Master Project

Keiwi

Designing a multiplayer card game to stimulate critical thinking on personal data economy issues in classroom settings.

Cindy Tang — Author

Master of Science in Digital Humanities
École Polytechnique Fédérale de Lausanne

Dr. Jessica Pidoux — Supervisor

PersonalData.IO

Prof. Jérôme Baudry — Supervisor

Laboratory for the History of Science and Technology
École Polytechnique Fédérale de Lausanne

Prof. Yannick Rochat — Expert

Department of Language and Information Sciences
University of Lausanne

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Website: keiwi.cindytang.ch.

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Résumé

Ce travail porte sur la conception d'un jeu éducatif visant à stimuler la réflexion et les discussions sur les enjeux liés aux données dans un cadre scolaire. À travers un processus itératif de conception de jeu, le prototype final, *Keiwi*, a été développé comme un jeu de cartes multijoueur intégrant des éléments de stratégie, de simulation et de jeu de rôle. Les joueur·euse·s incarnent à la fois des développeur·euse·s d'applications et des utilisateur·rice·s, explorant les complexités de l'économie des données personnelles. Testé auprès de 89 élèves et étudiant·e·s, principalement issu·e·s du gymnase, ainsi que de l'école secondaire et de la Haute École Pédagogique (HEP), le jeu a été bien accueilli, stimulant des réflexions sur l'économie des données et l'utilisation des données personnelles. Malgré cet accueil positif, certains défis subsistent, notamment la complexité des règles, un déséquilibre entre les rôles de développeur·euse et d'utilisateur·rice, ainsi qu'une certaine ambiguïté dans son message central.

Mots-clés : économie des données, données personnelles, sciences du jeu, conception de jeux, apprentissage par le jeu, sciences de l'apprentissage, sciences de l'éducation.

Abstract

This work explores the design of an educational game intended to foster critical thinking and discussion on data-related issues in classroom settings. Through an iterative game design process, the final prototype, *Keiwi*, emerged as a multiplayer card game integrating strategy, simulation, and role-play. Players take on dual roles as both application developers and users, navigating the complexities of the personal data economy. The game was tested with 89 students—primarily from high school, along with secondary school and Haute École Pédagogique (HEP)—and was well received, stimulating reflections about the data economy and personal data usage. Despite its positive reception, the game presents challenges, including rule complexity, an imbalance between developer and user roles, and ambiguity in its core message.

Keywords: data economy, personal data, game studies, game design, game-based learning, learning science, education science.

Contents

1 Introduction

Nowadays, data assists nearly every aspect of our lives. From online shopping and social media to banking and navigation, our daily activities generate digital traces—known as personal data—that offer revealing insights into who we are [16, 28, 34]. Personal data includes any information related to an identified or identifiable person, such as names, locations, browsing habits, and behavioral patterns. This information powers the data economy—a vast system where data is collected, exchanged, and monetized—bringing both opportunities and challenges [5, 36]. While data collection drives innovation and convenience, it also raises concerns about privacy, autonomy, and the ethical implications of data-driven decisions [9, 38]. Its misuse can lead to surveillance [4], discrimination [36], and manipulation [52], raising important questions about how individuals can navigate this increasingly complex landscape.

> *Science sans conscience n'est que ruine de l'âme. (Science without conscience is the soul's perdition.)*
>
> François Rabelais, *Pantagruel* (1532).

The rapid expansion of data-driven technologies brings to mind the words of the French Renaissance humanist. While technological advancements offer unprecedented possibilities, they need be accompanied by critical reflection and ethical responsibility. However, public awareness of data collection practices remains limited [2, 45, 46], and the mechanisms governing the data economy may remain opaque [30, 37, 42].

Various organizations are actively addressing these challenges, including *PersonalData.IO*[1], a public-interest association focused on empowering individuals in the management and protection of their personal data. Their initiatives include helping individuals regain access to their data and understand its value, fostering innovation by supporting community-driven projects centered on ethical data use, advocating for secure and user-controlled data governance models, and conducting research to audit algorithmic transparency and ensure compliance with data access rights.

[1] https://personaldata.io/

As part of a collaboration with *PersonalData.IO*, this study explores a game-based learning approach by designing a game that encourages players to critically engage with the personal data economy issues. The objective is to stimulate reflection, promote discussion, and encourage players to examine their own roles, as well as those of others, within the complex system of data collection, sharing, and governance. By providing an interactive and accessible experience, the game aims to demystify data practices and empower individuals to better comprehend their relationship with personal data.

This work primarily targets a young audience, particularly high school students in the canton of Vaud in Switzerland. This choice aligns with the introduction of computer science as a mandatory subject in Swiss high schools starting in the 2022–2023 academic year[2]. The updated curriculum aims to equip students with fundamental digital competencies, including data representation, programming, and computer architecture. Moreover, it places strong emphasis on the societal implications of digital technologies, encouraging students to critically assess how digitization influences privacy, social relationships, politics, economics, culture, and media[3]. By integrating these perspectives, the curriculum highlights the importance of developing informed and responsible digital citizens. Within this educational framework, a classroom-playable game can serve as a complementary tool, offering an interactive way for teachers and students to engage with personal data economy issues while supporting broader pedagogical goals of digital literacy and civic awareness.

Beyond its specific educational application, this research also aims to contribute to the broader field of game-based learning as a way to foster dialogue on societal issues. By addressing its objectives, the study builds upon work at the intersection of the Data Economy and the Game-based Learning fields.

[2] https://www.admin.ch/gov/fr/accueil/documentation/communiques.msg-id-71332.html

[3] https://www.vd.ch/fileadmin/user_upload/organisation/dfj/dgep/dgep_fichiers_pdf/DGEP_brochure_EM_web.pdf

2 State of the Art

2.1 Data Economy

For millennia, humans have recorded observations of the natural and social worlds, from ancient Egyptian flood records to celestial tracking tables [18]. However, these served primarily as historical notes rather than analytical tools. A pivotal shift occurred in 1662 when John Graunt, a London haberdasher, analyzed birth and death records to estimate London's population. His work laid the foundation for demography, demonstrating that data could inform broader purposes, such as taxation, military planning, and economic decisions. This marked the beginning of data being viewed not as standalone records but as interconnected elements within a collective dataset that could inform societal decision-making.

In today's digital age, the data economy has grown rapidly, fueled by the widespread use of digital tools and services that generate vast amounts of personal information, ranging from browsing history and location data to biometric and financial details [38]. To regulate the collection and use of such data, governments have implemented legal frameworks such as the General Data Protection Regulation (GDPR)[4], made in 2016 for in European Union, or the Swiss Federal Act on Data Protection (FADP)[5], made in 2020 and revised in 2023 in Switzerland. They also require organizations to disclose their data handling practices and inform users of their rights through privacy policies.

However, despite these legal safeguards, research suggests that individuals rarely engage with privacy policies due to their length, complexity, and legal jargon, often accepting terms without fully understanding the implications for their personal data [30, 42, 46]. This gap between regulation and user awareness highlights the need for alternative approaches to fostering data literacy and informed decision-making.

The challenge in understanding and managing personal data may come from both its abstract nature and the complexity of the digital infrastructure behind it. Users often struggle to perceive how their data is collected, processed, and circulated across various platforms, as these

[4] https://gdpr-info.eu/

[5] https://www.fedlex.admin.ch/eli/oc/2022/491/fr

processes may remain invisible [33, 26]. Previous studies highlight support mechanisms, such as data visualization, which can help make these hidden data flows, infrastructures, and interactions more interpretable and accessible [21, 51].

Studies also reveal that privacy-protective behaviors, such as clearing cookies, managing browsing history, and refusing data permissions, are infrequent. Many users avoid such actions due to limited awareness, low digital literacy, and the lack of accessible privacy tools [2, 7, 45]. This lack of understanding and action may limit users' ability to make informed and autonomous decisions about their data, posing challenges to individual and societal data governance.

However, increased understanding of data collection practices alone does not always lead to protective action. Many users experience a gap between knowledge and behavior, with some choosing not to act due to a lack of motivation or a perceived inability to influence outcomes. This highlights the complexity of achieving behavioral change in data privacy practices, suggesting that fostering data literacy requires more than information, it requires practical empowerment and a motivating framework that encourages users to take control of their data [31].

Research also underscores the importance of engaging children and young people in discussions about data literacy and integrating these topics into school curricula [15, 27, 43]. Beyond personal privacy, fostering data citizenship is essential to equip students with the technical and ethical skills needed to understand and navigate the societal impact of data-driven decision-making. Incorporating data economy discussions in education seeks to empower young people to critically assess data practices, and strengthen their role as informed digital citizens.

Building on the challenges identified in the literature, this work seeks to explore an approach that addresses both the informational and the motivational gap in personal data management. The abstract nature of data, coupled with the complexity of privacy policies and digital infrastructures, often discourages users from engaging with their own data privacy. To counterbalance this, the project aims to create an interactive experience, through a game-based approach, that not only informs but also actively engages users, encouraging them to reflect on the role of data in their daily lives and critically question its implications.

2.2 Game-based Learning

The intrinsic educational value of games has been raised since antiquity. In the *Laws*, Plato, the Ancient Greek philosopher, discussed how games contribute to character development, particularly in preparing children for their roles as future citizens [10]:

> *What I assert is that every man who is going to be good at any pursuit must practice that special pursuit from infancy, by using all the implements of his pursuit both in his play and in his work. For example, the man who is to make a good builder must play at building toy houses, and to make a good farmer he must play at tilling land; and those who are rearing them must provide each child with toy tools modelled on real ones. Besides this, they ought to have elementary instruction in all the necessary subjects — the carpenter, for instance, being taught in play the use of rule and measure, the soldier taught riding or some similar accomplishment.*
> - Plato, *Laws I.643 (b-d)*, translated by Robert Gregg Bury (1869-1951). Cambridge, MA, Harvard University Press.

This perspective underscores that games serve not only as entertainment but also as structured learning tools that encourage social development, problem-solving, and role exploration. These early insights set the foundation for contemporary game-based learning approaches.

A game can be defined as a dynamic system in which players interact to achieve a goal using available resources while adhering to rule-based constraints. Within this structure, players strategize to utilize resources effectively and reach their objectives [29, 53]. When educational objectives are explicitly embedded within a game's mechanics, it is referred to as an *educational game*, and its application in learning contexts is known as *game-based learning* [39, 40]. These games utilize the engaging nature of play to facilitate knowledge transfer and transform abstract ideas into concrete experiences. Numerous studies have highlighted the positive effects of gaming on learning, including enhanced motivation, engagement, information retention, cognitive structuring, and problem-solving skills [11, 35, 44, 49]. On a neurological perspective, studies suggest that gameplay can increase brain plasticity, and improve hand-eye coordination, memory, and visual acuity [1, 22].

Tangible games, on their side, provide a physical and social setting where players can interact directly, fostering skills in communication, cooperation, and socialization [24, 35, 44]. More

specifically, the use of cards as an educational tool further capitalizes on these advantages, as their compact, physical form invites hands-on engagement. This tactile interaction allows learners to offload cognitive processes onto physical objects, enhancing learning by making abstract ideas more relatable and accessible, and encourage collaborative, interactive learning [14].

Furthermore, integrating role-playing techniques into educational games can enrich the learning experience by incorporating empathy exercises, enabling players to adopt diverse perspectives of objects or characters. This approach fosters a deeper understanding of individual needs and broader environmental interactions. By stepping into different roles, players can detach from their immediate viewpoints, engaging in a more objective and creative problem-solving process [25, 41].

This aligns with research in learning sciences, which highlights empathy as an interesting component in learning, particularly in disciplines such as literature, social studies, and ethics [13]. Empathy can help learners to emotionally connect and immerse themselves with characters. This connection deepens understanding and improves retention by allowing learners to experience perspectives and emotions beyond their own. Research also suggests that reading fosters empathy, which in turn enhances engagement and memory retention.

Drawing on the potential of game-based learning, this study attempts to harness its benefits to engage players with the complexities of the personal data economy system. The objective is to design a game that functions both as an educational tool and an interactive space for reflecting on societal issues. By integrating tangible components, role-playing mechanics, and strategic decision-making, the game seeks to foster discussion, critical thinking, and active engagement with personal data-related challenges.

2.3 Game Review

From a same perspective, various studies and organizations have investigated educational games aimed at increasing privacy awareness on social media [6, 17, 47, 50]. The following part presents three notable examples:

- *Un jeu de cartes pour rester net sur Internet!*[6], developed by the *French National Commission on Informatics and Liberty (CNIL)*, is a print-and-play card game which introduces children aged 8 to 10 to fundamental concepts of data privacy and online security. Played in pairs or in teams with a game master, the game follows a quiz-based format that encourages discussion. Players take turns answering privacy-related questions, and the team or player with the most correct answers wins.
- *Gao & Blaze*[7] is a mobile game created as part of the *Privacy and Playful Pedagogy* project, funded by *Prévention MAIF* and *Fondation MAIF*, to promote personal data protection. The game aims to exercise players on managing data permissions for contacts, photos, and geolocation on smartphones. Targeting young and vulnerable users, it encourages recognition of risks associated with data permissions and provides actionable steps to control personal data. Combining experiential learning with emotional engagement, the game seeks to promote privacy awareness and drive change in digital behaviors concerning data privacy.
- *Datak*[8] is a web-based game by *Radio Télévision Suisse (RTS)*, designed for players aged 15 and older, and suitable for classroom usage. Players assume the role of a trainee data protection manager in the fictional town of *DataVille*, where they navigate dilemmas such as video surveillance installation and data-sharing decisions with private companies or political groups. Their choices impact the town's development, their career progression, and their personal life, all while managing constraints such as time, budget, and salary. Available in German, French, Italian, and English, *Datak* blends interactive gameplay with multimedia reports and humorous videos, providing an engaging way to explore data privacy challenges.

While the existing games provide valuable inspiration, most of them tend to be predominantly digital or often reduce data literacy to quiz-like experiences centered on theoretical questions aimed at accumulating correct answers. Some games explicitly seek to change players' behaviors by leveraging emotional effects. However, this is not our primary objective. Instead, the aim to create an informational tool that encourages players to take on different roles within the data economy, and stimulates reflection and discussions about their relationship with data.

[6] https://www.cnil.fr/fr/education/un-jeu-de-cartes-pour-rester-net-sur-internet
[7] https://gaoandblaze.org/
[8] https://www.datak.ch/

The employed approach emphasizes allowing individuals to make their own decisions rather than guiding them toward a specific behavioral change. To achieve this, the project envisions designing a more open and flexible game, specifically, a simulation-based game that models the personal data economy. Unlike games that present clear right or wrong answers, the dynamic system would offer multiple possibilities and strategies for players to explore. Players' actions would influence one another within this interconnected simulation world, fostering a dynamic environment where decision-making will lead to their consequences. By prioritizing exploration and discussion over prescriptive outcomes, the objective is to enhance personal data literacy through an engaging and thought-provoking gaming experience.

3 Methods

To design the game, the method used is based on the iterative game design process presented by Macklin and Sharp in *Games, Design and Play: A Detailed Approach to Iterative Game Design* [29]. This approach uses an iterative cycle of Conceptualizing, Prototyping, Playtesting, and Evaluating, allowing for continuous refinement of the game design (see Figure 2). Unlike predictive design methods, which assume a direct path from concept to final product without significant modifications, iterative game design embraces an experience-driven approach. Since games are not static products but interactive experiences shaped by both designer intent and player engagement, the adaptive process allows to continuously refine mechanics, balance dynamics, and ensure that the intended play experience aligns with actual player behavior.

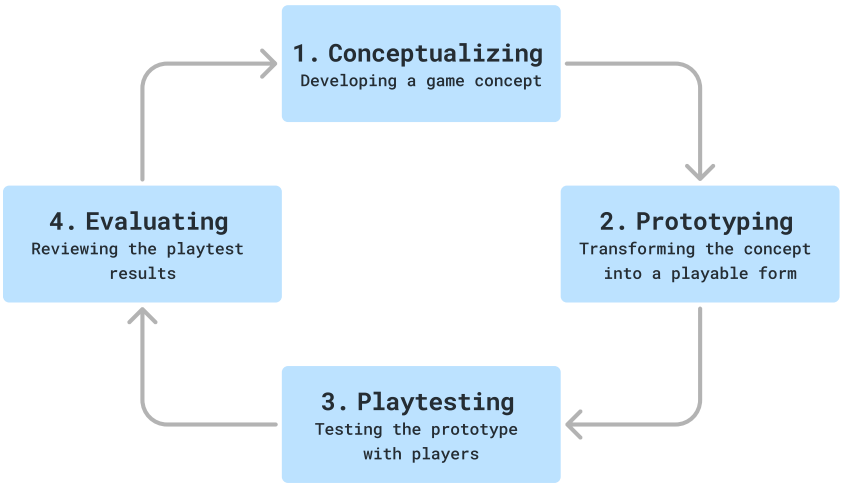

Figure 2: Iterative game design process. The cycle is composed by four phases: 1. Conceptualizing, 2. Prototyping, 3. Playtesting, 4. Evaluating.

3.1 Conceptualizing

Conceptualizing is the first phase of the cycle, where an idea for the game and its play experience take shape. In the first iteration, this phase focuses on generating concepts, then as the design evolves through prototyping and playtesting, it shifts toward refining ideas and solving emerging design challenges. The conceptualization goes through four different steps:

Generating Ideas. The first step is to generate as many ideas as possible through brainstorming to foster creativity, encourage the exploration of all possibilities, and incorporate diverse perspectives into the design process.

Selecting Ideas & Defining the Objectives. After generating a wide range of ideas, the goal is to identify key priorities and select the most relevant concepts to be retained.

Transforming Ideas into Play Experiences. Once a core idea is selected, the focus shifts to shaping the game's experience. This includes defining player actions, constraints, and experience. Macklin and Sharp [29] propose guiding questions to shape the design:

- ***Experience.*** *What does the player do when playing? What does the player get to do? And how does this make them feel physically and emotionally?*
- ***Theme.*** *What is the game about? How does it present this to players? What concepts, perspectives, or experiences might the player encounter during play? How are these delivered? Through story? Systems modeling? Metaphor?*
- ***Point of view.*** *What does the player see, hear, or feel? From what cultural reference point? How are the game and the information within it represented? Simple graphics? Stylized geometric shapes? Highly detailed models?*
- ***Challenge.*** *What kind of challenges does the game present? Mental challenge? Physical challenge? Or is it more a question of a challenging perspective, subject, or theme?*
- ***Decision-making.*** *How and where do players make decisions? How are decisions presented?*
- ***Skill, strategy, chance, and uncertainty.*** *What skills does the game ask of the player? Is the development of strategy important to a fulfilling play experience? Does chance factor into the game? From what sources does uncertainty develop?*
- ***Context.*** *Who is the player? Where are they encountering the game? How did they find out about it? When are they playing it? Why are they playing it?*
- ***Emotions.*** *What emotions might the game create in players?*

Structuring Ideas into Game Design Document. To formalize the game concept, key ideas are compiled into a Game Design Document (see Appendix A), outlining core motivations and

translating them into actionable design values. This document serves as a guiding framework for development decisions and is continuously updated throughout the design process.

3.2 Prototyping

Prototyping is the second phase of the cycle, transforming abstract concepts into tangible, playable forms. It tests the feasibility of design ideas, uncovering both successful mechanics and flaws in development. This process allows to reveal unexpected player reactions and interactions, aligning with the iterative approach of continuous testing and refinement. Rather than viewing failures as setbacks, they serve as opportunities to improve the game system. Through the iterative process, multiple versions are created to explore different design choices, ensuring that the combination of mechanics functions as intended.

3.3 Playtesting

Playtesting is the third phase of the cycle, aiming to reveal how the game truly functions when experienced by players. It provides concrete answers to the questions posed during conceptualization phase, highlighting the game's strengths, weaknesses, and necessary adjustments.

Playtests were conducted with different audiences:

1. **Internal Playtesting.** The first step involves self-testing to identify fundamental issues before introducing the game to external participants.
2. **Friends and Family Playtesting.** Testing with close acquaintances provides an opportunity to observe real interactions with the game in a more convenient and easily organized setting. The playtesters included graduates and students from high school, École Polytechnique Fédérale de Lausanne (EPFL) and University of Lausanne (UNIL).
3. **Target Audience Playtesting.** Once the game reached a more refined state, testing with the target audience is the final step. Since different audiences may respond differently, this step ensures the design resonates with its intended players. The final prototype was tested in classroom settings with students, primarily from high school, along with secondary school and Haute École Pédagogique (HEP) (see Table 1).

Date	Duration	School	Number of students	Groups of 3 players	Groups of 4 players
10.12.24	45 min.	High school	25	3	4
19.12.24	55 min.	HEP	9	3	0
13.01.25	90 min.	High school	8	0	2
13.01.25	90 min.	High school	10	2	1
15.01.25	90 min.	Secondary school	9	3	0
20.01.25	90 min.	High school	8	0	2
20.01.25	90 min.	High school	11	1	2
22.01.25	90 min.	High school	9	3	0
Total			89	15	11

Table 1: In-class playtests. Eight playtest sessions were conducted, including six at high school, one at secondary school, and one at HEP, with a total of 89 student participants.

Playtests are composed by different steps:

1. **Introduction.** Before the playtest, players receive a brief introduction to the game's theme and are informed that they are testing a prototype. They are encouraged to provide feedback to support its improvement while engaging with the game naturally.
2. **Observation & Listening.** During the playtest, the focus is on closely observing players' actions, body language, reactions, and emotions while minimizing intervention to avoid biasing their experience or influencing their feedback. Detailed notes are taken to document observations. Additionally, special attention is given to listening for questions, comments, and discussions. In learning science, learner-generated questions are key indicators of engagement and comprehension, as they drive knowledge construction,

stimulate discussion, support self-assessment, and spark curiosity, ultimately enhancing both motivation and understanding [8].

3. **Discussion & Questionnaire.** After the playtest, discussions offer an opportunity to gather in-depth feedback from players' perspectives. These conversations provide valuable insights into their experiences, perceptions, and how the game prompts reflection on data-related issues. Players often give valuable ideas and improvements, which will be considered during the next phases. For in-class playtests, a questionnaire (see Appendix C) is used to collect feedback from all participants, as individual discussions with each student are complicated to conduct in practice. A paper format is opted for unrestricted, open-ended responses, enabling students to express their thoughts without the limitations of predefined digital formats [3]. The rating-scale questions follows the grading scale used in school systems in the canton of Vaud, ranging from 1 (very poor) to 6 (excellent), with half-point increments and a score of 4 considered sufficient. This familiar scale attempts to make it easier for students to provide evaluations.

3.4 Evaluating

Evaluating is the last stage of the cycle, where playtest results are analyzed to assess the effectiveness of the game's design and determine necessary refinements. This phase feeds back into conceptualization, continuing the iterative cycle. By reviewing both expected and unexpected findings from playtests, the goal is to identify game's strengths, weaknesses, and areas for improvement to determine the next steps. If conceptualizing raises questions, prototyping and playtesting provides answers, evaluating is where those answers are interpreted and translated into next design adjustments.

Weeks	Tasks
23.09 - 27.09	Reviewing related games
30.09 - 04.10	Defining the objectives with *PersonalData.IO*
07.09 - 11.10	Writing the first game design document (GDD)
14.10 - 18.10	Reviewing related literature
21.10 - 25.10	Reviewing related literature
28.10 - 01.11	Reviewing related literature
04.11 - 08.11	Writing report
11.11 - 15.11	Prototyping the 1st version
18.11 - 22.11	Prototyping the 2nd version
25.11 - 29.11	Prototyping the 2nd and 3rd versions
02.12 - 06.12	Prototyping the 4th and 5th versions
09.12 - 13.12	Prototyping the 6th version + In-class playtesting
16.12 - 20.12	Prototyping the 7th version + In-class playtesting
23.12 - 27.12	*Winter break*
30.12 - 03.01	*Winter break*
06.01 - 10.01	Writing report
13.01 - 17.01	In-class playtesting
20.01 - 24.01	In-class playtesting
27.01 - 31.01	Writing report
03.02 - 07.02	Writing report

Table 2: Project time allocation. The four-month project can be divided into three overlapping parts: seven weeks dedicated to reviewing related works and defining objectives, followed by six weeks of game prototyping, and concluding with seven weeks of in-class playtesting and report writing.

4 Results

This section presents the outcomes of the final iteration of the game design process. It includes the refined game concept, the latest prototype version, insights from in-class playtesting, and an evaluation of playtest feedback.

4.1 Final Game Concept

Learning Science. To enhance educational effectiveness, intrinsic learning is employed to integrate knowledge directly into game mechanics rather than delivering it as separate informational content [23].

The gameplay is designed to simulate a simplified model of the data economy, where players simultaneously take on the roles of companies developing applications and users relying on these applications for daily activities. This dual perspective fosters a deeper understanding of the incentives and trade-offs faced by different stakeholders in the data economy. By incorporating role-playing and empathy-driven mechanics, the game seeks to increase emotional engagement, improve comprehension and retention [13], and provide insight into the flow of personal data within digital ecosystems.

To further support cognitive processing, content chunking technique is employed to break down complex information into smaller, manageable units, thereby reducing cognitive load. This approach enables players to absorb and retain information more effectively as they progress [19]. For instance, the instructions can be separated between the rules and cards, and each card may present additional information about different legal aspects related to personal data.

Agency & Playfulness. Agency, defined as *the satisfying power to take meaningful action and see the results of our decisions and choices* by Janet Murray [32], plays a crucial role in enhancing playfulness. By designing a game that allows for diverse strategic combinations rather than imposing clear right or wrong answers, the focus shifts toward exploration, engagement, and critical thinking. Increasing players' choices, freedom, and ability to take meaningful actions seeks to foster a sense of agency, leading to greater enjoyment and satisfaction [48].

Indirect Consequences of Data-sharing. In everyday life, the consequences of data-sharing are often indirect and delayed. The idea is to replicate this dynamic by designing the game mechanics so that giving away personal data does not result in immediate penalties but instead accelerates the growth of competitors' applications, indirectly shaping the game's outcome. This indirect impact would encourage players to think critically about long-term consequences, mirroring their own digital interactions.

Alternatives in the Data Economy. Another game's message is to illustrate that individuals often have alternative choices when navigating the data economy. This can be represented through different applications, some of which collect more personal data than others while still fulfilling the same tasks. Non-digital activities can be incorporated allowing players to complete daily tasks without sharing data, though often at the expense of additional time. Additionally, legal frameworks can be introduced to present personal data rights, such as GDPR-related actions. By incorporating these elements, the game emphasizes that while data-sharing is frequently encouraged, individuals have alternatives to protect their privacy [20].

Tangibility & Social Interaction. A format of tangible cards and tokens is opted in order to counterbalance the abstract nature of personal data. Data collection often happens invisibly within digital systems, making it challenging for individuals to fully comprehend its impact [33, 26]. By representing data as tangible tokens that players have to physically exchange, the game aims to translate an abstract process into a concrete experience, reinforcing awareness of data-sharing actions.

Additionally, a physical game fosters direct, face-to-face interaction. Player actions are designed to directly influence one another, fostering an environment where decisions and exchanges occur between players rather than being dictated by the game system. This structure mirrors data interactions, where personal data is shared, traded, and utilized within a network of individuals and organizations. The objective is also to create a shared space for discussion, negotiation, and debate.

Since data economy issues are inherently social, requiring collective awareness and regulation, a physical and multiplayer format aligns with the goal of stimulating conversations about privacy and digital rights.

Practical Elements. The number of players is set at three to four to balance engagement and convenience. A minimum of three players ensures dynamic role interactions and strategic decision-making keeping the number of game copies manageable for teachers. On the other hand, keeping the player count low prevents long waiting times, maintaining an active and immersive experience for all participants. Moreover, the range of possible player counts is limited to facilitate the game balancing.

To suit educational environments, the game prioritizes a short playtime, making it suitable for classroom sessions while enabling students to engage with key concepts without demanding excessive time.

Moreover, the game components are intentionally compact, consisting of cards, tokens, and a rule leaflet designed to match the card size, ensuring facilitated transport, storage, and classroom distribution.

Thematic Elements. The visual elements are selected with the aim to reflect the game's themes of data exchange, movement, and economy.

The *Arvo*[9] slab-serif typeface family, designed by Anton Koovit, is chosen for its geometric and structured appearance. In the Finnish language, *Arvo* means *number, value, worth*, all concepts closely tied to the data economy. Bold text is used for titles and key information, while italics differentiate various types of content.

Furthermore, separating sections of the game materials by square dot lines, can visually evoke the concept of the data permanently moving between different entities in digital systems.

The game is named *Keiwi*, derived from the etymology of the term *society* in an Italic language [12], reflecting its focus on simulating social interactions within a data-driven ecosystem. In earlier prototypes, *Keiwi* tokens represented social wealth. While these tokens were later removed, the name was retained due to its positive reception among playtesters.

[9] https://fonts.google.com/specimen/Arvo

4.2 Final Prototype

Keiwi is a card game that blends strategy, simulation, and role-play to explore personal data collection and usage. Designed for three to four players, the game includes 4 rule leaflets, 60 cards, and 108 tokens representing personal data. The deck consists of four types of cards: *Action*, *Activity*, *Application*, and *Mission*. The game materials are shown in the Figures 4 and 5.

Players take on dual roles, developing *Applications* to attract users while also using others' *Applications* to complete *Missions* and earn points. Using an *Application* requires sharing personal *Data*, which can then be collected to upgrade *Applications* for additional points. At the end of the game, the player with the most points wins. In parallel, *Activity* cards offer an alternative way to complete missions without data sharing but take more time, while *Action* cards leverage GDPR laws to protect players' data rights. The game system is shown in the Figure 3.

The first game session lasts about 30 minutes, including time for players to integrate the rules, while subsequent sessions take approximately 15 minutes. Primarily designed as an educational tool for high school students, the game aims to encourage discussions on personal data economy issues in classroom settings. However, it can also be adapted for a broader audience.

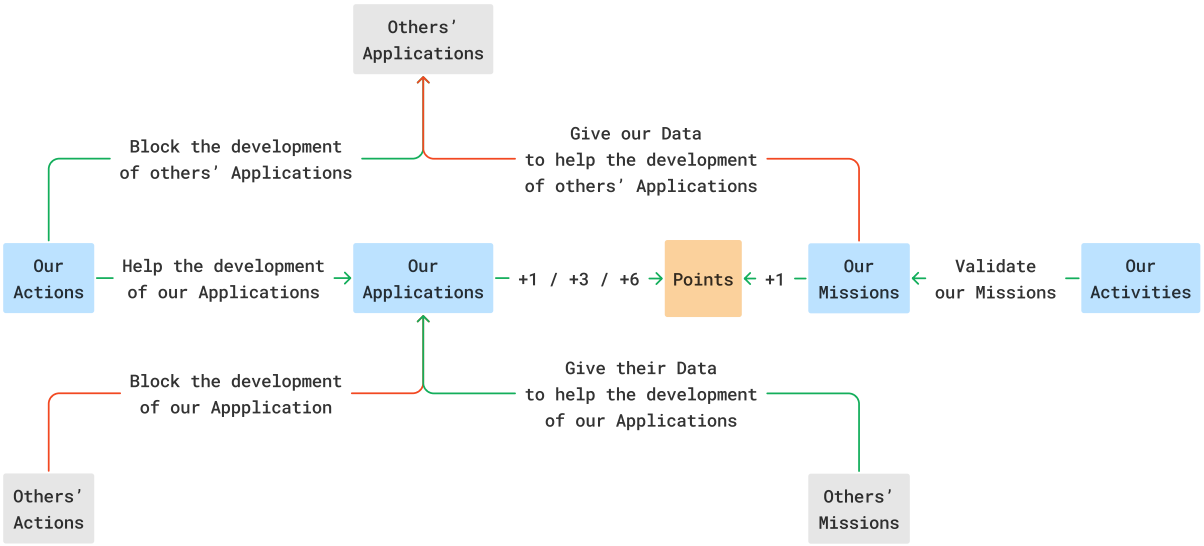

Figure 3: Game system from one player's perspective. The game's goal is to accumulate the highest number of points (in orange). Blue boxes represent playable cards, while gray ones denote playable cards from other players. Green arrows indicate favorable actions and red arrows indicate unfavorable actions for the player.

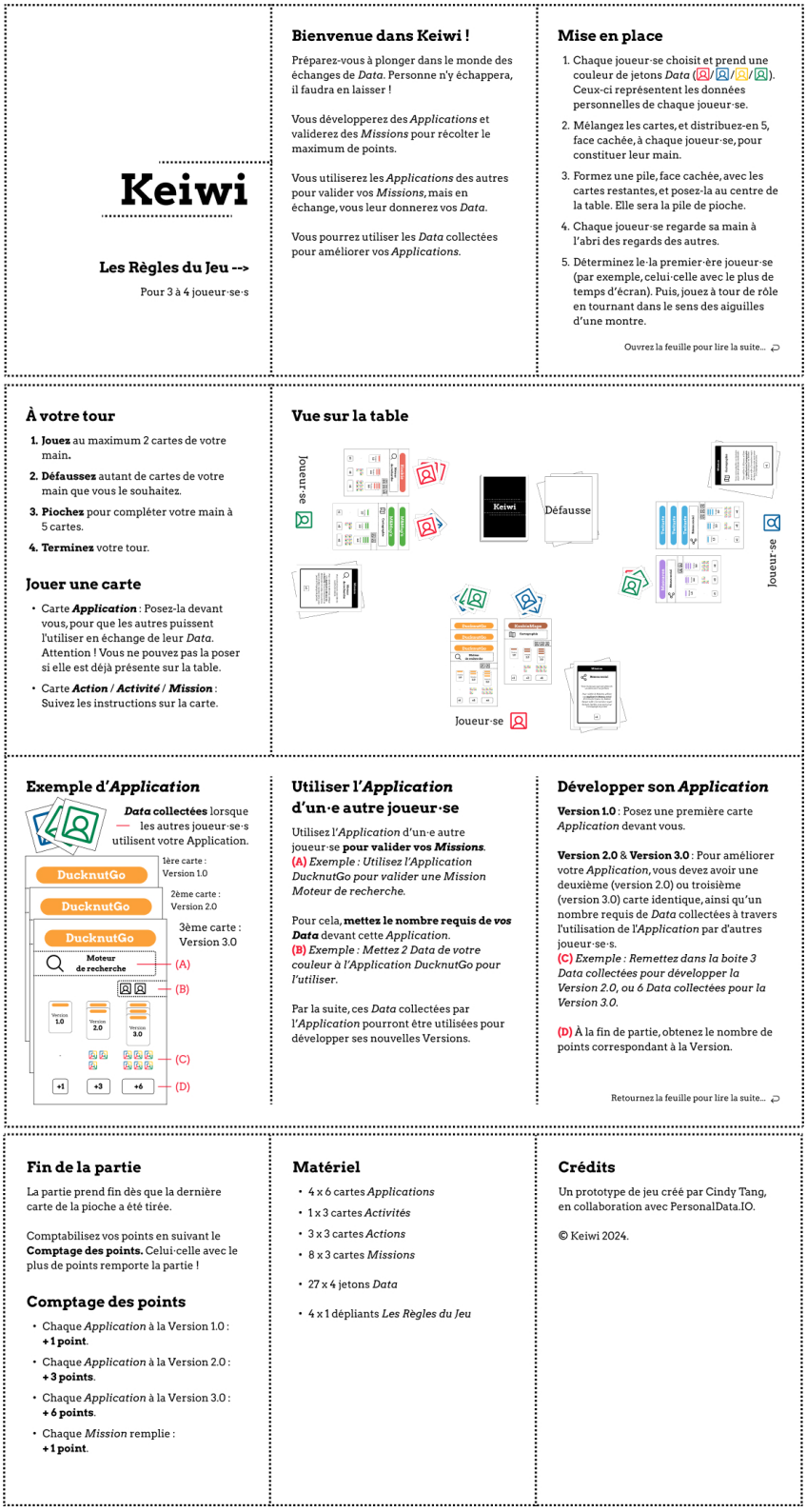

Figure 4: Game rules (7th and last version).

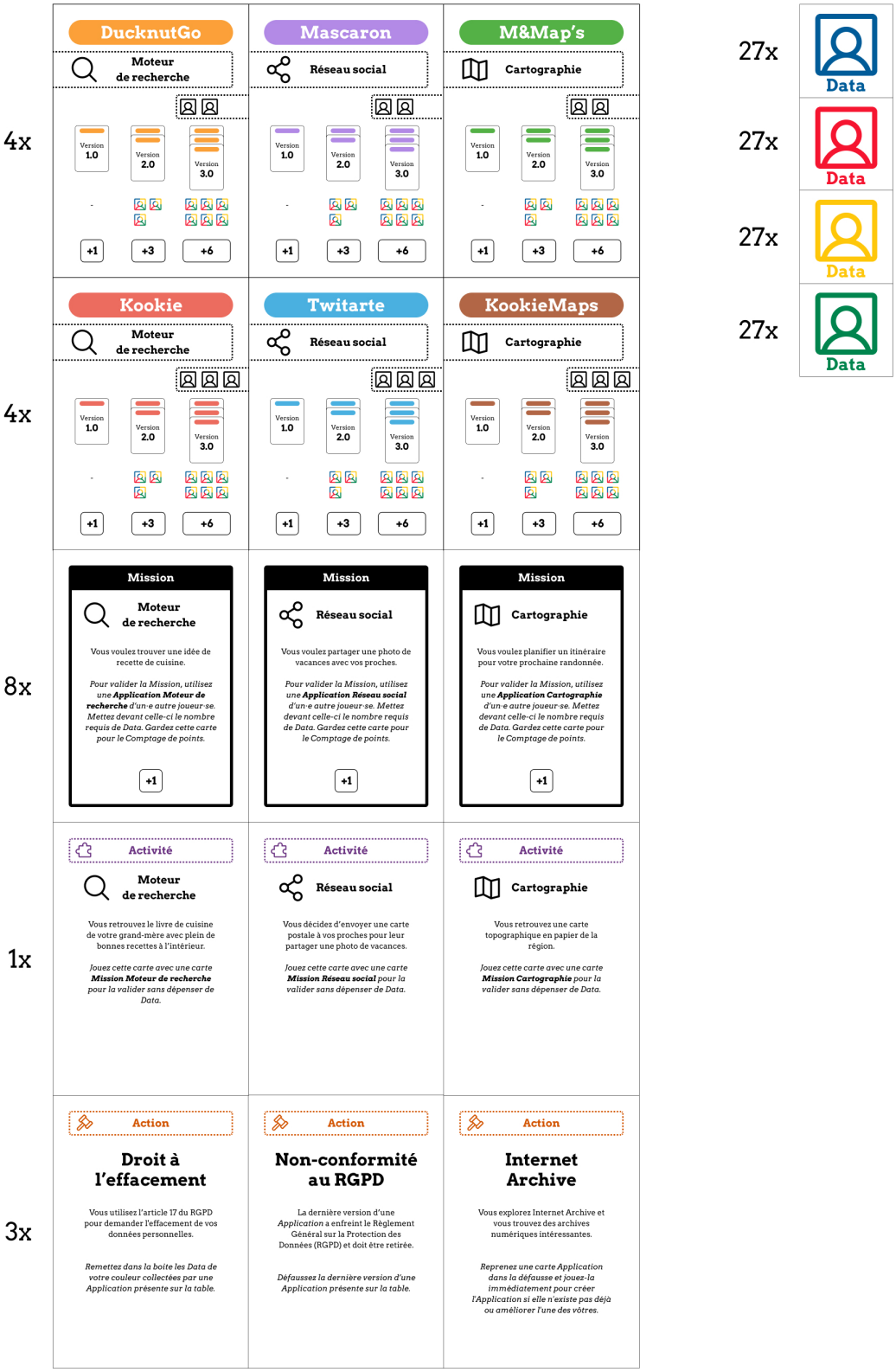

Figure 5: Game cards and tokens (7th and last version).

4.3 Final Playtest Feedback

Eight in-class playtest sessions were conducted, including six at high school, one at secondary school, and one at the HEP, with a total of 89 student participants (see Table 1). The following section summarizes key observations, student discussions, and insights gathered from questionnaire responses.

General Appreciation. The game received an average rating of 4.92 / 6 from student participants (see Figure 6). They also characterized the game as:

- *ludique* (playful), *amusant* (amusing), *fun* (fun), *marrant* (funny), *cool* (cool), *sympa* (nice), *bien* (good), *très bon* (very good), *bien aimé* (well liked), *pas mal* (not bad), *vraiment chouette* (really great),
- *intéressant* (interesting), *original* (original), *complet* (complete), *un jeu éducatif très bien construit* (a very well constructed educational game),
- *compétitif* (competitive), *stratégique* (strategic),
- *simple* (simple), *facile à comprendre* (easy to understand), *compliqué à comprendre* (difficult to understand), *rapide* (fast), *pas trop long* (not too long).

Gameplay Dynamics. The initial phase of play was generally quiet, as players concentrated on reading and understanding the rules. Gradually, they started discussing uncertainties, selecting token colors, distributing cards, and attempting the first round, often asking clarifying questions during this stage. Within about fifteen minutes, most groups grasped the game system, and after approximately thirty minutes, they completed their first game. Many players expressed interest in replaying, trying to apply more strategic thinking, to form alliances, and to engage in negotiation.

Players expressed their appreciation for the competitive and strategic aspects of the game. While the game is primarily competitive, cooperative behaviors also emerged as some players temporarily formed alliances to challenge a player who is taking the lead.

The most engaging moments observed occurred when *Action* cards were played, triggering direct player interactions that disrupted the game's rhythm and elicited reactions, from excite-

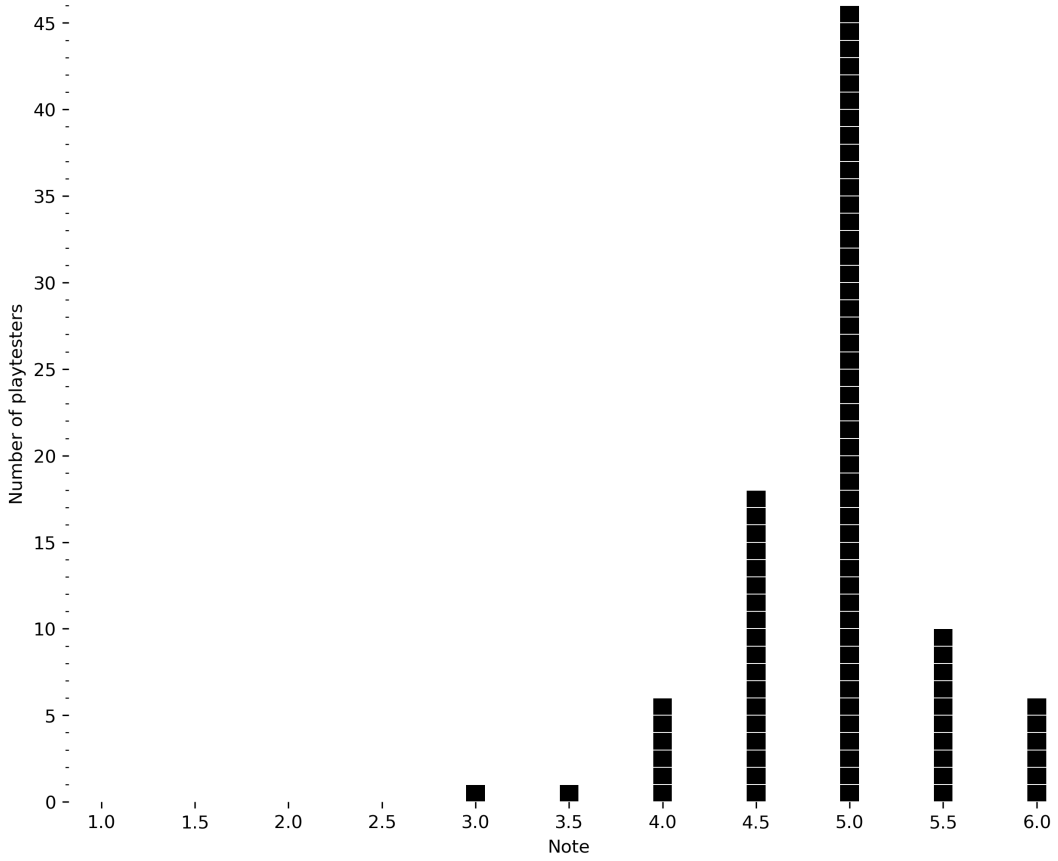

Figure 6: Distribution of 89 student ratings for the question *Quelle note donnerais-tu à ce jeu ?* (How would you rate this game?). The ratings follow the grading scale of the school system in the canton of Vaud, ranging from 1 (very poor) to 6 (excellent), with half-point increments. A score of 4 is considered sufficient. The average rating received is 4.92.

ment to frustration, creating a sense of anticipation. When asked about their favorite cards via the questionnaire, a majority of players highlighted *Action* cards, with 59% selecting *GDPR non-compliance*, 14% selecting *Internet archive*, and 6% selecting *Right to erasure*.

Additionally, at the start of the game, players were instructed to determine the first player based on their own screen time, which sometimes sparked discussions about personal device usage. Some participants were surprised by their own screen time, leading to further reflection on their digital habits.

Rules Complexity. Many players initially found the rules challenging to understand, resulting in frequent questions and noticeable confusion, such as:

- What does the term *défausse* (discard) mean?
- How do we start the game?
- Can we use our own *Applications* to validate *Missions*?
- The *Application* card are challenging to interpret as it presents a large amount of information.
- How do we upgrade an *Application*?
- Does the cost of an *Application* increase with its upgrades?
- Are the points cumulated with *Application* upgrades?
- Some players attempt to develop an *Application* that has already been developed by another player, which is not permitted.
- When we play the *Internet Archive* card, is the required amount of *Data* still necessary for the upgrade?
- When we play an *Activity* card with a *Mission* card, does it count for two played cards?
- At times, players do not follow the correct sequence of instructions, such as discarding cards before playing, which is against the rules.

Game balance. Another key issue identified was game balance, which at times led to a paradoxical message. The initial design intended to demonstrate that excessive data-sharing benefits other players, making it easier for them to develop *Applications* and take advantage. However, some players bypassed *Application* development entirely, focusing solely on completing *Missions* by using *Applications* and sharing *Data*, and still managing to win, contradicting the intended message.

Additionally, some players raised concerns about the role of randomness, noting that card drawing, which dictates the range of available actions, is entirely luck-based. This element of randomness sometimes felt overly influential, leading to frustration and sense of injustice, as players felt they lost due to bad luck rather than poor strategy.

Opinions on game duration were also divided. While some appreciated the short playtime encouraging multiple rounds, others preferred a longer session allowing for more strategic depth.

Parallels between the game and daily life. Discussions and questionnaire responses revealed a range of perspectives and reflections on the game's connection to data economy issues and personal data usage and collection.

- Some underlined the parallels between the game and the data economy system:
  - *Le jeu reflète bien que toutes les applications veulent toutes nos données pour accroître.*
    (The game reflects the fact that all the applications want all our data to grow.)
  - *Il les reflète assez bien car lorsque l'on va sur une application on vend nos données. Je trouve aussi que ça nous permet de voir, dans un jeu, ce qui se passe sur nos téléphones, ordinateurs, etc.*
    (It reflects them quite well, because when we go onto an application, we are selling our data. I also find that it allows us to see, in a game, what is going on on our phones, computers, etc.)
  - *Montre bien qu'on peut dépenser nos données sans conséquences directes.*
    (It shows that we can spend our data without any direct consequences.)
  - *On nous invite à utiliser nos data pour avoir accès à des applications.*
    (We are invited to use our data to access applications.)
- Some made connections between the game with business and economic worlds:
  - *Le jeu représente très bien de manière simple la manière dont les applications utilisent nos données pour se développer.*
    (The game is a simple way of showing how applications use our data to develop.)
  - *Cela reflète bien le monde de l'entreprenariat et le fait de vouloir être le meilleur à la fin tout en réfléchissant à comment s'améliorer.*
    (It is a good reflection of the world of entrepreneurship and of wanting to be the best at the end of the day while thinking about how to improve.)
  - *C'est assez vrai plus on donne de data plus le développeur améliore le jeu et plus il s'enrichit.*
    (It's true enough, the more data you donate, the more the developer improves the

game and the richer it becomes.)

  - Some evoked similarities with *Monopoly*[10], an economics-themed board game.

- Some reflected on their awareness of data usage:

  - *Je pense que le jeu nous permet de prendre conscience de la quantité de données qu'on donne à chaque fois que l'on fait une action sur internet.*
    (I think the game makes us aware of the amount of data we give away every time we do something on the Internet.)
  - *On donne souvent beaucoup de données aux applications/sites sans se rendre compte.*
    (We often give a lot of data to applications/websites without realizing it.)
  - *Généralement on accepte les cookies sur internet sans vraiment lire les conditions.*
    (We generally accept cookies on the Internet without really reading the conditions.)

- Some felt lacked knowledge of the subject to fully engage in the discussion:

  - *Je n'ai pas vu les liens avec la vie quotidienne. Peut-être est-ce dû à mon manque de connaissance en informatique.*
    (I did not see the links with everyday life. Perhaps this is due to my lack of computer knowledge.)
  - *Pour les personnes pas renseignées, les termes ne signifiaient rien.*
    (For those who did not know, the terms meant nothing.)
  - *Je n'ai pas beaucoup de connaissance mais ça m'a aidé à mieux comprendre.*
    (I do not have much knowledge but it helped me to better understand.)

- Some were more focused on playing rather than making connections to their own experiences:

  - *Je n'y prettais aucune attention pendant le jeu mais ça y ajoute quand même du sens.*
    (I did not pay any attention to it during the game, but it still adds meaning.)
  - *Je suis plus concentré à gagner/jouer.*
    (I am more focused on winning/playing.)

- Some found that the scenarios presented did not resonate with their personal experiences:

[10] https://monopoly.hasbro.com/en-us

  - *Je n'utilise pas tant internet que ça donc je me retrouve rarement dans des situations où j'accepte de partager mes données.*
    (I do not use the Internet that much, so I rarely find myself in situations where I agree to share my data.)
  - *Je ne suis pas propriétaire d'applications.*
    (I am not an application owner.)

- Some recognized certain similarities but generally felt that the game did not fully reflect daily life:
  - *Au-delà des applications qui collectent nos données, je ne vois pas trop le rapport.*
    (Beyond the applications that collect our data, I do not really see the connection.)
  - *Les deux lois expliquées sont bien et bien utilisés, elles permettent un jeu avec plus d'actions. Mais le jeu en lui-même ne reflète pas totalement et beaucoup les situations de la vie quotidienne.*
    (The two laws explained are well and good used, they allow a game with more actions. But the game itself does not fully reflect daily life situations.)
  - *Je n'ai pas vraiment trouvé de similitudes, ne serait-ce que les trahisons.*
    (I did not really find any similarities, apart from the betrayals.)
  - *L'idée est là mais j'ai de la peine à faire le lien avec la vie quotidienne.*
    (The idea is there, but I am having trouble making the connection with everyday life.)

- Some felt that the game encouraged them to use their personal data, leading them to perceive its core message as paradoxical:
  - *Pour gagner, il faut vendre ses data pour gagner des missions. La morale : Il faut vendre ses données personnelles pour gagner des avantages. Un peu paradoxal comme message à transmettre.*
    (To win, you have to sell your data to win missions. The moral: You have to sell your personal data to gain advantages. A bit of a paradoxical message.)
  - Discussions revealed that players may be unconcerned about sharing their data during the game, prompting questions on the reasons behind this design choice.
  - Some suggested introducing penalties for used data or bonuses for remaining data at the end of the game to reinforce the risks of data-sharing.

- Some suggested additional aspects of the data economy to incorporate into the game:
  - *Il faudrait rajouter des publicités qui utilisent les données en échange d'upgrade pour être plus correspondant à la vie.*
    (We should add advertising that uses data in exchange for upgrades to be more in tune with life.)
  - *On ne parle pas de l'utilité principale des données personnelles : les vendre à des entreprises.*
    (There is no mention of the main use of personal data: selling it to companies.)
  - *Le jeu est bien pensé et illustre d'une manière simple le fonctionnement du partage de données personnelles. Pour un jeu c'est bien, car la réalité est plus complexe.*
    (The game is well thought out and illustrates in a simple way how the sharing of personal data works. That is good for a game, because the reality is more complex.)

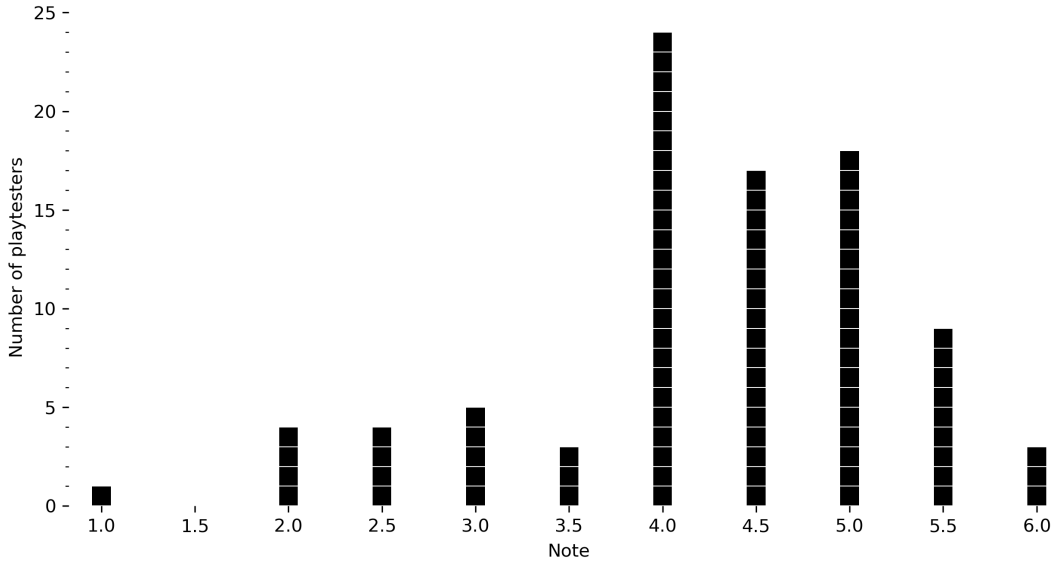

Figure 7: Distribution of 89 student ratings for the question *À quel point trouves-tu que le jeu reflète bien des situations de la vie quotidienne ?* (How well do you think the game reflects daily life situations?). The ratings follow the grading scale of the school system in the canton of Vaud, ranging from 1 (very poor) to 6 (excellent), with half-point increments. A score of 4 is considered sufficient. The average rating received is 4.26.

4.4 Final Evaluation

The game's main strengths include:

- **Playfulness.** The game was well-received, with players particularly enjoying its competitive and strategic elements. *Action* cards emerged as memorable features, demonstrating their emotional impact in gameplay. These cards not only create engaging moments but also represent legal frameworks, some key concepts that are valuable for players to retain as citizens. Therefore, leveraging impactful in-game actions may serve as an effective technique to enhance learning and long-term recall.
- **Classroom Suitability.** The game's short and stable duration with compact materials made it suitable for classroom use.
- **Stimulating Critical Thinking.** The game stimulated critical thinking and discussion among many students on data economy issues, including personal data collection and usage. Some players reflected on their own digital habits, while others critiqued aspects of the game and suggested improvements. While some students felt they lacked enough knowledge to engage deeply, some among them also expressed curiosity to learn more, indicating an interest in the subject.

The game's main weaknesses include:

- **Rule Complexity.** Many players found the rules challenging to understand. This complexity may stem from the dual roles of developer and user, which results in a large number of rules to retain. Additionally, certain visual elements, particularly the *Application* cards, are not entirely intuitive and are difficult to interpreted. However, diagrams and concrete examples were found to be helpful in clarifying the rules.
- **Imbalance between the developer and user roles.** It was observed that players who solely adopted the user role, prioritizing *Mission* completion without restricting *Data*-sharing, often achieved unexpected victories, undermining the intended message of the game. However, this inconsistency was recognized and sparked discussions among students, demonstrating their critical engagement with the topic.
- **Ambiguity of messages conveyed.** Some players perceived the game as encouraging data-sharing, which they saw as paradoxical. Additionally, the long-term consequences of data-sharing were not always evident, creating ambiguity in the game's core message.

Areas of future improvement include:

- **Improving the Game Rules.** Several players suggested modifications to enhance rule clarity, including:
  - Including an example of a game round.
  - Providing an instructional video.
  - Separating the explanations for *Application* and *Mission* tasks.
  - Enhancing the visual clarity of the *Application* cards.
- **Adjusting Balance Between Developer and User Roles.** To ensure data-sharing has expected consequences, adjustments to game balance were proposed:
  - Limiting to only one *Application* per player in the first round.
  - Increasing the advantages of *Application* development by awarding more points.
  - Implementing a computational model to optimize the game's balance.
- **Exploring the Possibility of an Extended Version.** Some students expressed interest in a longer and more complex version of the game. To maintain simplicity in the initial rules, one suggestion is to offer two modes: a classic version for first-time players and an extended version with additional mechanics. During the 90-minute classroom sessions, most groups completed three plays. For the last one, players were given the freedom to experiment with their own rule modifications, all of which showed potential for future implementation. Variations tested by students included:
  - Expanding the game to six players.
  - Reusing the discard pile to extend playtime.
  - Introducing negotiation and deals between players.
- **Beyond the Game.** Some students and teachers suggested providing additional background explanations, either within the rule leaflet or as supplementary material. This could take the form of a presentation, discussion prompts, or thematic questions for educators to explore in subsequent lessons. Such additions can help players unfamiliar with data economy concepts better contextualize the game's themes and increase the experience efficiency.

Conclusion. The playtests demonstrated that the game is an engaging and effective tool for stimulating reflections on data economy issues in classroom settings. Players appreciated the competitive and strategic aspects, but challenges remain regarding rule clarity, game balance, and the explicit link between gameplay and daily life data practices. Future iterations should refine mechanics to ensure consistency in the intended message, improve accessibility through clearer rules and visual design, and explore supplementary materials to enhance the game's educational efficiency.

5 Discussion

A game functions as a system of interconnected mechanics, where the challenge lies in optimizing their arrangement to create an engaging and meaningful experience. Balancing these components requires continuous decision-making and trade-offs, as resolving one issue may introduce another. The objective is to find an optimal equilibrium that aligns with the game's core design values. Throughout the iterative development process, different solutions were tested, adopted, or discarded based on playtesting feedback. The evolution of the game's prototypes is documented in Appendix B.

One of the main challenges was balancing complexity. If the game contained an excessive amount of information, players found it overwhelming and discouraging. Conversely, an overly simple game lacked challenge, reducing engagement. Additionally, excessive simplification could also make it harder for players to draw parallels between the game and their own experiences with data.

Some design choices initially added complexities to the process. For example, the decision to incorporate direct interactions, where one player's actions directly affected others, introduced additional challenges in predicting outcomes from different strategies, thus in balancing the game. Similarly, assigning dual roles to players further complicated the game rules.

The rules complexity was an inherent issue from the start of prototyping. To address this, the rules were iteratively refined based on player feedback, confusion, and observed difficulties during playtests. The final version expanded from eight to twelve pages, incorporating clearer formulations, additional diagrams, and concrete examples. The winning conditions were also simplified: initially, players could win by either developing two *Applications* at the last version or collecting ten *Keiwi* tokens, which represented social wealth. This was later changed to a single objective, accumulating the highest points by the end of the game.

Some playtesters suggested using recognizable brand names for *Application* cards, as implemented in the first version, to facilitate to make associations with their own digital experiences. However, intellectual property constraints prevented this.

Another observed issue was that the first player had a significant advantage, as they could start developing *Applications* before others, blocking competitors due to a rule preventing duplicate *Applications*. A potential solution was to limit the number of cards played per turn, but this risked slowing the game and increasing waiting time. Before the sixth version, players could play three cards per turn, which was later reduced to two to moderate the first-player advantage.

Additionally, *Application* development was perceived as more vulnerable than *Mission* validation. *Applications* could be disrupted by GDPR-related *Action* cards, whereas *Missions*, once completed, always granted points. To mitigate this, adjustments were made in later versions. For example, the *Legal attack* card, which previously allowed players to remove an entire *Application*, was modified into *GDPR non-compliance*, which only removed the latest version of an *Application*. This reduced the punitive impact of *Action* cards and made *Application* development a more viable strategy. Moreover, the *Internet archive* card, added in the second version, allows players to retrieve an *Application* card from the discard pile. This feature provided a way to counteract *Application* losses and kept the game dynamic.

Finally, the game aims to illustrate the indirect and delayed consequences of data-sharing, mirroring data economy dynamics. However, this approach sometimes led to ambiguity, with players perceiving conflicting messages about whether data sharing was encouraged or discouraged. Some suggested adding penalties for excessive data-sharing or bonuses for retaining data at the end of the game. However, this was ultimately not retained, as it risked promoting a simplistic *data sharing is bad* narrative, which was not the intended message. Instead, the objective was to illustrate how data-sharing decisions have consequences on daily life. The intention was not to dictate a moral stance on data-sharing but to create a space for reflection, encouraging players to critically engage with the mechanics and draw their own conclusions. Ensuring that this message is effectively conveyed remains an area for further refinement in future iterations.

6 Conclusion

With the rapid expansion of data-driven technologies and the growing role of data in modern society, it is important for citizen to develop an understanding of the data economy to make informed decisions in everyday life.

This study aimed to contribute to the fields of data literacy and game-based learning, exploring how games can serve as tools for fostering discussions and critical thinking about societal and economic data-related issues. Specifically, it focuses on designing an educational game to engage high school students in reflecting on personal data use and collection within classroom settings.

Using an iterative game design process—comprising conceptualizing, prototyping, playtesting, and evaluating—the game was continuously refined based on player feedback to enhance both its playability and educational utility.

The resulting prototype, named *Keiwi*, is a multiplayer card game integrating strategy, simulation, and role-play aspects. Players take on dual roles: as companies developing applications and as users relying on these services for daily tasks. However, using applications requires sharing personal data, and excessive sharing can empower other players, leading to their victory. Meanwhile, special cards introduce legal protections and alternative strategies for safeguarding privacy. Through these mechanics, the game encourages players to critically assess the flow of their personal data and its broader implications.

To assess its effectiveness, the game was tested with 89 students, primarily from high schools, along with secondary school and HEP. The overall feedback was positive, with an average rating of 4.92 / 6. Players found the game enjoyable and engaging, and it effectively encouraged reflection on personal data economy issues, demonstrating its potential as an educational tool for introducing discussions in classroom settings. However, challenges remain, including the complexity of the rules, an imbalance between the developer and user roles, and ambiguity in the game's core message.

Future work could focus on addressing these challenges, such as refining the rules for clarity, rebalancing gameplay mechanics, and potentially developing an extended version for a more complex and strategic experience. Additionally, integrating supplementary materials, such as discussion guides, could further support educators in using the game as an effective educational tool. Ultimately, this project highlighted the potential of games as interactive learning experiences, offering an engaging approach to raising awareness, promoting critical thinking, and fostering discussions about data economy issues in education.

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The writing of this work was assisted by OpenAI’s ChatGPT (Write For Me, GPT-4o and GPT-4o mini versions) for text reformulations. Retrieved from chatgpt.com.

A Game Design Document

Le Cœur du Jeu

Informatif
Le but n'est pas de culpabiliser, ni de faire changer de comportements, mais plutôt d'informer, de laisser les joueur·se·s se glisser dans la peau de différent·e·s acteur·rice·s de l'économie des données (entreprise et utilisateur·rice privé·e) pour comprendre chaque point de vue.

Interconnexion entre les joueur·se·s
Les échanges de données personnelles et de services se font directement entre les joueur·se·s. Les choix que nous faisons influent directement sur les autres joueur·se·s et réciproquement.

Conséquences du partage des données
Partager nos données personnelles ne nous impacte pas immédiatement, mais cela permet aux applications des autres joueur·se·s de se développer plus vite. Par la suite, ces choix peuvent leur donner un avantage décisif et les propulser vers la victoire.

Le Corps du Jeu

Titre : *Keiwi*

Description : *Keiwi* est un jeu de société qui plonge les joueur·se·s dans l'économie des données. Chacun·e incarne à la fois le rôle d'une entreprise, développant des applications, et d'un·e utilisateur·rice utilisant les services proposés pour accomplir des missions du quotidien. Cependant, l'utilisation des applications nécessite de partager ses données personnelles, mais trop en partager peut offrir un avantage décisif aux autres et faire perdre le contrôle de la partie.

Objectifs pédagogiques : Encourager la réflexion sur les enjeux liés à l'économie des données personnelles. Prendre conscience de la collecte des données personnelles, des raisons pour lesquelles elle est réalisée, et des conséquences qu'elle peut apporter. Prendre conscience qu'il existe souvent des alternatives, et des lois pour se protéger.

Motivation : Les enjeux des données personnelles sont parfois sous-estimés ou méconnus. Le

jeu offre une prise de conscience par une approche ludique et expérimentale.

Type : Jeu de société, de cartes, de simulation, de stratégies, d'échanges.

Matériel : Cartes (Action - Activité - Application - Mission) + Jetons (Data) + Règles du jeu

Expérience de jeu : *Keiwi* se joue avec 3 ou 4 joueur·se·s autour d'une table. La première partie dure environ 30 minutes, puis les suivantes environ 15 minutes. Chaque joueur·se développe des applications et invite les autres à les utiliser. Utiliser ces applications permet de valider des missions et de gagner des points, mais cela nécessite de partager ses données. En parallèle, collecter les données des autres permet d'améliorer ses applications, augmentant ainsi les points collectés. À la fin, le·la joueur·se ayant accumulé le plus de points remporte la partie !

Contexte : Le jeu s'adresse principalement à des gymnasien·ne·s pour une utilisation en classe, offrant une base ludique pour engager des discussions sur les enjeux sociaux liés à l'économie des donées personnelles.

Contraintes : Maintenir une cohérence des concepts introduits avec la vie réelle, l'engagement de tout·e·s les participant·e·s tout au au long de la période de jeu, des règles du jeu facile et rapide à intégrer, un temps de jeu stable et court.

Défi des joueur·se·s : Faire des choix avec des conséquences plus ou moins immédiates. Trouver la bonne stratégie pour développer son jeu dans cette société inter-connectée, où les actions de chaque joueur·se influencent directement celles des autres.

Émotions : Réflexif, stimulé, actif, compétitif.

Ambiance : Circulation, échange, numérique, économie, gestion.

B Prototype Archive

Bienvenue dans Keiwi !

Ici, développez vos applications et utilisez les applications des autres joueur·se·s.

Recevez des jetons *Keiwi* lorsque vous utilisez les applications des autres. Mais, vous leur donnez vos jetons *Data* en retour.

Collectez les jetons *Data* des autres pour développer vos applications.

Deux manières de gagner

Être le·la premier·ère à :

- Développer 2 colonnes de cartes *Application* complètes.
  ou
- Obtenir 10 jetons *Keiwi* ☺.

Éléments du jeu

- Les cartes *Application*.
- Les cartes *Action* permettent de défendre vos droits en justice.
- Les cartes *Activité* permettent de gagner des jetons *Keiwi*.
- Les jetons *Data* matérialisent les données de chaque joueur·se.
- Les jetons *Keiwi* ☺ matérialisent la richesse sociale.

Mise en place

1. Mélangez les cartes, et distribuez-en 5, face cachée, à chaque joueur·se, pour constituer leur main.
2. Formez une pile, face cachée, avec les cartes restantes, et posez-la au centre de la table. Elle sera la pile de pioche.
3. Chaque joueur·se choisit et prend une des quatre couleurs de jetons *Data* (/ / /).
4. Déterminez le·la premier·ère joueur·euse. Puis, jouez à tour de rôle en tournant dans le sens horaire.

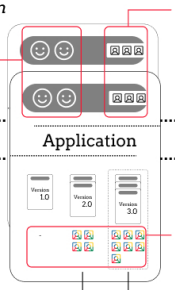
A votre tour

1. Tirez 3 cartes de la pioche et ajoutez-les à votre main.
2. Réalisez 3 actions. Il y a 3 types d'action possibles :
   a. Développer une *Application*.
   b. Jouer une carte *Action* ou *Activité*.
   c. Défausser une carte.
3. Les autres joueur·se·s peuvent utiliser vos *Applications*. Iels reçoivent des jetons *Keiwi* et vous donnent des jetons *Data* de leur couleur choisie au départ. Le nombre de jetons dépend de l'*Application* et de sa Version.
   (-> voir au verso)
4. Terminez votre tour.

Utiliser une *Application*

L'utilisateur·rice prend de la boite le nombre de jetons *Keiwi* présent sur les deux cartes (ici 4 jetons *Keiwi*).

L'utilisateur·rice donne au propriétaire de l'*Application* le nombre de jetons *Data* présent sur les deux cartes (ici 6 jetons *Data*).



Nom de l'*Application*

Développer une *Application*

Commencez une nouvelle application en plaçant une carte Application devant vous.

Développez la Version 2.0 de l'application en plaçant une deuxième carte Application dans la colonne.

Pour développer les différentes versions d'une *Application*, vous devez avoir collecté un nombre requis de jetons *Data* d'autres joueur·se·s.

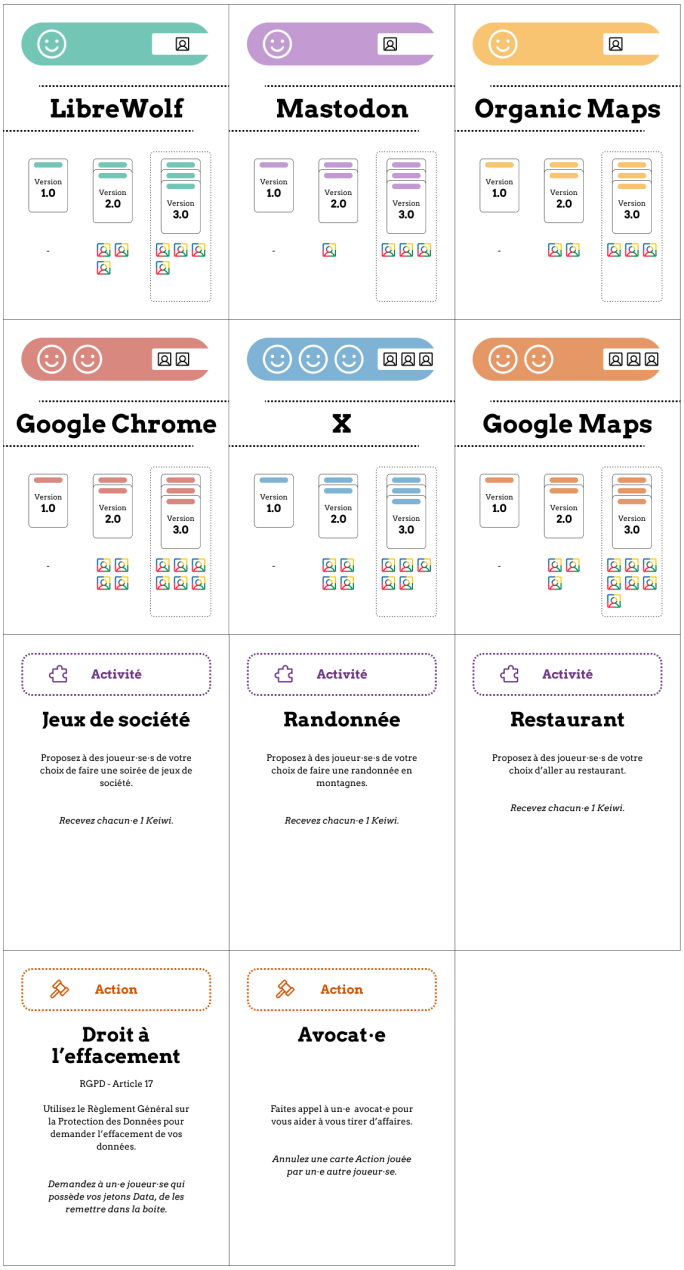
L'*Application* est complète lorsque sa Version 3.0 est développée.

Keiwi

Les Règles du Jeu -->

Pour 3 à 4 joueur·se·s

Game rules (1st version).



Game cards (1st version).

Bienvenue dans Keiwi !

Ici, vous développez vos *Applications* et vous utilisez les *Applications* des autres joueur·se·s.

Vous recevez des *Keiwi* lorsque vous utilisez les *Applications* des autres. Cependant, vous leur donnez des *Data* en retour.

La collection des *Data* des autres joueur·se·s vous permet de développer les Versions 2.0 et 3.0 de vos *Applications*.

Éléments du jeu

- Les **cartes *Application***.
- Les **cartes *Action***.
- Les **cartes *Activité***.
- Les **jetons *Data*** matérialisent les données personnelles de chaque joueur·se.
- Les **jetons *Keiwi*** matérialisent la richesse sociale de chaque joueur·se.

Mise en place

1. Mélangez les cartes, et distribuez-en 5, face cachée, à chaque joueur·se, pour constituer leur main.
2. Formez une pile, face cachée, avec les cartes restantes, et posez-la au centre de la table. Elle sera la pile de pioche.
3. Chaque joueur·se choisit et prend une des quatre couleurs de jetons *Data* (/ / /).
4. Déterminez le·la premier·ère joueur·euse. Puis, jouez à tour de rôle en tournant dans le sens des aiguilles d'une montre.

À votre tour

1. **Réalisez 1 à 3 action(s).** Il existe quatre types d'actions au choix. (a. / b. / c. / d.) Vous pouvez réaliser plusieurs fois la même action.
   - a. **Placez une carte *Application*** devant vous pour développer l'*Application*. (Voir au verso ->)
   - b. **Utilisez une *Application*** d'un·e autre joueur·se pour recevoir des *Keiwi*. (Voir au verso ->)
   - c. **Jouez une carte *Action*** ou ***Activité***.
   - d. **Défaussez** une ou plusieurs cartes.
2. **Terminez votre tour avec 5 cartes.** Piochez pour compléter votre main à 5 cartes. Puis, terminez votre tour.

But du jeu

La partie prend fin lorsque la pile de pioche est vide.

Les joueur·se·s comptabilisent leurs points en suivant le **Comptage des points.**

Celui·celle avec le plus de points remporte la partie !

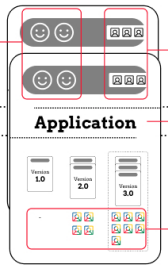
Comptage des points

- Chaque *Application* à la Version 1.0 **+ 1 point**.
- Chaque *Application* à la Version 2.0 **+ 3 points**.
- Chaque *Application* à la Version 3.0 **+ 7 points**.
- Chaque *Keiwi* **+ 2 points**.

Utiliser l'*Application* d'un·e autre joueur·se

Prenez de la boite le nombre de jetons *Keiwi* présent sur sa colonne de cartes *Application* (ici, 4 jetons *Keiwi*).

Donnez à le·la propriétaire de l'*Application* le nombre de jetons *Data* présent sur sa colonne de cartes *Application* (ici, 6 jetons *Data*).



Nom de l'*Application*

Développer son *Application*

Placez une carte Application devant vous pour commencez la Version 1.0 de celle-ci.

Développez les Versions 2.0 et 3.0 de l'*Application*, en plaçant une deuxième et une troisième carte de la même couleur sur la colonne.

ATTENTION, vous ne pouvez pas avoir plus de **3 colonnes** de cartes *Application* devant vous !

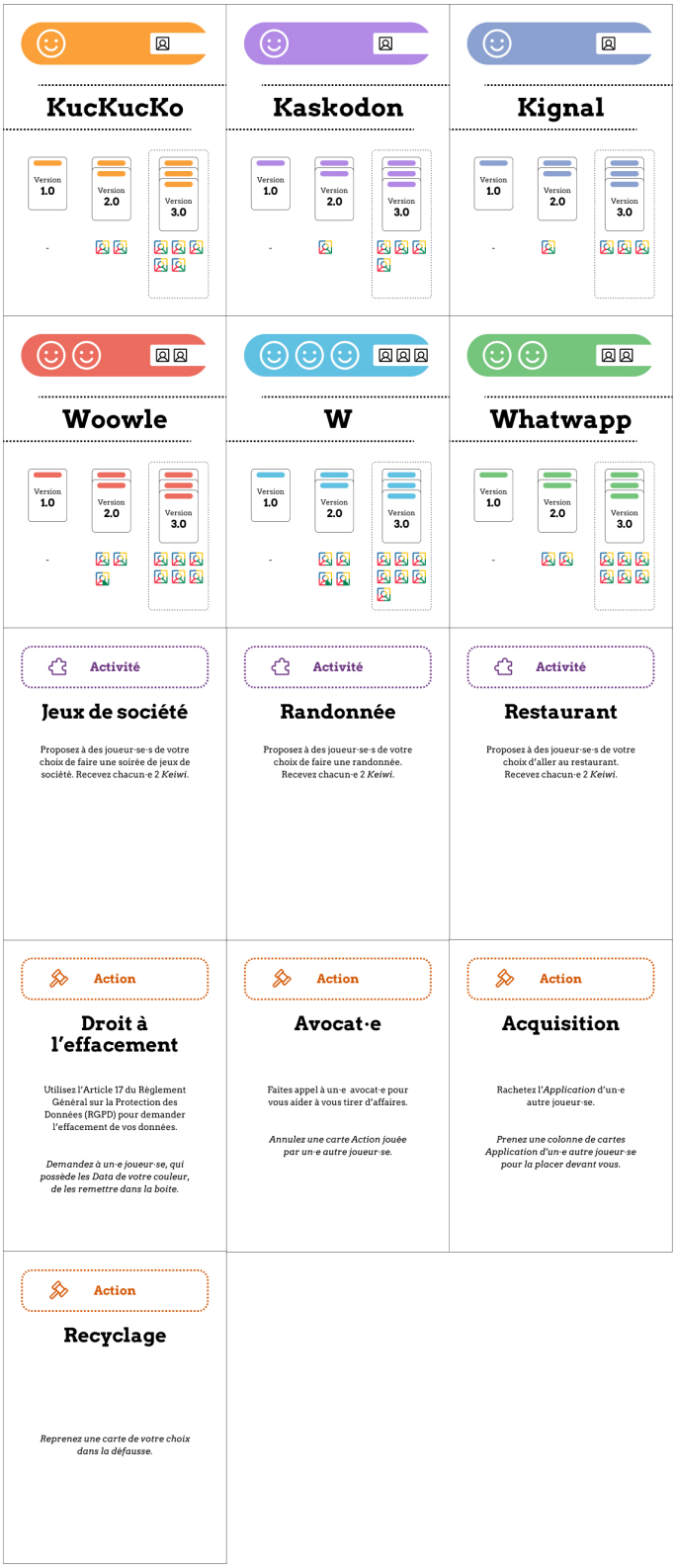
Remettez dans la boite le nombre correspondant de *Data* collectées des autres joueur·se·s pour développer les prochaines Versions de l'*Application*.
(Ici, vous devez utiliser 2 *Data* d'autres joueur·se·s pour développer la Version 2.0, et 6 *Data* pour la Version 3.0.)

Keiwi

Les Règles du Jeu -->

Pour 3 à 4 joueur·se·s

Game rules (2nd version).



Game cards (2nd version).

Bienvenue dans Keiwi !

Ici, validez des *Missions* et développez des *Applications* pour récolter des points qui vous mèneront la victoire !

Utilisez les *Applications* des autres pour valider vos *Missions*, mais en échange, donnez leur vos *Data*.

En même temps, collectez les Data des autres afin d'améliorer vos *Applications* en Versions 2.0 et 3.0.

But du jeu

La partie se termine une fois que chaque joueur·se a joué 4 tours.

Les joueur·se·s comptabilisent leurs points en suivant le **Comptage des points.**

Celui·celle avec le plus de points remporte la partie !

Comptage des points

- Chaque *Application* à la Version 1.0 **+ 2 points**.
- Chaque *Application* à la Version 2.0 **+ 6 points**.
- Chaque *Application* à la Version 3.0 **+ 12 points**.
- Chaque *Mission* remplie **+ 2 points**.

Mise en place

1. Chaque joueur·se choisit et prend une couleur de jetons *Data* (/ / /).
2. Mélangez les cartes, et distribuez-en 5, face cachée, à chaque joueur·se, pour constituer leur main.
3. Chaque joueur·se regarde sa main à l'abri des regards des autres.
4. Formez une pile, face cachée, avec les cartes restantes, et posez-la au centre de la table. Elle sera la pile de pioche.
5. Déterminez le·la premier·ère joueur·se. (Par exemple, celui·celle avec le moins de temps d'écran.) Puis, jouez à tour de rôle en tournant dans le sens des aiguilles d'une montre.

À votre tour

1. Jouez 1 à 3 carte(s) de votre main.
2. Si vous le souhaitez, défaussez une ou plusieurs carte(s) de votre main.
3. Tirez des nouvelles cartes de la pioche pour avoir 5 cartes à la fin de votre tour.

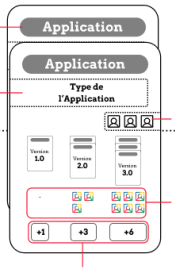
Jouer une carte

- Carte *Application* : placez-la devant vous (-> voir au verso).
- Carte *Mission* : validez la *Mission* et formez une pile devant vous avec toutes les *Missions* remplies.
- Carte *Activité* : suivez les instructions sur la carte.
- Carte *Action* : suivez les instructions sur la carte.

Utiliser l'*Application* d'un·e autre joueur·se

Nom de l'*Application*

Type de l'*Application*. Certaines *Missions* peuvent être validées en utilisant cette Application.



Donnez à le·la propriétaire de l'*Application* le nombre de jetons *Data* nécessaire. Mettez ces jetons au dessus de sa colonne de cartes. Les Data collectées sont propres à chaque *Application*. (ici, 3 jetons *Data*).

Remettez dans la boite le nombre correspondant de *Data* collectées *par cette Application* auprès des autres joueur·se·s pour développer les prochaines Versions de celle-ci. (Ici, vous devez utiliser 3 *Data* d'autres joueur·se·s pour développer la Version 2.0, et 6 *Data* pour la Version 3.0.)

A la fin de la partie, obtenez le nombre de points correspondant à la Version de l'*Application*.

Développer son *Application*

Placez une carte *Application* devant vous pour commencer la Version 1.0 de celle-ci.

Développez les Versions 2.0 et 3.0 de l'*Application*, en plaçant une deuxième et une troisième carte de la même couleur sur la colonne.

Keiwi

Les Règles du Jeu -->

Pour 3 à 4 joueur·se·s

Game rules (3rd version).

Game cards (3rd version).

Bienvenue dans Influo !

Ici, développez des *Applications* et validez des *Missions* pour récolter le maximum de points !

Utilisez les *Applications* des autres pour valider vos *Missions*, mais en échange, donnez leur vos *Data*.

En même temps, collectez les *Data* des autres pour améliorer vos *Applications* en Versions 2.0 et 3.0.

Fin de la partie

La partie prend fin lorsque la pile de pioche est vide.

Les joueur·se·s comptabilisent leurs points en suivant le **Comptage des points.**

Celui·celle avec le plus de points remporte la partie !

Comptage des points

- Chaque *Application* à la Version 1.0 : **+1 point**.
- Chaque *Application* à la Version 2.0 : **+3 points**.
- Chaque *Application* à la Version 3.0 : **+6 points**.
- Chaque *Mission* remplie : **+1 point**.

Mise en place

1. Chaque joueur·se choisit et prend une couleur de jetons *Data* (/ / /). Ceux-ci représentent les données personnelles de chaque joueur·se.
2. Mélangez les cartes, et distribuez-en 5, face cachée, à chaque joueur·se, pour constituer leur main.
3. Chaque joueur·se regarde sa main à l'abri des regards des autres.
4. Formez une pile, face cachée, avec les cartes restantes, et posez-la au centre de la table. Elle sera la pile de pioche.
5. Déterminez le·la premier·ère joueur·se (par exemple, celui·celle avec le plus de temps d'écran). Puis, jouez à tour de rôle en tournant dans le sens des aiguilles d'une montre.

À votre tour

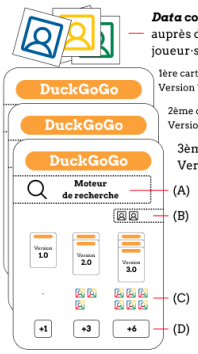
1. **Jouez au maximum 3 cartes** de votre main.
2. Si vous le souhaitez, **défaussez** une ou plusieurs carte(s) de votre main. Puis, tirez des nouvelles cartes de la pioche pour **avoir 5 cartes en main**.
3. **Terminez** votre tour.

Jouer une carte

- Carte ***Application*** : placez-la devant vous (-> voir l'exemple au verso).
- Carte ***Mission*** : validez la *Mission* et gardez-la devant vous pour le Comptage des points à la fin de la partie.
- Carte ***Action*** ou ***Activité*** : suivez les instructions sur la carte.

La suite au verso... -->

Exemple d'*Application*



Utiliser l'*Application* d'un·e autre joueur·se

(A) Utilisez l'*Application* d'un·e autre joueur·se pour **valider vos *Missions***.

(B) Pour cela, mettez le nombre requis de jetons *Data* de votre couleur devant cette *Application*.

Dans l'exemple, mettez 2 Data de votre couleur devant l'Application DuckGoGo pour utiliser celle-ci, et ainsi remplir votre Mission Moteur de recherche.

Développer son *Application*

Version 1.0 : Placez une 1ère carte *Application* devant vous.

ATTENTION : Vous ne pouvez PAS développer une *Application* qui est déjà présente sur la table.

Version 2.0 & **Version 3.0** : Placez une 2ème et une 3ème carte *Application* IDENTIQUE à la 1ère sur la colonne, et **(C)** remettez dans la boite le nombre requis de *Data* collectées par cette *Application* auprès des autres joueur·se·s.

Dans l'exemple, remettez 3 Data collectées pour développer la Version 2.0, et 6 Data collectées pour la Version 3.0.

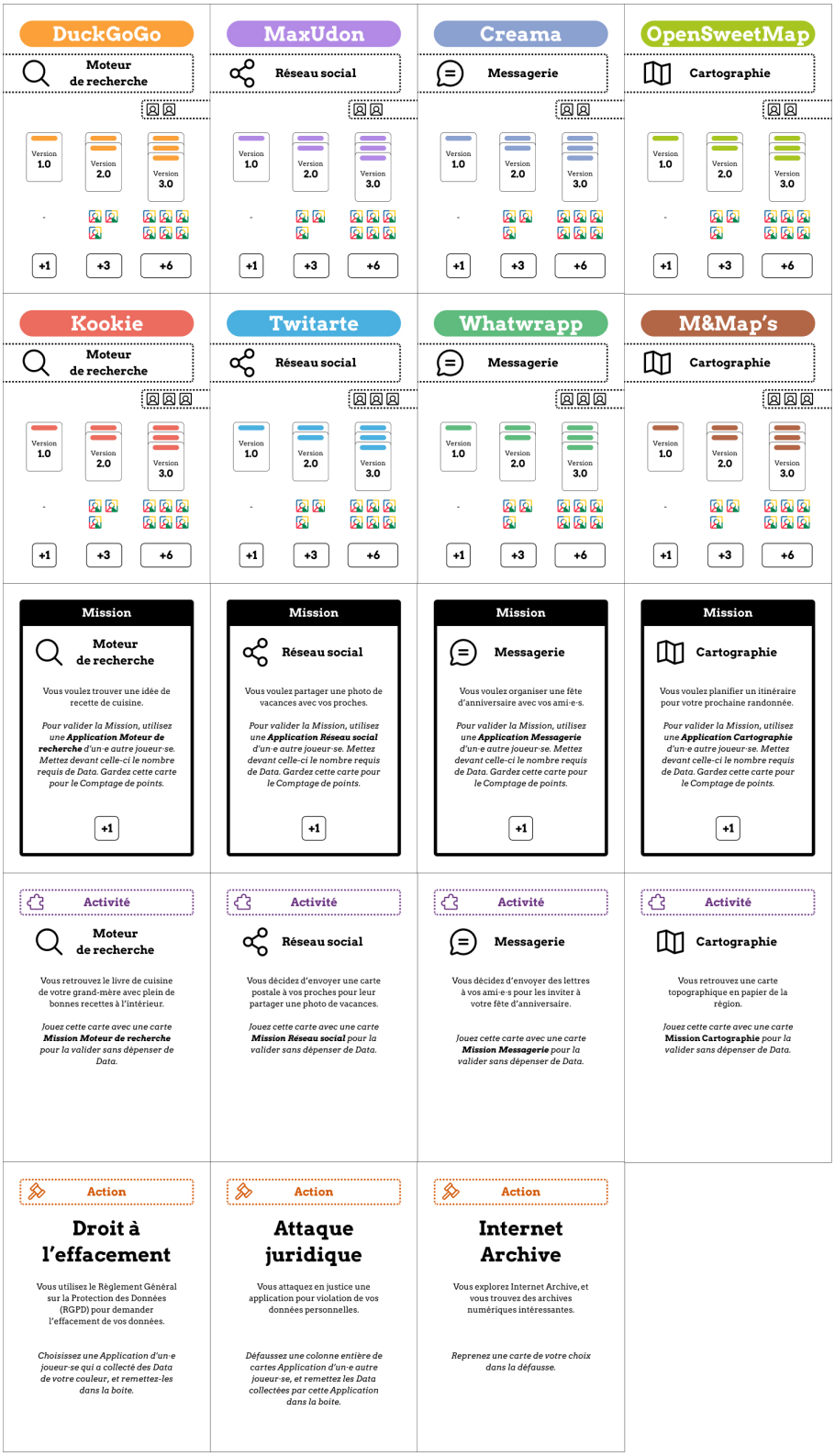
(D) À la fin de partie, obtenez le nombre de points correspondant à la Version.

Influo

Les Règles du Jeu -->

Pour 3 à 4 joueur·se·s

Game rules (4th version).



Game cards (4th version).

Bienvenue dans Keiwi !

Ici, développez des *Applications* et validez des *Missions* pour récolter le maximum de points !

Utilisez les *Applications* des autres pour valider vos *Missions*, mais en échange, donnez leur vos *Data*.

En même temps, collectez les *Data* des autres pour améliorer vos *Applications* en Versions 2.0 et 3.0.

Fin de la partie

La partie prend fin lorsque la pile de pioche est vide.

Les joueur·se·s comptabilisent leurs points en suivant le **Comptage des points.**

Celui·celle avec le plus de points remporte la partie !

Comptage des points

- Chaque *Application* à la Version 1.0 : **+1 point**.
- Chaque *Application* à la Version 2.0 : **+3 points**.
- Chaque *Application* à la Version 3.0 : **+6 points**.
- Chaque *Mission* remplie : **+1 point**.

Mise en place

1. Chaque joueur·se choisit et prend une couleur de jetons *Data* (/ / /). Ceux-ci représentent les données personnelles de chaque joueur·se.
2. Mélangez les cartes, et distribuez-en 5, face cachée, à chaque joueur·se, pour constituer leur main.
3. Chaque joueur·se regarde sa main à l'abri des regards des autres.
4. Formez une pile, face cachée, avec les cartes restantes, et posez-la au centre de la table. Elle sera la pile de pioche.
5. Déterminez le·la premier·ère joueur·se (par exemple, celui·celle avec le plus de temps d'écran). Puis, jouez à tour de rôle en tournant dans le sens des aiguilles d'une montre.

À votre tour

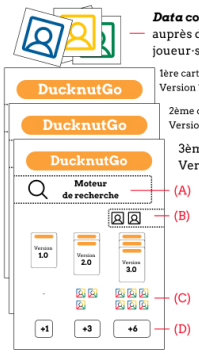
1. **Jouez au maximum 3 cartes** de votre main.
2. Si vous le souhaitez, **défaussez** une ou plusieurs carte(s) de votre main. Puis, tirez des nouvelles cartes de la pioche pour **avoir 5 cartes en main**.
3. **Terminez** votre tour.

Jouer une carte

- Carte ***Application*** : placez-la devant vous (-> voir l'exemple au verso).
- Carte ***Mission*** : validez la *Mission* et gardez-la devant vous pour le Comptage des points à la fin de la partie.
- Carte ***Action*** ou ***Activité*** : suivez les instructions sur la carte.

La suite au verso... -->

Exemple d'*Application*



Utiliser l'*Application* d'un·e autre joueur·se

(A) Utilisez l'*Application* d'un·e autre joueur·se pour **valider vos *Missions***.

(B) Pour cela, mettez le nombre requis de jetons *Data* de votre couleur devant cette *Application*.

Dans l'exemple, mettez 2 Data de votre couleur devant l'Application DucknutGo pour utiliser celle-ci, et ainsi remplir votre Mission Moteur de recherche.

Développer son *Application*

Version 1.0 : Placez une 1ère carte *Application* devant vous.

ATTENTION : Vous ne pouvez PAS développer une *Application* qui est déjà présente sur la table.

Version 2.0 & **Version 3.0** : Placez une 2ème et une 3ème carte *Application* IDENTIQUE à la 1ère sur la colonne, et **(C)** remettez dans la boite le nombre requis de *Data* collectées par cette *Application* auprès des autres joueur·se·s.

Dans l'exemple, remettez 3 Data collectées pour développer la Version 2.0, et 6 Data collectées pour la Version 3.0.

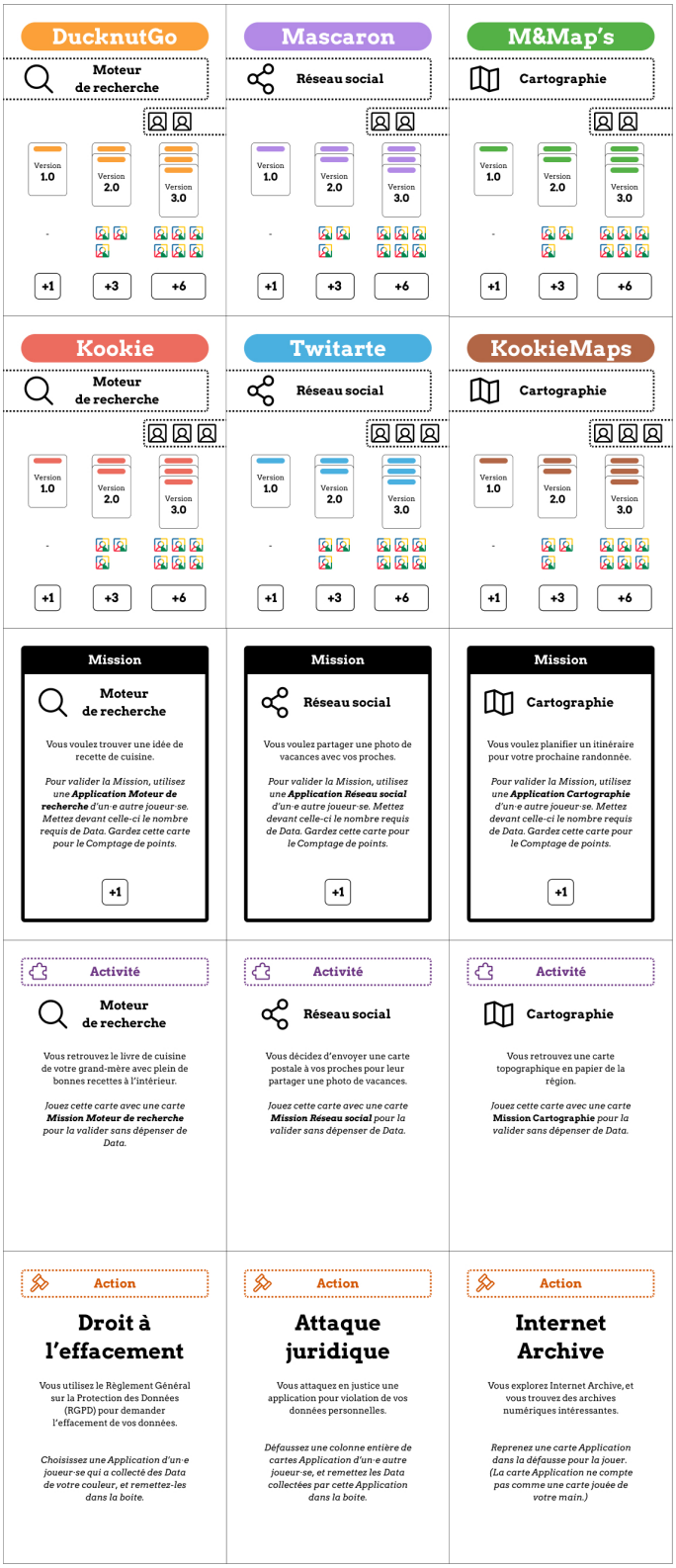
(D) À la fin de partie, obtenez le nombre de points correspondant à la Version.

Keiwi

Les Règles du Jeu -->

Pour 3 à 4 joueur·se·s

Game rules (5th version).



Game cards (5th version).

Bienvenue dans Keiwi !

Ici, développez des *Applications* et validez des *Missions* pour récolter le maximum de points !

Utilisez les *Applications* des autres pour valider vos *Missions*, mais en échange, donnez leur vos *Data*.

En même temps, collectez les *Data* des autres pour améliorer vos *Applications* en Versions 2.0 et 3.0.

Mise en place

1. Chaque joueur·se choisit et prend une couleur de jetons *Data* (/ / /). Ceux-ci représentent les données personnelles de chaque joueur·se.
2. Mélangez les cartes, et distribuez-en 5, face cachée, à chaque joueur·se, pour constituer leur main.
3. Chaque joueur·se regarde sa main à l'abri des regards des autres.
4. Formez une pile, face cachée, avec les cartes restantes, et posez-la au centre de la table. Elle sera la pile de pioche.
5. Déterminez le·la premier·ère joueur·se (par exemple, celui·celle avec le plus de temps d'écran). Puis, jouez à tour de rôle en tournant dans le sens des aiguilles d'une montre.

À votre tour

1. **Jouez** au maximum 2 cartes de votre main.
2. **Défaussez** au maximum 2 cartes de votre main.
3. **Piochez** pour compléter votre main à 5 cartes.
4. **Terminez** votre tour.

Jouer une carte

- Carte ***Application*** : placez-la devant vous (-> voir l'exemple au verso).
- Carte ***Mission*** : validez la *Mission* et gardez-la devant vous pour le Comptage des points à la fin de la partie.
- Carte ***Action*** ou ***Activité*** : suivez les instructions sur la carte.

Fin de la partie

La partie prend fin dès que la dernière carte de la pioche a été tirée.

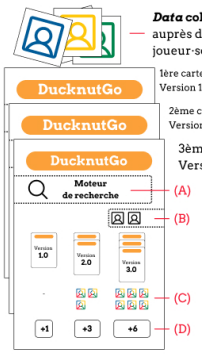
Comptabilisez vos points en suivant le **Comptage des points.** Celui·celle avec le plus de points remporte la partie !

Comptage des points

- Chaque *Application* à la Version 1.0 : **+ 1 point**.
- Chaque *Application* à la Version 2.0 : **+ 3 points**.
- Chaque *Application* à la Version 3.0 : **+ 6 points**.
- Chaque *Mission* remplie : **+ 1 point**.

La suite au verso... -->

Exemple d'*Application*



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Utiliser l'*Application* d'un·e autre joueur·se

Utilisez l'*Application* d'un·e autre joueur·se **pour valider vos *Missions***.
(A) *Exemple : Utilisez l'Application DucknutGo pour valider une Mission Moteur de recherche.*

Pour cela, **mettez le nombre requis de *vos Data*** devant cette *Application*.
(B) *Exemple : Mettez 2 Data de votre couleur à l'Application DucknutGo pour l'utiliser.*

Par la suite, ces *Data* collectées par l'*Application* pourront être utilisées pour développer ses nouvelles Versions.

-->

Développer son *Application*

Version 1.0 : Placez une 1ère carte *Application* devant vous.

ATTENTION : Vous ne pouvez pas développer une *Application* qui est déjà présente sur la table.

Version 2.0 & **Version 3.0** : Placez une 2ème et une 3ème carte *Application* identique à la 1ère sur la colonne, et **remettez dans la boite le nombre requis de *Data* collectées** par cette *Application* auprès des **autres joueur·se·s**.
(C) *Exemple : Remettez 3 Data collectées pour développer la Version 2.0, puis 6 Data collectées pour la Version 3.0.*

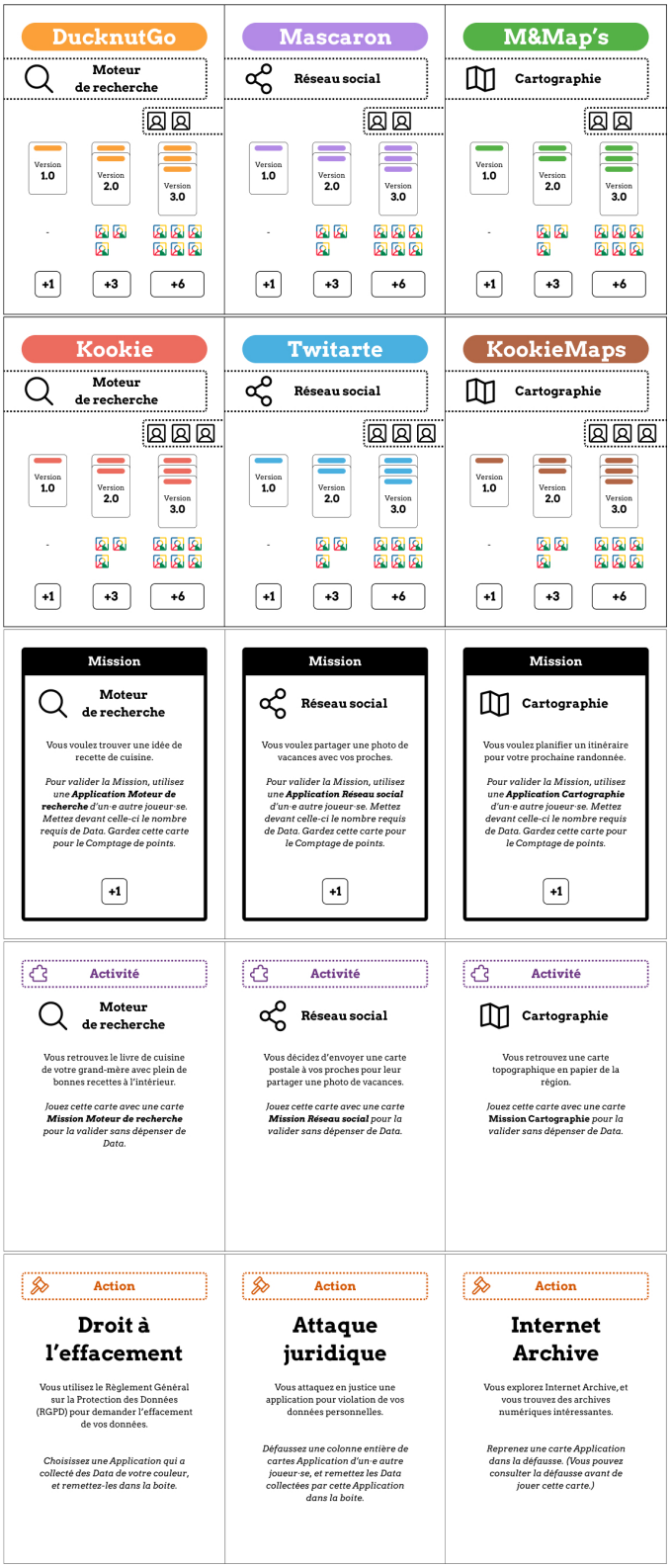
(D) À la fin de partie, obtenez le nombre de points correspondant à la Version.

Keiwi

Les Règles du Jeu -->

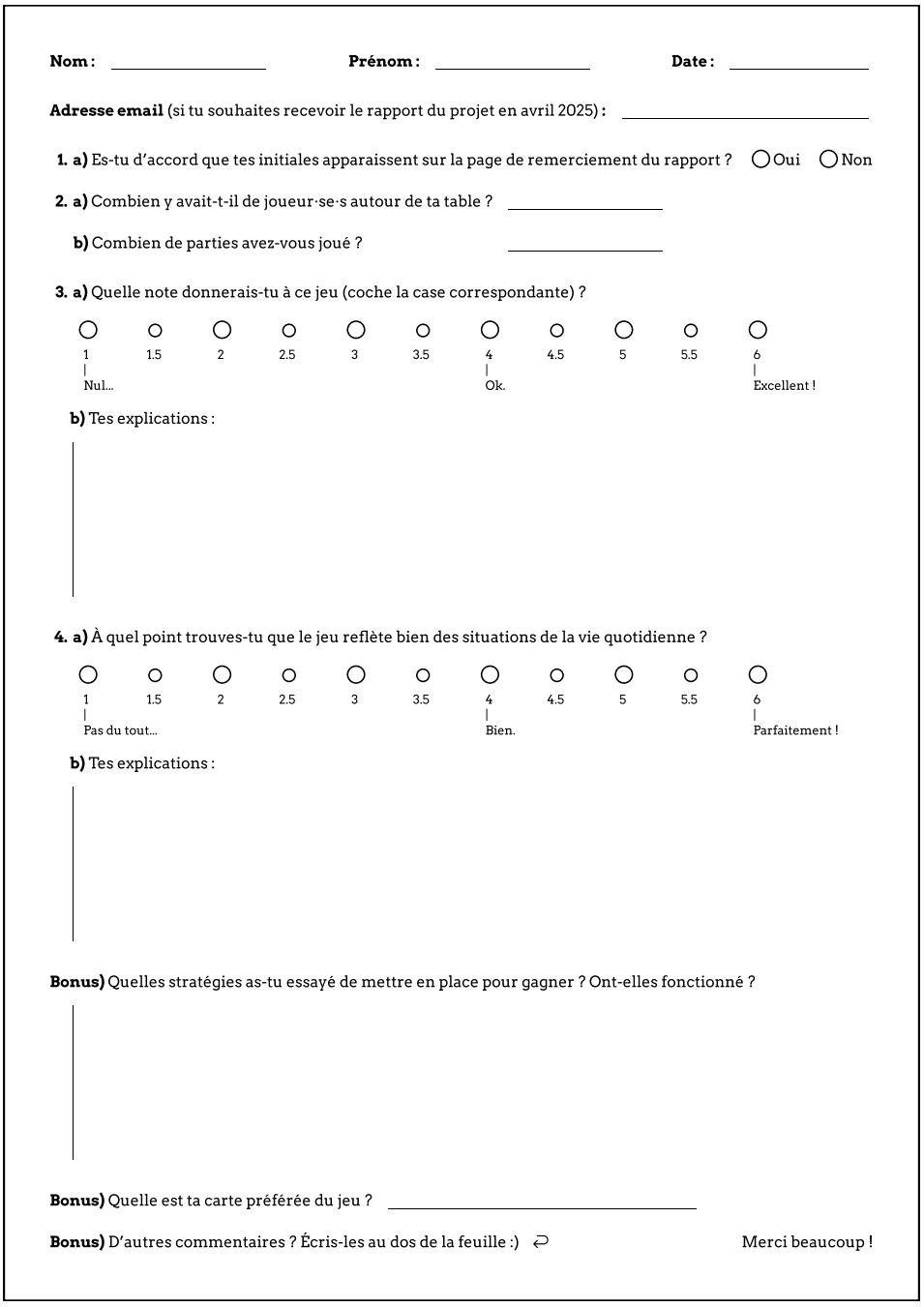
Pour 3 à 4 joueur·se·s

Game rules (6th version).



Game cards (6th version).

C Questionnaire



Nom : _____ **Prénom :** _____ **Date :** _____

Adresse email (si tu souhaites recevoir le rapport du projet en avril 2025) **:** _____

1. a) Es-tu d'accord que tes initiales apparaissent sur la page de remerciement du rapport ? ◯ Oui ◯ Non

2. a) Combien y avait-t-il de joueur·se·s autour de ta table ? _____

b) Combien de parties avez-vous joué ? _____

3. a) Quelle note donnerais-tu à ce jeu (coche la case correspondante) ?

◯ 1 (Nul...) ◯ 1.5 ◯ 2 ◯ 2.5 ◯ 3 ◯ 3.5 ◯ 4 (Ok.) ◯ 4.5 ◯ 5 ◯ 5.5 ◯ 6 (Excellent !)

b) Tes explications :

4. a) À quel point trouves-tu que le jeu reflète bien des situations de la vie quotidienne ?

◯ 1 (Pas du tout...) ◯ 1.5 ◯ 2 ◯ 2.5 ◯ 3 ◯ 3.5 ◯ 4 (Bien.) ◯ 4.5 ◯ 5 ◯ 5.5 ◯ 6 (Parfaitement !)

b) Tes explications :

Bonus) Quelles stratégies as-tu essayé de mettre en place pour gagner ? Ont-elles fonctionné ?

Bonus) Quelle est ta carte préférée du jeu ? _____

Bonus) D'autres commentaires ? Écris-les au dos de la feuille :) ⮐ Merci beaucoup !

Questionnaire. A paper questionnaire was distributed at the end of in-class playtest sessions to gather feedback from students.