation of and the content of the learning experience, after which game two and three were explained. Game 1 was removed from testing since the meeting started later due to public transportation difficulties, and since game 3 contains elements from game 1 it was chosen to have the focus on game 2 and game 3.

- Introductie (15 min)

Testen spel 2: Raad de Data & Video **(5 min)**

Testen spel 3: Social Media Battle (20 min)

- Inclusief antwoordenboekje.

Participants: Combination of professors, researchers and phd candidates from Movezlab, a research group from the Erasmus school of social and behavioral sciences that aims to empower the next generation toward being smart, healthy and happy media users.

Interview Vragen

Gameplay en ontwerp:

1. Wat is jullie eerste indruk van de spellen en van de leerervaring?

2. Denken jullie dat de spellen aantrekkelijk en begrijpelijk zijn voor leerlingen van 12-16 jaar? Waarom wel/niet?

3. Wat vinden jullie van het ontwerp van het spel?

4. Kijkend naar het ontwerp, zijn er bepaalde elementen van het ontwerp waarvan jullie zien dat het iets probeert weer te geven, en verwacht je dat leerlingen dit ook zien?

Effectiviteit en uitdaging:

5. Denken jullie dat de spellen en afwisseling met leermateriaal en klassendiscussies, voldoende uitdaging bieden om leerlingen actief betrokken te houden in de leerervaring?

6. Hoe goed denkt u dat de spellen en de leerervaring bijdragen aan de algoritmische geletterdheid van leerlingen? Oftewel, dat ze begrijpen hoe algoritmen werken en hoer er mee om te gaan, wat hun maatschappelijke impact is en de kritische denkvaardigheden t.a.v. sociale media?

7. Verwachten jullie dat met de spellen en de complete leerervaring dat deze de manier waarop leerlingen over sociale media nadenken en hoe ze het gebruiken zullen veranderen? Waarom wel of niet?

8. Welke onderdelen van de leerervaring en spellen lijkt of lijken jullie het meest effectief om hieraan bij te dragen?

9. Hebben jullie suggesties om de educatieve waarde van de leerervaring verder te verbeteren? Wellicht vanuit het DME Model? (Digital Media Empowerment model)

Samenhang en structuur:

10. Hoe ervaren jullie de samenhang tussen de verschillende spellen binnen de leerervaring? Wordt er een logisch en opbouwend verhaal verteld?

Innovatie en relevantie:

11. Hoe ziet u de relevantie van deze leerervaring in de bredere context van digitale geletterdheid?

12. Ziet u kansen om de spellen breder toepasbaar te maken, bijvoorbeeld voor andere leeftijdsgroepen of onderwerpen?

Results

An expert meeting was held with professors, researchers and PhD candidates from Movezlab, a research group from the Erasmus school of social and behavioral sciences that aims to empower the next generation toward being smart, healthy and happy media users. In this meeting, information was given about te creation and content of the learning experience, after which game two and three were explained and play tested by four of the five experts that were present. The meeting started late due to public transportation difficulties. Hence game one (Enter the Bubble) was removed from play testing since game three (Social Media Battle) contains similar elements as game one, specifically entering a filter bubble by performing actions.

After giving the information about the Learning Experience and play testing the games, a semi structured interview took place in which questions were asked upon the gameplay and design and the effect of, and coherence throughout the learning experience and the games. Moreover, as an open discussion often emerged, several other valuable points of feedback were mentioned.

Gameplay and Design

Questions were asked upon impressions of the learning experience and games and whether the experts see it as understandable and appealing for students aged 12 to 16 years old. Elements of gameplay were mentioned that influenced the understandability and appeal.

One of the experts in the room mentioned that the first impression was “Wauw” to which the others enthusiastically agreed. It was mentioned that the learning experience as well as the games is highly valuable for these students, since “you really get to understand what is behind it”. Additionally, it was mentioned that “it also fits in nicely with their own desire to gain control over their algorithm”. It was furthermore mentioned that the games make well use of what students like: “Because you actually go through that feed. I think students really like that”.

Regarding the gameplay of the games one of the experts really liked guessing the data in game 2: “I thought it was a very nice idea, to guess based on videos what we can get out of it. I think it is interesting”. Several game elements of game 3 were also highly liked, especially the roles the students take, entering and exiting a filter bubble and the questions.

“I really like the idea that you have these different roles, that you indeed have a company and a user, and that you initially have to look at how you can really get into that bubble. I can imagine that when you at some point have to turn around and have to get out of it..... I think this is a funny, nice idea. I think that really encourages reflection.”

“it is also reflected in the questions, because that one question that you are not in the algorithm, why is that? Because you've been interacting too much with other videos. You already start to realize that in the next round I'm just going to do exactly what I just answered. I thought that was nice.”

Regarding the understandability one expert mentioned that students would quickly understand the games, since “they are very intuitive with scrolling and liking”. During testing it was noticable that it took some time to truly understand the games and all elements. But one expert also mentioned that “because there is a bit of complexity, it can be very triggering. That they do need that too. A bit of a challenge”.

Effect & Coherence

One of the most important aspects of the learning experience and the games is the desired effect, which is the aim to achieve the learning goals of algorithmic literacy regarding social media algorithms. The experts agreed that the learning experience as well as the games definitely add to the algorithmic literacy of students, specifically upon the knowledge aspect. They mentioned the percentage in the games as key element for this. “that percentage, that you enter more or less in a bubble, I think that is really good”, “yes, you get direct feedback”.

Another aspect that was highlighted involves reflecting on actions or elements that are typically overlooked or not given much thought when using social media. “And then you think: even watching a video again. It's not just liking and disliking or something like that, but indeed just watching it again or sharing it. You do not really think about that.” One of the experts mentioned that these reflecting moments really add to the awareness: “I think because it involves that stop and think moment, so to speak, that you actually transfer that data to the company, that you indeed make them very aware of the process behind it.”

A valuable point of feedback upon the effect of the learning experience is the durability of the effect, since students do not play the game with their own accounts and feeds. “You still have some kind of 'transfer of learning element . You have to transform the acquired knowledge and attitude from the game context to their own personal context and that is often complicated.” This point sparked some discussion and various methods of how this could be achieved were brought to the table such as individual challenges or a challenge with the class, an action plan or to do-list and even inspiring and giving advise to teachers to keep up with this topic because t does not end after the learning experience.

In relation to the coherence of the games the experts mentioned that the games really build upon each other well: “the second game, the first one we did, is in terms of content a bit easier. That helps”.

Points of Feedback

Two important points of feedback were regarding the game instructions and the durability of the games.

During explaining the games it was noticeable that there was a lot of enthusiasm to start playing and the digital platform was already explored and clicked through without reading to text or listening to the explanation. During the interview they mentioned this themselves: “We saw that even we were a bit impatient. And then you think: oh, you have to read. Then you think, oh, just tell me. Yes, young people have that too” and gave the tip that “everything that you can actually catch by simply explaining it verbally, yes, that is much nicer” which they mentioned can be done through slides or videos.

Next to the instructions, the durability of the games was questioned. A scenario was sketched in which a platform that is mentioned in the questions drops in popularity or is even prohibited to use in the future and how the game could handle this situation by making it more generic instead of platform specific and make use of BeYou. However, another expert mentioned that using these platforms does target these students: “If you're talking about TikTok or Snapchat, that are the platforms they use right? Perhaps the awareness is a bit more concrete than talking about something that is not real. “ We conclude that there needs to be the right balance between durability of the games while also targeting the user group.

Appendix T
User Testing Protocol

This document is a user testing protocol for testing a series of games with students aged 12 to 16 years old as part of the Final Master Project of Yorn Thijssen at Eindhoven University of Technology. A session either includes playing one out of three games or playing all three games, depending on the time available. Students will be asked to think out loud and explain their decision-making during the games, revealing critical thinking and algorithmic understanding. After each game students will be asked to fill in a form that asks questions about their emotional state while, and their learning through playing the games. At the end, an interview will take place in which questions will be asked about the coherence in the three games, design wise and learning wise.

In all three games, there will be made use of a Social Media simulation. This is an abstract simulation of how social media platforms work, specifically what behavior leads to personal results. This simulation in in development, so not all elements (such as the percentages that influence gameplay) are defined at this stage. This will be ready when testing takes place.

Protocol

Introduction **(5 min)**

The project, learning experience and games will be introduced to the students, as well as what participating in this user-test entails.

1a Explanation Game 1: Enter the Bubble **(5 min)**

Enter the bubble will be explained to the students.

1b Playing Game 1: Enter the Bubble **(4 rounds of max 5 min, max 20 min)**

Enter the bubble will be played by the students, existing of 4 rounds of a maximum of 5 minutes.

1c Forms for Game 1: Enter the Bubble **(5 min)**

Students answer the questions in the forms for Game 1: Enter the Bubble.

2a Explanation Game 2: Guess the Data & Video **(5 min)**

Guess the Data & Video will be explained to the students.

2b Playing Game 2: Guess the Data & Video **(4 rounds of max 5 min, max 20 min)**

Guess the Data & Video will be played by the students, existing of 4 rounds of max 5 minutes.

2c Forms for Game 2: Guess the data & Video **(5 min)**

Students answer the questions in the forms for Game 2: Guess the Data & Video.

3a Explanation game 3: Social Media Battle **(5 min)**

Social Media Battle will be explained to the students.

3b Playing game 3: Social Media Battle **(30 min)**

Social Media Battle will be played by the students, 2 rounds of a maximum of 15 minutes.

3c Forms for Game 3: Social Media Battle **(5 min)**

Students answer the questions in the forms for Game 3: Social Media Battle.

Interview **(15 min)**

Session Possibilities:

Total: Introduction: 5 min + Game 1 total: 30 min + Game 2 total: 30 min + Game 3 total: 40 min + Interview: 15 min = 120 min (maximum)

Session 1: Introduction: 5 min + Game 1 total: 30 min + Interview: 15 min = 50 min

Session 2: Introduction: 5 min + Game 2 total: 30 min + Interview: 15 min = 50 min

Session 3: Introduction: 5 min + Game 3 total: 40 min + Interview: 15 min = 60 min

Game explanations

Game 1: Enter the Bubble

This game is played with two duo's. The goal is to enter a filter bubble for X % by performing actions on the BeYou feed. Every action a duo performs costs a specific amount of data that has to be put in the 'black box'.

The duo who reaches the bubble with the most data still in possession wins. So, it's not about who reaches the bubble the fastest, but who does so most strategically. However, there is a time limit to each round.

If a duo thinks they have reached their bubble they can check the percentage. But they have to be careful since this can only be done twice in each round. When this is done, the other duo also sees the percentage. When both duo's entered the bubble, the team with most data in possession wins. 4 rounds of this game will be played.

Possible actions:

No data: **→ 0%**
- Scroll

1 data: **→ 5%**
- Like
- Comment
- Not interested

2 data: **→ 10%**
- Share
- (un)follow
- "watch" Hashtag (click that you interact, without moving away from feed)

3 data: **→15% (+5%, +5%)**
- Rewatch (2 times)
- 1 added data to rewatch again:
    - watch 3 times: 4 data
    - watch four times: 5 data. (Players need to watch/wait this time)

Each duo splits up in 2 roles that switch in each round:
- Data keeper: The player who watches and controls the data. Also puts the data into the black box.
- Interaction player: The player who performs the (inter)actions on the platform.

Data is stored in a "black box" that needs to be opened after each round to count the amount of data that each duo has given away to reach to bubble.

Each round has a winner (the duo with most data in possession) or can result in a draw (same amount of data). After 4 rounds one of the duo's has won or it is a complete draw.

Duo's take along their data from the last round to the final game: Social Media battle. The duo that wins the last round, has strategically played the best, with least amount of data. So they have

a disadvantage at the end game, giving the team that has lost (less understanding of how the algorithm works) an advantage at the final game.

Game goal:

Explore the use of an algorithm, see how fast and which behavior gets one into a filter bubble.

Focus on knowledge: Learners understand how an algorithm on social media works; what data is collected and how this leads to personalized content.

Objectives:

1. 1. I know that algorithms are used in a variety of applications, platforms and services

2. I understand how algorithms work

4. I know how to influence algorithmic operations

Emotion:

- Explorative
- Excited
- Curious

Discrete emotion:

- Desire
- Happiness

Game 2: Guess the Data & Video

This game is played with the same duos against each other.
The goal is to think as an algorithm and guess what data an algorithm has in its possession to have created the feed they are watching.

Players need to guess the correct data for several categories and place a data category on the playing board. They can choose from a list of 10 data categories. If a duo has put 6 different types of data on the board, the game is paused and the information is checked. When at least 5 are correct, that duo win this round. When checked, the other duo also sees whether the chosen information of the categories is correct.

This game is played in 4 rounds, (the four created bubbles in game 1). After each round, the duo's see 4 videos from which they correctly need to place one within the feed they have just watched.

Possible Categories:
- Gender
- Age
- Location
- Nationality
- Personality
- Interests
- Political View
- Relationship status
- Education/Career
- Feeling/Emotion

Each round has one duo as the winner (the duo that has 5 categories correct the fastest).
The duo that wins most rounds wins the game, but it can also result in a draw.

After 4 rounds, the players can change the chosen videos that belong within each of the feeds.

When a draw happens, the result will be determined by placing the correct videos within each feed. When both duo's do have these correct, and this happens to be a draw as well, the game ends in overall draw. If one duo has this correct, that duo is the winner of the game.

The winner duo takes along the correct amount of data from the last round to the final game.
If the result is a total draw, no duo has won so neither duo receives data from the last game. However: An additional 3 data tokens can be won and moved along to the final game by having the videos for each feed correct, (so that is not always the winner of the game). This means in the case of a total draw, both duo's receive the additional 3 data tokens.

Game Goal

Compare algorithms/feeds with that of classmates or other people.

Focus on Knowledge: Learners see the result of personalized content, learn that other people see completely different things.

Objectives:

1. I know that algorithms are used in a variety of applications, platforms and services
3. I know how to be critical towards algorithms and their workings.

Emotion:

- Shocked
- Surprised
- Compassion

Discrete emotion:

- Disgust
- Desire
- Happiness

Game 3: Social Media Battle

In Social Media Battle, two duo's compete: one as users navigating a social media platform and the other as the company of a new social media platform: BeYou, that controls control the algorithms.

The user duo explores the personal feed of BeYou, performing actions like liking, commenting, and sharing, each costing data tokens. Their goal is to first reach a 90% filter bubble in round 1 and then reduce it to 10% in round 2.

The company starts with the 'like algorithm' and duo updates their algorithm such that they can collect data, aiming to gather all data of the user duo by the end of the second round. They start with the Like Algorithm and can acquire additional updates as the game progresses, winning round 1 when owning half the updates.

A duo wins the game when they achieve their goal for both rounds. If each duo wins one round the game results in a draw.

Both duos can reach their goal by taking turns pressing the button, moving their pawns on the game board, landing on a position that determines whether to draw a questions or action card. Correct answers allow the user duo to perform an action on the platform or the company duo to earn update percentages, which can be used to update their algorithm and collect more data from the user. Action cards can either benefit or negatively impact a duo.

Starting amount of data for user duo: XX
starting algorithm for company duo: like algorithm

User duo: can have an advantage through earlier games in which they received data.

Company duo: can exchange (pre existing) data they have earned in earlier games for percentage updates for algorithms. This cannot be done in the game itself.
1 data tokens= XX percent update.

Added scroll feature: When user duo has a question wrong, they can decide to scroll, either benefiting the bubble or not. This does not cost data.

Game goal:

Play Social Media Battle to test the awareness, knowledge, skills and critical thinking learned throughout the learning experience.

Focus on Knowledge and skill: Learners test the knowledge and skills they learned about algorithms in social media through playing Social Media Battle.

Objectives:

Knowledge:
1. I know that algorithms are used in a variety of applications, platforms and services
2. I understand how algorithms work
3. I know how to be critical towards algorithms and their workings
4. I know how to influence algorithmic operations

Skill:
1. I will use the knowledge to be aware of algorithms in daily life
2. I create a better understanding of algorithmic working
3. I will create critical thoughts about the use of algorithmic operations
4. I apply the knowledge to influence algorithmic operations

Emotion:
- Excited
- Joyful
- Happy

Discrete emotion:
- Happiness
- Desire

Question Forms:

Demographics:
Participant number:
Gender**:**

- Male
- Female
- Other
- Prefer not to say

Age**:**

- 12
- 13
- 14
- 15
- 16

Grade**:**

- 1 (Brugklas)
- 2
- 3
- 4

Educational Level:

- Havo
  Vwo

Social Media use:

- How often do you use social media?
  - Never, Occasionally, Daily, Several times a day, almost constantly
- Which Platforms do you use most often?
  - Instagram, Tiktok, Snapchat, Facebook, Youtube, Other
- Do you think your feed is the same as your friends?
  - Yes, no, I do not know

Algorithms:

- What do you think an algorithm is?
  - Open text
- Do you think algorithms affect your social media experience?
  - Yes, no, I do not know.
- Do you believe algorithms can influence your emotion, opinions or decisions?
  - Yes, no, I do not know.
- How much control do you think you have over the content you see on social media?
  - 1 = no control, 5 – full control

After Testing each game:

Have you learned something by playing this game? If so, what?

This game aims to achieve the following learning goals: [Insert Objectives for each game]

Do you think the game supports to achieve these learning goals (yes, no, partly)? Why?

Do you think learning material (questions, working sheets, group assignment) and class discussions about how algorithms work after playing the game adds value to the game? Why?

What emotions did you experience while playing this game?

What aspect of the game made you feel this emotion the most?

Interview

Session with only 1 game:

Game in general:
- What did you think about the game?
- Were the instructions for the game clear? What confused you?
- How challenging did you find the game?
    - Too easy, hard or just right?
- Did you feel engaged throughout the game? Why or why not?

Learning:
- What do you think this game was trying to teach you?
- Do you think the knowledge or skills you gained from the game could be useful in real life? Why or why not?
- Did the game make you think differently about social media or algorithms in social media? If so, how?
- Do you think these games will change how you use social media? Why or why not?

Design:
- What do you think of the design of the game?
- Looking at the design, what do you think several elements of the design aim to resemble?

Feedback:
- If you could change one thing about the game, what would it be?

Session with all 3 games:

Games in general:
- What did you think about the games?
- Were the instructions for the game clear? What confused you?
- How challenging did you find the game?
    - Too easy, hard or just right?
- Did you feel engaged throughout the games? Why or why not?

Design:
- What do you think of the design of the game?
- Looking at the design, what do you think several elements of the design aim to resemble?

Learning:
- Do you think the knowledge or skills you gained from the games could be useful in real life? Why or why not?
- Did the games make you think differently about social media or algorithms in social media? If so, how?
- Do you think these games will change how you use social media? Why or why not?

Coherence:
- How do you think the games are connected?
    - And in terms of what you learned.
    - Did the knowledge or skills from one game help you play the next game? Can you give an example?

Feedback:
- If you could change one thing about the game, what would it be?

Appendix U
User Testing Results & Analysis

This document contains the results, analysis and written results of user testing the series of games with students aged 12 to 16 years old as part of the Final Master Project of Yorn Thijssen at Eindhoven University of Technology. In total 2 sessions were held in which four students played all three games partly.

Before each game, students filled in a form containing questions about their demographics, social media use and understanding of algorithms in social media. After each game students filled in a form that contained questions about their learning through playing the game and their emotional state while playing the games. At the end, an interview took place in which questions were asked about their perspective upon the games and the coherence throughout the games, design wise and learning wise.

First, demographics of all participants are listed after which the answers on the forms are listed for each game. Lastly the results of the interview are noted.

Demographics

Gender:
P1: Male
P2: Male
P3: Female
P4: Female
P5: Male
P6: Male
P7: Male
P8: Male

Age:
P1: 14
P2: 13
P3:12
P4: 13
P5:13
P6:14
P7: 14
P8:13

Grade:
All: 2

Educational Level:
P1-P4: vwo
P5-P8: havo

Social Media use:

How often do you use social media?
P1: Oten (every day)
P2: Often (every day)
P3: Very Often (Multiple times a day)
P4: Very Often (Multiple times a day)
P5: Very Often (Multiple times a day)
P6: Often (every day)
P7: Very Often (Multiple times a day)
P8: Very Often (Multiple times a day)

Which Platforms do you use most often?
P1: TikTok, Snapchat
P2: YouTube
P3: TikTok, Snapchat
P4: Snapchat
P5: TikTok, Instagram, Snapchat, Youtube
P6: TikTok, Snapchat
P7: TikTok, Snapchat, Youtube
P8: TikTok, Instagram, Snapchat

Do you think your friends see the same content on social media as you do?
P1: Yes
P2: No
P3: I don't know
P4: No
P5: No
P6: Yes
P7: Yes
P8: Yes

Algorithms:
Do you know what an algorithm (on social media) is?
P1: Yes, it looks at what you are interested in and suggests things from there
P2: Seeing about the same things that you like
P3: No
P4: Yes, that is how computers communicate with each other.
P5: Yes, that it the program that makes sure you see what you would like to see
P6: No I do not know
P7: Yes, that determines what you get to see
P8: What your feed is

Do algorithms affect your social media experience?
P1: Yes
P2: Yes
P3: I don't know
P4: Yes
P5: Yes
P6: I do not know
P7: I do not know
P8; I do not know

Can algorithms influence your emotion, opinions or decisions?
P1: Yes
P2: No
P3: Yes
P4: Yes
P5: No
P6: I do not know
P7: No
P8: No

How much control do you think you have over the content you see on social media?
1 = no control, 5 – full control

P1: 4
P2: 2
P3: 3
P4: 2
P5: 4
P6: 4
P7: 3
P8: 2

Game 1: Enter the Bubble

Game goal:

Explore the use of an algorithm, see how fast and which behavior gets one into a filter bubble.

Focus on knowledge: Learners understand how an algorithm on social media works; what data is collected and how this leads to personalized content.

Objectives:

1. 1. I know that algorithms are used in a variety of applications, platforms and services

2. I understand how algorithms work

4. I know how to influence algorithmic operations

Emotion:

- Explorative
- Excited
- Curious

Discrete emotion:

- Desire
- Happiness

Questions after playing game 1:

Have you learned something by playing this game? If so, what?

P1: Yes, don't use too much data
P2: Yes, how you can easily influence your own algorithm
P3: Yes, that you can enter a bubble quite fast
P4: Yes, that the algorithm can know what your interests are
P5: a little that by liking the algorithm about that subject you will get to see that more
P6: Yes, I now know what algorithms are
P7: That an algorithm is quite strong
P8: what an algorithm is

This game aims to achieve the following learning goals:

Objectives:
1. I know that algorithms are used in a variety of applications, platforms and services
2. I understand how algorithms work
4. I know how to influence algorithmic operations

Do you think the game supports to achieve these learning goals (yes, no, partly)? Why?

P1: Partly, it shows how it works but not a lot
P2: Yes, you learn about the algorithm
P3: Yes, I now better understand what algorithms are
P4: Yes, because you will get to see how much the algorithm knows about you
P5: Yes, because you now get a better idea of what algorithms do
P6: Yes because it has helped me
P7: Yes, because you realize what happens when you give a like for example
P8: Partly since I now know what an algorithm is.

Do you think learning material (questions, working sheets, group assignment) and class discussions about how algorithms work after playing the game adds value to the game? Why?

P1: Maybe, because then you know what it is about already.
P2: Yes, it gives a different perspective
P3: Yes, then you repeat it once again.
P4: Yes, it can help in forming an opinion.
P5: Yes, because you are going to think about it even more
P6: I think they are good this way because it is clear
P7: Yes, because then you can change opinions
P8: no because the game is good this way.

What emotions did you experience while playing this game?

P1: Relaxation
P2: Relaxation, Happiness
P3: Happiness
P4: Anxiety
P5: Happiness
P6: Anxiety, Relaxation
P7: Anxiety, relaxation
P8: Relaxation, Happiness

What aspect of the game made you feel this emotion the most?

P1: It is not a very demanding game
P2: none
P3: Doing it with a friend
P4: You want to know who won
P5: because you play against others
P6: It was exciting who was going to win
P7: The end to see whether you won
P8: That we won

Game 2: Guess the Data & Video

Game Goal

Compare algorithms/feeds with that of classmates or other people.

Focus on Knowledge: Learners see the result of personalized content, learn that other people see completely different things.

Objectives:

1. I know that algorithms are used in a variety of applications, platforms and services
3. I know how to be critical towards algorithms and their workings.

Emotion:

- Shocked
- Surprised
- Compassion

Discrete emotion:

- Disgust
- Desire
- Happiness

Questions after playing game 2:

Have you learned something by playing this game? If so, what?

P1: Yes, that there are big differences in the interests of people
P2: No
P3: Yes, you can guess somebody's interests and personality through videos
P4: Yes, through videos you can determine interests etc.
P5: How 'fast' an algorithm gets to know plenty of things about you.
P6: That a company can see what you think is interesting
P7: That you have to be specific as algorithm
P8: What data categories are

This game aims to achieve the following learning goals:

Objectives:
1. I know that algorithms are used in a variety of applications, platforms and services
3. I know how to be critical towards algorithms and their workings.

Do you think the game supports to achieve these learning goals (yes, no, partly)? Why?

P1: No, I just don't get it.
P2: Yes, it teaches you how to be critical
P3: Yes, they only show you what you want to see
P4: Yes, because you know how the algorithm works
P5: Yes, because you quickly learn how an algorithm works
P6: yes, because I can now list the learning goals
P7: Yes because you cannot just choose a video
P8: Yes because I know what kind of feed I like

Do you think learning material (questions, working sheets, group assignment) and class discussions in which different feeds will be compared after playing the game adds value to the game? Why?

P1: Yes, I will understand it better
P2: Yes, it gives a different perspective
P3: Yes, you repeat what you have learned
P4: Yes, because you know better how it works
P5: Yes because you are going to think about it even more about how much such an app knows about you
P6: I think it is good this way
P7: Yes because the you can give reasons for why you chose for a video
P8: I do not know

What emotions did you experience while playing this game?
P1: Anxiety
P2: Relaxation, Happiness
P3: Anxiety
P4: Anxiety
P5: happiness
P6: Anxiety, relaxation, happiness
P7: Anxiety, Desire
P8: Anxiety, Relaxation, Happiness

What aspect of the game made you feel this emotion the most?

P1: It was quite the feed
P2: None
P3: Because you want to win
P4: Curiosity whether you are correct
P5: Because it is fun to play
P6: You want to know how it ends
P7: Choosing the video at the end
P8: Resulting in a draw

Game 3: Social Media Battle

Game goal:

Play Social Media Battle to test the awareness, knowledge, skills and critical thinking learned throughout the learning experience.

Focus on Knowledge and skill: Learners test the knowledge and skills they learned about algorithms in social media through playing Social Media Battle.

Objectives:
Knowledge:
1. I know that algorithms are used in a variety of applications, platforms and services
2. I understand how algorithms work
3. I know how to be critical towards algorithms and their workings
4. I know how to influence algorithmic operations

Skill:
1. I will use the knowledge to be aware of algorithms in daily life
2. I create a better understanding of algorithmic working
3. I will create critical thoughts about the use of algorithmic operations
4. I apply the knowledge to influence algorithmic operations

Emotion:
- Excited
- Joyful
- Happy

Discrete emotion:
- Happiness
- Desire

Questions after playing game 3:

Have you learned something by playing this game? If so, what?

P1: How companies create algorithms
P2: No
P3: Yes, once companies do not buy something, they don't receive data
P4: Yes, I now know how a company works
P5: Yes, through making choices the algorithm can get confused
P6: yes, I have learned what algorithms are.
P7: Not really but a bit with the questions
P8: Not really

This game aims to achieve the following learning goals:

Objectives:
Knowledge:
1. I know that algorithms are used in a variety of applications, platforms and services
2. I understand how algorithms work
3. I know how to be critical towards algorithms and their workings
4. I know how to influence algorithmic operations
Skill:
1. I will use the knowledge to be aware of algorithms in daily life
2. I create a better understanding of algorithmic working
3. I will create critical thoughts about the use of algorithmic operations
4. I apply the knowledge to influence algorithmic operations

Do you think the game supports to achieve these learning goals (yes, no, partly)? Why?

P1: Yes, you learn how to apply it yourself
P2: Partly
P3: yes, I now understand how algorithm work
P4: Yes, you better understand how to prevent it
P5: yes because you learn that by making choices the algorithm thinks differently
P6: Yes because it has helped me
P7: yes, you get explanations the whole time
P8: Yes

Do you think a class discussion after playing the game adds value to the game? Why?

P1: No, this can be done while playing the game
P2: Yes, it gives a different perspective
P3: Yes, you repeat it.
P4: Yes, much has been said about it and you know more about it after playing.
P5: No, because you already know what the algorithm does
P6: I think it will be spoken about in class after playing
P7: With this one I do not think really.
P8: no because it has to stay fun

What emotions did you experience while playing this game?

P1: relaxation
P2: Relaxation, Happiness
P3: Happiness
P4: Anxiety
P5: happiness
P6: Anxiety, desire, relaxation, happiness
P7: Anxiety, desire
P8: Anger, anxiety, relaxation, happiness

What aspect of the game made you feel this emotion the most?

P1: Calm game (thumbs up)
P2: none
P3: Doing it with a friend
P4: Answering the questions and wanting to know if it is correct.
P5: Playing it with friends
P6: You are curious whether you answered the question correctly
P7: At a question
P8: whether the others had a question right or wrong

Observations during play testing the games:

Game 1:
Session 1
- Did not work at the very start. Wrong conditionals (the percentage was minus, could not scroll through)
- Instead of counting the data in the box, also possible to count data left
- Students discussed about the strategy: what actions to perform at each video.
- Students also noted the other about not speaking too hard
- That multiple actions were possible was later clear
- Check percentage was clear
- Clear that some actions probably do more than other actions.

Session 2:
- Putting data in the black box was clear from the very start, also the correct quantity
- Being able to do multiple actions was clear as well
- Percentage check was not used
- Black box was sturdy
- Who won was clear, also in case of both in bubble

Game 2:
Session 1:
- Students again noted the other in the pair not to talk too loud
- The pairs first noted any information they saw in the videos, after which they started thinking about the categories instead of doing it immediately.
- The lights turned green and students wondered whether this was a good or bad thing.
- Students are having fun, lots of laughing.
- Profile names are taken into account as well

Session 2:
- 1 duo discussed strategy, the other duo did not
- Both duo's wrote down information in the first round
    - Was not clear that data needed to be put on the board
- Both duo's layed down the data tokens on the board when trying to guess
- "do not speak to loud. The others will hear it too"
- Participants scrolled easily through similar videos as they saw earlier on this feed
- Guessing was done really quitely.
- Prototype worked well, one participant pressed one data token a bit harder in the board, trying to achieve the green light that turned on with the others (wizard of oz)
- Both duo's won one round

Game 3:
Session 1:
- The question is not being read out loud.
- Reading out loud is causing anxiety, tension.
- Update percentage slider was clear immediately when the company duo earned update
- Booklet with the answers was clear
    - Which question it is and notifying the other pair about it is clear
- Determining whether the questions is correct or false (open question) can be difficult.

Session 2:
- Reading out loud was not a problem this time
- Number of the question and the question booklet was very clear
    - Did not need explanation
    - Answer booklet was given to the others in turns

- Strategy: let's do it now because whether we will do it now or later does not matter
- "Let's go for True, because we have seen this is the case in the second game"
- Mentioned they liked it while playing the game
- "Lets not do watch again, then the algorithm thinks we like it en the percentage becomes less"

Interviews:

Games in general:
- **What did you think about the games?**
- Fun 2x
- Good to do
- Educational

- Fun to play (2x)
- You learn from it
- Nice and a lot of interaction
- You learn a lot

- **Were the instructions for the game clear? What confused you?**

- Clear, but it becomes more clear by playing.
- Some things speak for themselves

- **How challenging did you find the game?**
    - **Too easy, hard or just right?**
- It is doable, when you are not distracted
- A good balance (4x)

- **Did you feel engaged throughout the games? Why or why not?**

- Yes (4x)

Design:
- **What do you think of the design of the game?**
- Beautiful design

- Nice
- Neatly made
- Nice that you can develop something like this

- **Looking at the design, what do you think several elements of the design aim to resemble?**

- Yellow stripes resemble data streams

- Data tokens with code on them
- Game board, with the chips and the wires, connected with each other
- Computer like, with the chips

Learning:

- **Do you think the knowledge or skills you gained from the games could be useful in real life? Why or why not?**
- P4: I think it can be useful, you can make sure that not everything will end up online.
- P1: Yes, maybe
- P2: I think I would not use it

- Yes, because social media is being used a lot, also by me I am not going to deny that. But you learn from it that the algorithm knows what kind of person you are. You learn how they work and are consciously thinking about it. (others agree)
- You get knowledge on algorithms

- a little, it is clearer now. Normally it is a broad concept, but now it is more specific.
- I think you learn more about it when you don't know anything about it.

Coherence:

- **How do you think the games are connected?**
    - **And in terms of what you learned.**
    - **Did the knowledge or skills from one game help you play the next game? Can you give an example?**

- There is a logical build-up of the games
- The story is fine, maybe a bit basic/standard.

- The games have the same topic
- The games are played on the same playing board
    - It allows that not much has to be changed to change the games
- At the start you learn what it is, and later how it works and what it does.
- Good story that is connected well, even that it could have been real.

Feedback:

- **If you could change one thing about the game, what would it be?**

- No student would change anything about the games.
- More development of the app
- Portable ButtonBox instead of cables

User Test Analysis

Demographics

8 Participants

- 2 female
- 6 male

Age**:**

- 12: 1
- 13: 4
- 14: 3

Grade:

All second grade

Educational level:

- Havo: 4
- Vwo: 4

Social Media use:

- Very Often (Multiple times a day): 5
- Often (every day): 3

Platforms:

- TikTok: 6
- Snapchat: 7
- Youtube: 3
- Instagram: 2

Do you think your friends see the same content on social media as you do?

- Yes: 4
- No: 3
- I do not know: 1

Algorithms:

Correct:

P1: Yes, it looks at what you are interested in and suggests things from there
P5: Yes, that it the program that makes sure you see what you would like to see
P7: Yes, that determines what you get to see

Sort of correct:
P2: Seeing about the same things that you like
P8: What your feed is

Wrong/do not know:
P3: no
P4: Yes, that is how computers communicate with each other.
P6: No I do not know

Do algorithms affect your social media experience:
- Yes: 4
- I don't know: 4

Can algorithms influence your emotions, opinions or decisions?
- Yes: 3
- No: 4
- I do not know: 1

How much control do you think you have over the content you see on social media?
1- No control: 0
2- 3
3- 2
4- 3
5- Full control: 0

Game 1: Enter the Bubble
Game goal:

Explore the use of an algorithm, see how fast and which behavior gets one into a filter bubble.

Focus on knowledge: Learners understand how an algorithm on social media works; what data is collected and how this leads to personalized content.

Objectives:

1. 1. I know that algorithms are used in a variety of applications, platforms and services

2. I understand how algorithms work

4. I know how to influence algorithmic operations

Emotion:

- Explorative
- Excited
- Curious

Discrete emotion:

- Desire
- Happiness

Have you learned something?

- Yes: 7
    - What an algorithm(s) is/are 2
    - Algorithm is strong / enter bubble fast 2
    - Algorithm can know interests: 1
    - Do not use too much data
- A bit: 1
    - By liking you will get to see that more

Does it achieve the learning objectives?

- Yes: 6
    - Learn about /understand algorithms 3
    - How much algorithm knows about you
    - Has helped me
    - Realize what happens when you give a like for example
- Partly: 2
    - shows it works but not a lot
    - I know what an algorithm is

Learning material:

- Yes: 5
    - Different perspective
    - Repetition/think about it more (2)
    - Help in forming an opinion / change opinions (2)
- Maybe: 1
    - You already know what it is
- No: 2
    - Game is good on itself (2)

Emotion:

- Relaxation: 5
- Happiness: 4
- Anxiety: 3

What aspect?

- Not demanding: 1
- None: 1
- Doing it with a friend: 1
- Being the winner: 1
- Playing it against others: 1
- Whether you won: 3

Game 2: Guess the Data & Video
Game Goal

Compare algorithms/feeds with that of classmates or other people.

Focus on Knowledge: Learners see the result of personalized content, learn that other people see completely different things.

Objectives:

1. I know that algorithms are used in a variety of applications, platforms and services
3. I know how to be critical towards algorithms and their workings.

Emotion:
- Shocked
- Surprised
- Compassion

Discrete emotion:
- Disgust
- Desire
- Happiness

Have you learned something?

- Yes: 7
    - Big differences in interests of people
    - Guess interest and personality through video's (2)
    - How fast an algorithm gets to know a lot of things about you(1)
    - Company can see what your interest are (1)
    - Be specific as algorithm
    - What data categories are
- No: 1

Does it achieve the learning objectives?

- Yes: 7
    - Teaches to be critical
    - They only show what you want to see
    - You get to know how the algorithm works (2)
    - Can now list the working goals
    - Because you cannot just choose a video
    - I know what kind of feed like
- No: 1
    - Just don't get it.

Learning material:

- Yes: 6
    - Understand it better(2)
    - Different perspective
    - Repetition / think about it more (2)
    - Give reasons (1)
- No: 1
    - Good this way
- I do not know: 1

Emotion:

- Relaxation: 3
- Happiness: 4
- Anxiety: 6
- Desire:1

What aspect?

- The feed
- Want to win / how it ends (2)
- Fun to play
- If you are correct
- Choosing the video
- Result in a draw.

Game 3: Social Media Battle

Game goal:

Play Social Media Battle to test the awareness, knowledge, skills and critical thinking learned throughout the learning experience.

Focus on Knowledge and skill: Learners test the knowledge and skills they learned about algorithms in social media through playing Social Media Battle.

Objectives:
Knowledge:
1. I know that algorithms are used in a variety of applications, platforms and services
2. I understand how algorithms work
3. I know how to be critical towards algorithms and their workings
4. I know how to influence algorithmic operations

Skill:
1. I will use the knowledge to be aware of algorithms in daily life
2. I create a better understanding of algorithmic working
3. I will create critical thoughts about the use of algorithmic operations
4. I apply the knowledge to influence algorithmic operations

Emotion:
- Excited
- Joyful
- Happy

Discrete emotion:
- Happiness
- Desire

Have you learned something?

- Yes: 5
    - How companies create algorithms
    - Once companies do not buy something, they do'nt receive data
    - How a company works
    - Through making choices the algorithm can get confused
    - What algorithms are
- A bit:
    - With the questions
- No:2

Does it achieve the learning objectives?

- Yes: 7
    - Learn how to apply it yourself
    - Understand better how algorithms work
    - Understand better how to prevent it
    - By making choices the algorithm thiks differently
    - It has helped me
    - explanations
- Partly: 1

Learning material:

- Yes: 3
    - Different perspective
    - Repetition
    - Dive into it even more
- No: 5
    - Done while playing
    - Know what it does already
    - Will already be spoken about in class after playing
    - It has to stay fun

Emotion:

- Relaxation: 4
- Happiness: 5
- Anxiety: 4
- Anger: 1
- Desire: 2

What aspect?

- Calm game
- Doing it with a friend (2)
- Questions (4)
- None

Observations

Game 1:
Session 1
- Students discussed about the strategy: what actions to perform at each video.
- Students also noted the other about not speaking too hard
- Clear that some actions probably do more than other actions.

Session 2:
- Putting data in the black box was clear from the very start, also the correct quantity

Game 2:
Session 1:
- Students again noted the other in the pair not to talk too loud
- The pairs first noted any information they saw in the videos, after which they started thinking about the categories instead of doing it immediately.
- The lights turned green and students wondered whether this was a good or bad thing.
- Students are having fun, lots of laughing.

Session 2:
- "do not speak to loud. The others will hear it too"
-
- Prototype worked well, one participant pressed one data token a bit harder in the board, trying to achieve the green light that turned on with the others (wizard of oz)
-

Game 3:
Session 1:
- The question is not being read out loud.
- Reading out loud is causing anxiety, tension.
- Update percentage slider was clear immediately when the company duo earned update
- Booklet with the answers was clear
    - Which question it is and notifying the other pair about it is clear

Session 2:
- Reading out loud was not a problem this time
- Number of the question and the question booklet was very clear
    - Did not need explanation
    - Answer booklet was given to the others in turns
- Strategy: let's do it now because whether we will do it now or later does not matter
- "Let's go for True, because we have seen this is the case in the second game"
- Mentioned they liked it while playing the game
- "Lets not do watch again, then the algorithm thinks we like it en the percentage becomes less"

Interview:
Opinion about the games:
- Fun 4x
- Good to do
- Educational (3)
- A lot of interaction

Instructions:
- Clear
- More clear by playing
- Some things speak for themselves

Challenge:
- Good balance 4x

Engagement:
- Yes(4x)

Design:
- Beautiful/nice (3)
- Nice you can make this (2)

Resemblance:
- Data streams (2x)
- Data tokens/code
- Computer like, with the chips (2x)

Learning:
- Useful
- Learn how they work and to be aware (4x)
- Knowledge on algorithms
- Learn more when you do not know a thing

Coherence:
- Logical build up
- Similar topic
- Nice to play 3 games with 1 game board, not much needed to switch
- Learn what it is at the start, later how it works and what it does
- Good story connected throughout the games.

Written results

A user test was conducted with the final prototype as described in [paragraph]. In total 8 participants tested all three games. Testing consisted of a brief introduction about the project after which the participants filled in a questionnaire about demographics, social media use and knowledge and experience on algorithms in social media. Next, the games were introduced and played. After playing each game partly, the students answered questions in a questionnaire regarding their learnings and emotions throughout playing the game. Afterwards, an interview took place focused on various aspects such as the design, difficulty and coherence throughout the games. As the games require four players, two sessions were held in which each game was played partly. Game one was played one round, game two was played two rounds and game three was played for roughly 20 minutes.

Demographics

Participant	Gender	Age	Education (grade)	Social Media Use	Platforms
1	Male	14	Vwo (2)	Often (every day)	TikTok, Snapchat
2	Male	13	Vwo (2)	Often (every day)	YouTube
3	Female	12	Vwo (2)	Very Often (Multiple times a day)	TikTok, Snapchat
4	Female	13	Vwo (2)	Very Often (Multiple times a day)	Snapchat
5	Male	13	Havo (2)	Very Often (Multiple times a day)	TikTok, Instagram, Snapchat, Youtube
6	Male	14	Havo (2)	Often (every day)	TikTok, Snapchat
7	Male	14	Havo (2)	Very Often (Multiple times a day)	TikTok, Snapchat, Youtube
8	Male	13	Havo (2)	Very Often (Multiple times a day)	TikTok, Instagram, Snapchat

Social media Use & Algorithms

All participants use social media every day, of which 6 even multiple times a day. The most used platforms are Snapchat and TikTok.

Three students could relatively describe what an algorithm (in social media) is, with their answers being "that determines what you get to see" or "It looks at what you are interested in and suggests things from there". Their answers were divided whether algorithms could affect their social media experience, four answering yes and four not knowing. Only three students had the idea that algorithms can influence emotions, opinions or decisions.

Enter the Bubble

In Game 1 students explore the use of an algorithm, specifically which behavior and actions can lead to entering a filter bubble. The game is focused on knowledge: Learners understand how an algorithm on social media works; what data is collected and how this leads to personalized content. The learning goals this game aims to contribute to are:

1. 1. I know that algorithms are used in a variety of applications, platforms and services (awareness)

2. I understand how algorithms work (knowing)

4. I know how to influence algorithmic operations (skills)

The emotions that the game aims to spark are explorative, excitement and curiosity, the discrete emotions being *desire* and *happiness.*

Results on Learning

All students indicated to have learned from playing this game. Learning what an algorithm is, that it can be quite strong, you can enter a bubble really fast and that it can know your interests are mentioned among the learning points of this game. Six students indicated that the game does contribute to achieving the learning goals that belong to this game while two of them mentioned it does so partly. In line with this result, six students also indicate that additional learning material and class discussions will have added value to playing this game: "it gives a different perspective" and "it can help in forming an opinion".

Results on Emotion

The emotion that was most indicated participants by participants was relaxation (n=5) after which happiness follows (n=4). Also anxiety was mentioned three times.

Guess the Data & Video

Game 2 lets students think as an algorithm and look at different feeds. By guessing data that belongs to the profiles of various personal feeds, and recommending a video to each feed, students learn how an algorithm works and see and compare the various results of personalization. They learn that other people see completely different things. The learning goals this game aims to contribute to are:

1. I know that algorithms are used in a variety of applications, platforms and services
3. I know how to be critical towards algorithms and their workings.

The emotions the game aims to spark are shocked, surprised and compassion, with the discrete emotions being *disgust*, *desire* and *happiness*.

Results on Learning

Almost all students indicated to have learned from playing this game (n=7). They mentioned to have learned "that there are big differences in the interests of people" and "how fast an algorithm gets to know plenty of things about you". The same amount of students indicated that the game does contribute to the learning goals it aims to contribute to: "it teaches you how to be critical". For this game, 6 students mentioned additional learning material and class discussions would have added value to playing this game: "because you are going to think about it even more about how much such an app knows about you".

Results on Emotion

The emotion this game sparks which was most indicated by participants was anxiety (n=6) after which happiness follows (n=4). Relaxation was mentioned three times and desire once.

Social Media Battle

The third game has the aim to test the algorithmic literacy regarding algorithms in social media that students gained throughout the learning experience. It focusses on the knowledge by means of the questions and on the skills through performing actions on the platform. The corresponding goals this game aims to contribute to are:

Knowledge:
1. I know that algorithms are used in a variety of applications, platforms and services
2. I understand how algorithms work
3. I know how to be critical towards algorithms and their workings
4. I know how to influence algorithmic operations

Skill:
1. I will use the knowledge to be aware of algorithms in daily life
2. I create a better understanding of algorithmic working
3. I will create critical thoughts about the use of algorithmic operations
4. I apply the knowledge to influence algorithmic operations

The emptions this final game aims to spark are excitement, joy and happiness, with the discrete emotion being happiness and desire.

Results on learning

Six students indicated to have learned from playing this game and all students indicated that playing this game contributes to achieving the learning goals because “you learn that by making choices the algorithm thinks differently” and “you learn how to apply it yourself”. In contrast with the other games only three students indicated that class discussions would have added value to playing this game. The other students mentioned “this can be done while playing the game” or that it will be discussed in class anyways.

Results on emotions

The last game sparked various emotions. The emotion which was most indicated by participants was happiness (n=5) after which relaxation and anxiety follow (n=4). Desire was mentioned twice and also anger was mentioned once.