Bachelor of Science Thesis Creative Technology

EDUCATION ABOUT RISKS

FOR PEOPLE IN A HURRY

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ABSTRACT

Even though contemporary society offers a high level of security due to technological advancements, it is generally recognised that risk is the element that characterises it more than any other. In the hyperconnected and global society in which we live, risks also become global and can come from afar. Anxiety and stress affect every age group, particularly young people. Therefore, it is essential to develop a new form of literacy which can create a profound and deep-rooted risk culture within organisations and individuals. This can be achieved by starting to change teaching methods.

Traditional education, delivered by experts and institutions, is no longer sufficient in the era of social media and low attention spans. It is often perceived as dull, difficult and sporadic. The objective of this study is to propose microlearning, a method whose value is now widely recognised, as an alternative approach that can significantly impact and improve learning.

EduRisk aims to contribute to education, especially for young people, by making them more aware of and better equipped to handle risks and opportunities affecting their lives smartly. Thanks to its simple and engaging approach, short and multitasking format, and strategic communication based on the wise use of images, colours, and sounds, EduRisk provides continuous training through easily digestible, bite-sized information.

This research has highlighted some interesting elements. The platform is generally highly appreciated among the users tested, and very few people are familiar with platforms similar to EduRisk. Moreover, the majority of users displayed a lack of awareness about real dangerous situations, cognitive biases and the value of heuristics.

These findings confirm the need for and satisfaction with teaching methods that better suit the new users' needs and could also serve as a basis for future studies.

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TABLE OF CONTENTS

1. INTRODUCTION

In recent years, numerous serious emergencies of human and non-human nature have heavily challenged emergency management bodies and the world's population. In addition, even though technological advancements have improved our lives, work, and health conditions, according to Billotta [1] the perception of living in a risky society is widespread. Therefore, risk has become an element that characterises contemporary society. One of the main fears of today's society is the potential danger associated with technological advancements. In other words, the fear of some things that cause fewer accidents and claim fewer victims is higher than the fear of others with which people live peacefully. This paradox is a characteristic of modern global society.

On the one hand, the advent of new media has created a constant and continuous flow of information that is accessible anywhere and at any time. On the other hand, it has transformed the way people see both the surrounding reality and the potential danger. The complexity of all these events and the speed with which they evolve in space and time generate chaos, even on an emotional level, both resulting in challenges to manage and contain. For this reason, Pola believes [2] that it has become necessary not only to investigate the cognitive and emotional factors involved in risk assessment and decision-making during adverse events but also to educate individuals on how to manage and deal with risks effectively.

The perception of risk changes over time and is influenced not only by subjective elements but also by social context and the media. The media are not mere messengers of danger; they play an active and participatory role in the construction and definition of risky situations. The impact of an accident, for example, not only harms those affected but also affects organisations and people far from the original source. Incorrect or misunderstood communication can even be dangerous, creating unnecessary alarmism. For this reason, organisations and institutions need to invest in risk communication by employing highly specialised professionals who can be a vehicle for good communication through the media. Risk communication can and must become a tool to help citizens make appropriate decisions in terms of acceptance, elimination or reduction of risk both in emergencies and in daily activities.

The relationship between communication and education has been demonstrated empirically. The role of new media in the educational system is increasingly evident. To respond to the need for risk education, new communication methods and approaches need to be adopted in response to rapid technological developments, large amounts of media, and declining levels of individual attention. Microlearning is one of the most interesting online learning trends, as it can respond to the specific needs of educators and students simultaneously.

Using the vast amount and capillarity of the media available today, according to Kohnke [3], microlearning allows individuals to absorb information at their own pace and more efficiently within their daily routines. Its short, mobile-optimized content aligns perfectly with the multitasking preferences of today's individuals. Microlearning platforms can track student progress, identify areas where they excel and where they need improvement, and deliver targeted content and recommendations.

The main objective of this project is, therefore, to implement an innovative educational method focused on risks through the use of microlearning principles to empower and improve the perception and management of risk by non-expert individuals in a hurry. The first step to managing and mitigating risk is being aware of it. In order to accomplish such a goal, this research first explains the background knowledge of risks and risk management. Following that, the concept of microlearning is introduced, including its principles and techniques currently in use. Moreover, this project introduces the concept of Future Thinking, which is presented on the side. Through the simulation of future scenarios, which are currently considered

absurd but could one day become a reality, the user can become aware and confident that the situations that the future holds, even though unexpected and absurd, can be managed.

Once the topics of risks, microlearning, and future thinking were clearly defined, the design phase began. The design process was user-centric and included an effective communication strategy to develop a learning system that, thanks to its characteristics, adapts perfectly to the users' needs and preferences.

Pleasant communication that stimulates curiosity can lead to increased interest and the acquisition of further information on the topic. Thus, the challenge of this research project is to contribute to creating a profound and deep-rooted culture of risk.

Lastly, the results show a general appreciation of the project and may offer suggestions for potential future studies, which are highlighted in the concluding chapter of this thesis.

1.1 Research Questions

This research aims to educate people about risks by using a new learning approach, namely microlearning. The objective is to educate, particularly the younger generations, by carefully analysing the context, enabling them to become more aware and capable of smartly facing the risks and opportunities that significantly impact their lives. This will avoid uninformed decision-making and undesired outcomes, as per Ellis [4]. Traditional education, provided by experts and institutions, is no longer sufficient in the era of social media and low attention spans. It is often dull, complex, demanding and sporadic. What is needed is a new form of communication and education that responds to the needs of new generations and beyond (lifelong learning). That is why microlearning can be a solution. Its value is now widely recognised for the characteristics of its content: snackable, focused, practical, and multiplatform. Thanks to its simple and engaging approach and its short and multitasking format, it can really make a difference. In this way, people can continuously and independently learn through short videos, quizzes, and simulations and are encouraged to use their knowledge and problem-solving skills.

Therefore, the following research question (RQ) and the related sub-questions (SQ) can be formulated to explore this approach further:

RQ: How to provide an effective risk education in a society in a hurry?

- SQ 1: How can microlearning principles be applied to enhance learning about risks effectively?
- SQ 2: What are the main differences between the traditional teaching approach and the one proposed by microlearning in terms of risks?
- SQ 3: How can future thinking and simulation of potential scenarios improve individuals' confidence and their preparedness to face uncertain events of the future?

2. BACKGROUND KNOWLEDGE

2.1 Risk

2.1.1 Definition of Risk

A unique definition of risk does not exist. Many authors made their own definition of "risk". Athearn [5] in his journal, he tried to combine all the different perspectives and found that the first main characteristic, among the various definitions, is the equation between risk and uncertainty. Consequently, it is strictly necessary to refer to the future when risk is mentioned since the doubt concerning a certain situation rises when the outcome is still unknown. Therefore, risk theory consists of addressing the possibility of adverse deviations from expectations. In this context, risk management identifies and analyses current expectations to determine the likelihood, probability, and relevance of deviations from those expectations. Therefore, as reported by Ale [6] in his book, Arnaud [7] stated that probability, uncertainty, and chance are the essence of risk, which implies that risk is a combination of consequences and probabilities. Its magnitude can be calculated as R = p x c, namely chance multiplied by effect. Economics decision-making usually aligns with Arnaud's rule, which states that the acceptability of an activity is closely related to its level of risk. However, when considering the number of deaths or more general issues related to human lives, as history has shown, decision-making is more than just consequences and probabilities. Many factors can be considered when making decisions. Thus, the process of risk management can be condensed into the so-called risk management cycle by van Leeuwen and Hermens [8], as in Figure 1.

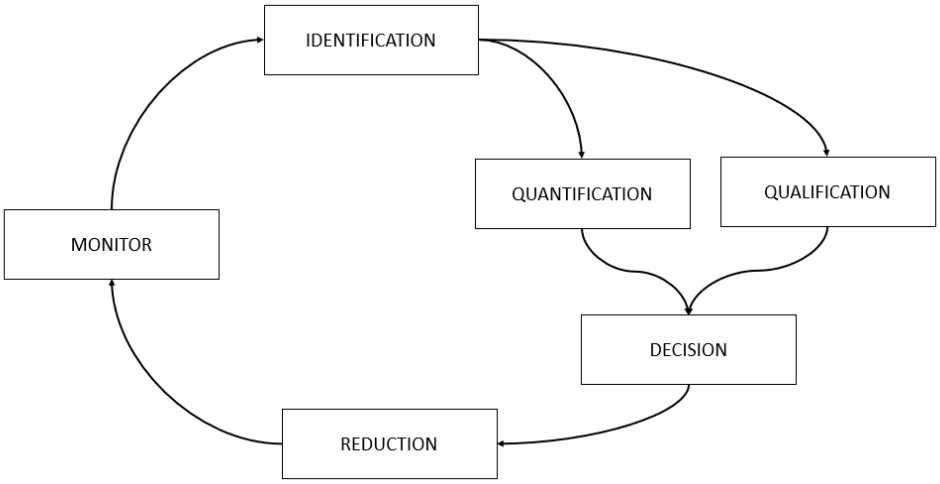

Figure 1: Risk management cycle, Ale [6, p. 6]

The cycle starts as described by Ale [6] with the identification of all potential unfavourable events. Once they have been identified, the quantification and modelling of consequences and probability are processed simultaneously with risk qualification. In this context, qualification stands for determining other attributes that can be associated with the risks of a specific situation and are essential for the decision-making process. Moreover, the magnitude of these attributes is considered and may influence the framing of the decision. Following the finalisation of this task, the information is ready to be used in the decision-making process.

After assessing whether the risk is acceptable or needs to be reduced, the risk is monitored, and based on whether the risk remains acceptable, a new cycle may begin.

Although the decision step is represented only by one block, this is actually the part that takes most of the time and is where most discussion is required. This is because when examining the link between risk and uncertainty, Crowe and Horn [9] asserted that risk is not the cause of uncertainty but instead that uncertainty is the result of the individual's perception of reality. As a result, everyone engaged in risk management needs to understand the importance of their own assessments and how they may affect the outcome. In particular, in such cases where the mathematical proof is, in principle, undefinable, a decision seems more challenging to determine and the theory of expectations by Shackle [10] comes into play. According to this theory, when deciding on a course of action, an individual weighs different possible outcomes considering their "potential surprise". The term surprise is used because Shackle argues that probability estimates do not help make decisions in specific instances. As explained by Athearn, decision theorists are aware that many decisions are based on habit. In other words, it means that when they face a situation that is similar to the previous one, instead of going through the analysis process again, they simply recall what they did on the previous occasions.

Moreover, when thinking about risks, it is unavoidable not to consider safety. According to Maslow [11] [12], safety is one of the basic human needs and generally stands for the condition of being free from danger. In this case, danger and risk are operational terms that must be differentiated. Dangers of hazards refer to those elements that make individuals unsafe, usually related to activities, e.g. driving a car, pollution of the sea, and going up and down ladders. They have two characteristics that need to be considered when analysed, namely defining the nature of the potential damage and the severity level of an event. At the same time, risk represents the entity mainly used to manage hazards. Thus, risk management consists of controlling hazards, and the two components that define it are the probability of occurrence and the magnitude of consequence. This is because decisions are never only based on implications. There is always some degree of probability that influences decisions.

2.1.2 Subjective Risk Assessment

The subjective component of risk is given by the different perceptions that each of us can have concerning the possibility that an adverse event occurs. Therefore, it can be said that risk is objective, but the perception of it is subjective. Lermer et al. [13] have identified various factors, such as cultural background, education, and the context of risk exposure, that are crucial in this subjective process. Slovic [14] pointed out that a discrepancy exists between the subjective perception of risk and the objective assessment in many cases. Consequently, there is a tendency to overestimate or underestimate the risk depending on the level or perceived danger of an activity. However, this perception is often unrelated to statistics and objective evaluations. The complexity of risk assessment lies in the integration of both objective and subjective elements.

In the realm of health-related risks, Coopers [15] emphasised the importance of subjective invulnerability, a psychological concept that incorporates danger and psychological invulnerability. Danger invulnerability involves the belief that health issues are unlikely to occur personally, leading individuals to underestimate associated risks and engage in risky behaviours. Psychological invulnerability refers to being unaffected by others' opinions and judgments, potentially resulting in disregarding consequences and feeling immunity to social pressures. Coopers [15] concluded that these beliefs significantly impact risk-

taking behaviours, particularly among young people who are most likely to decline adult constraints and increase peer exposure.

Cooper [15] highlighted that personal intuition and cognitive biases are among the factors influencing this assessment.

Cognitive biases are systematic errors in reasoning that impact individuals' judgments and viewpoints, resulting in illogical beliefs and choices. The involvement of emotions, personal experiences, and the desire for simplicity is crucial in this scenario. A prevalent cognitive bias in risk evaluation is outcome bias, denoting the inclination to assess a decision's quality based on its result rather than the decision-making process itself, potentially strengthening unjustified confidence in decision-making and adversely affecting future risk evaluations. As reported in FasterCapital [16], favourable outcomes might instil a deceptive sense of assurance, leading individuals to perceive their choice as trustworthy and replicate it subsequently. Conversely, adverse outcomes could prompt individuals to disregard potential drawbacks, causing them to disregard risks and engage in needless risk-taking in the future.

The certainty effect emerges as another prominent cognitive bias in this context, involving a preference for definite and familiar outcomes over uncertain and unfamiliar ones, despite the latter being more favourable. Wit and Meyer [17] highlighted that this bias could lead to suboptimal decision-making in risk management as individuals might favour assured yet suboptimal results over uncertain yet potentially optimal ones.

Intuition is another factor influencing risk assessment, often viewed as a reliable guide, particularly in time-sensitive situations. Nonetheless, intuition can be affected by cognitive biases. Therefore, Wit and Meyer [17] asserted that it might lead to decisions needing a comprehensive analysis of all related information and being subject to biases.

Mitigating intuition and cognitive biases in risk assessment necessitates a strong emphasis on the decision-making process rather than solely on outcomes. As outlined in FasterCapital [16], evaluating the available information at the decision moment and the rationale supporting it is crucial for assessing the decision's integrity rather than focusing on the end result. Wit and Meyer [17] advocated for techniques such as gathering diverse perspectives for constructive debate and slowing down the decision-making pace to gather more information and feedback, aiding in the identification of cognitive errors and the exploration of innovative solutions.

In other words, individuals do perceive risks, but differently. Based on their social and cultural oriented way, they tend to emphasise some risk factors and not others. As a direct consequence, just being aware of the existence of a certain number of probabilities that a given event occurs may not constitute a valid guide to action for the individual. Therefore, subjective risk assessment holds central importance in understanding and managing risks across diverse domains. Given the substantial impact of cognitive biases and intuition on subjective risk assessment, acknowledging and addressing these factors can lead to more informed and efficacious risk management decisions.

2.1.3 Model-based Risk Assessment

Model-based risk assessment is a systematic process for structurally identifying, analysing, and evaluating risks using models or frameworks. This allows organisations to make informed decisions and develop effective risk management strategies.

Murphy claimed that "If anything can go wrong, it will", meaning that if there is a slight chance that something terrible can happen, indeed, sooner or later, it will happen. That is why Ale [6] explained in his book that models are needed to foresee the result of a potential intervention. However, predicting the consequences of causes is not always that easy, especially when the event has yet to happen. This is because reality is always more complex than models.

So far, the tool used to represent the likelihood that events will occur is probability. In general terms, it corresponds to the average value obtained by dividing the total number of specified occurrences by the total number of attempts: $P(A) = N_A/N$. In which $P(A)$ corresponds to the probability of the event A, and N_A is the number of occurrences of A in a total of N events. In this context, a British mathematician named Bayes revolutionised the way of calculating probability by developing a method that combines pre-existing beliefs with new information or observation, thus allowing retrospective research of the causes of an event that has occurred. Considering two events with non-zero probabilities E and F $(P(E), P(F) \neq 0)$, the conditional probability of E versus F will be equal to the product between the conditional probability of F versus E and the probability of E over the probability of F. Translated into a formula, the so-called Bayes formula:

$$P(E|F) = \frac{P(E|F) * P(E)}{P(F)}$$

Many are the risk models that use this approach. One of them is the rigorous fault tree analysis.

Fault Tree Analysis (FTA) is a graphical tool (Figure 2) mainly used in safety and reliability engineering. Reliability engineering is a branch of engineering concerned with establishing methods and techniques to prevent failures during design and operation. Therefore, FTA is designed to understand how systems can fail by identifying causal chains that may lead to an accident and the best ways to reduce risk by describing the logical relationship between events leading to an accident.

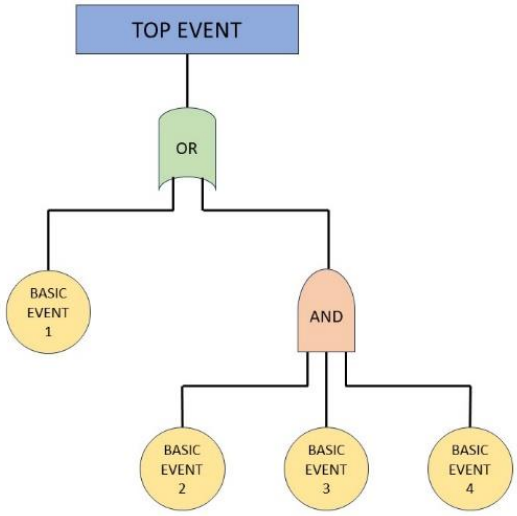

Figure 2: Fault tree.

As reported by Stoelinga and Ruijiters [18], FTA can either be qualitative or quantitative. Qualitative techniques aim at identifying critical paths and components, while quantitative techniques point

to computing different dependability metrics in terms of probabilistic information. Three are the conventional metrics: reliability, availability, and mean time to failure (MTTF). Reliability represents the probability that a system fails within a specific time frame; availability is the average percentage of time that the system is operational; MTTF corresponds to the average time for the system to fail.

The methodology of FTA consists of constructing a tree with a top-down approach, namely starting at the top from an undesired event (top event) and branching down to the causes of that event (basic events), connected through logic gates. In the case of static fault trees, considered the most simple and intuitive types, only Boolean gates are present, like AND, and OR (Figure 3).

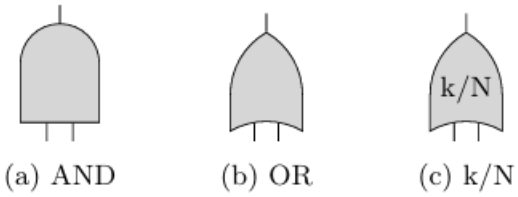

Figure 3: Gates in static fault trees. Retrieved from Stoelinga and Ruijiters [18]

An AND gate fails if all its children fail, while an OR gate fails if at least one of its children fails. The third type of gate, the VOT (k) gate, fails if at least k of its children fail.

Fault trees have become well-known thanks to their many advantages in the decision-making process, as per Stoelinga and Ruijiters [18]. First of all, they significantly aid in graphically comprehending how failures occur within the system and in understanding their root causes. Secondly, FTA improves the design of the system, namely making it more reliable by preventing the top event from happening or reducing its probability. Thirdly, FTA makes it possible to diagnose a fault that happened, thus understanding how it occurred. Furthermore, monitoring risks during operation is possible by reassessing the system vulnerabilities. Lastly, this approach allows systems to comply with the requested requirements by providing provable and traceable evidence, which is mainly helpful in governmental settings. Therefore, all these features make FTA an invaluable tool for complex systems, enabling efficiency and risk mitigation.

2.1.4 Risk Perception and Decision-making

When asked to determine how risky a situation is, people just interpret it in terms of how safe the event is. Continuous discoveries of new hazards, along with the emergence of new technologies, threaten individuals who see themselves more as victims of technology than as beneficiaries of it. Slovic et al. [9] believe this is caused by the public's will to pursue a "zero-risk" society. However, this approach threatens industry promoters and policymakers as a bad influence on the nation's political and economic stability.

Risk perception necessarily finds its roots in basic cognitive psychology. As reported by Slovic et al. [19], based on various laboratory research on perception and cognition, it was found that there are some structural difficulties in understanding probabilistic processes, leading to misjudging risks as well as anxieties. This is because people do not think in terms of probabilities. Individuals are not statically intuitive. People tend to interpret statistical relationships as causal relationships, which leads to a subjective evaluation of the probability and the risk.

The imaginability of future events and the memorability of past events impact risk assessments. That is why Slovic et al. [20] asserted that psychosocial factors influence the interpretation of numerical information, e.g. tending to believe that small samples precisely reflect the population from which they are

drawn. Thus, many are the factors that impact risk perception. Slovic et al. [10] [20] organise them into a two-dimensional scale of awfulness (Figure 4), namely, whether the risk/activity is known and whether some dreads are related to the consequences. In this context, dread stands for the combination of elements with imperceptible impacts. As shown in Figure 2, individuals are more likely to accept a known small loss rather than a large uncertain loss.

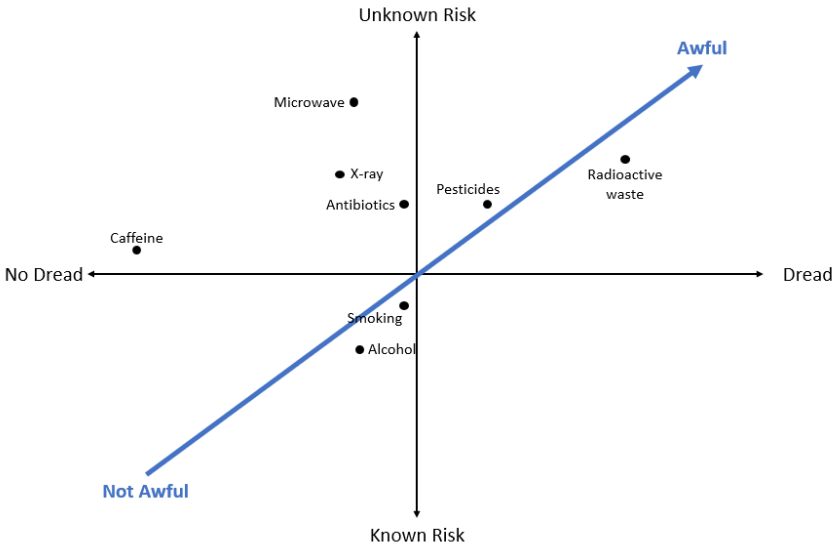

Figure 4: Scale of awfulness, Ale [6, p. 103]

Risk is a societal construct; thus, Ale [6] claimed in his book that it is the society that defines the meaning of risk. In general terms, risk is defined as the combination of probability and consequence. However, its acceptability is never a standalone problem. Therefore, when performing risk analysis, the decision of the metrics is essential for determining the outcome. This phenomenon is called framing. In other words, everything inside the "frame" will be considered, and what is outside the frame will be left out. Tversky and Kahneman [21] believe that the frame adopted by decision-makers is both the result of the problem formulation and their own norms, habits, and personal traits. Therefore, in their study, they found that relatively insignificant changes in the way choice problems are formulated can have a considerably more significant shift of preference. In particular, larger and more systematic effects occurred when the outcomes concerned the loss of human lives or were money-related. In conclusion, according to their finding, when faced with a choice, individuals with a clear preference may change it if the problem is differently framed, are normally uninformed about the alternative frames and their potential compelling attractiveness, wish their preferences were unaffected by the frame, and usually unsure on how to deal with detected inconsistencies. The framing effect also involves the decision-maker, who is supposed to make the best decisions to achieve coherent preferences. However, variations in framing raise concerns about the feasibility and adequacy of the used criteria. Therefore, this phenomenon and its consequences raise ethical concerns.

2.2 Microlearning

2.2.1 The Concept of Microlearning

Microlearning is a continuous personalised educational approach that facilitates adaptive and autonomous learning. According to Kusmana et al. [22], twenty-first-century students consider it one of the best and most popular educational methods. As defined by both Fox [23] and Sankaranarayanan and Mithun [24], it consists of digitally delivering and grouping easily digestible small and bite-sized information. This process is also called "chunking" by Sumarni and Salsabila [25] and is meant to improve learning. As a result, according to Rafiee et al. [26], learners receive micro-content in a time sequence divided into multiple segments, empowering them without being overwhelmed with information on the selected topic. In this way, microlearning facilitates memorisation, as proved by Miller's magical number, which suggests that the short-term memory of an average human can hold 7±2 objects. Thus, this concept aligns with Marcelle and Brahim [27], who proclaimed that the success of microlearning resides in delivering short, skill-based, and just-in-time learning, which is competency-based and immediacy-focused. In this way, they also believe students can gain a deeper understanding of a topic by engaging with various pieces of information and interacting with peers. This is why the development of each learning material is self-contained and independently accessible from other resources. Due to its technological nature, microlearning is more accessible via mobile devices anywhere at any time, thanks to three main characteristics defined by Fidan [28]: short, just-in-time and flash lessons. As stated by Rafiee et al. [26], 91% of the research on self-care capability indicated the significant effectiveness of microlearning.

In the field of language teaching, Duolingo is an example of microleaming, whose success is manifested by the green owl haunting learners if they do not finish the lesson. However, in the entrepreneurial field, initiatives to acquire and train both soft and hard skills of employees are increasing, even with free access. An example is the online training pills on major web platforms such as Google and Facebook. As reported by Italiano [29], one case is that of Fanuc, a company active in the field of industrial automation, which decided to support Italian manufacturing companies by launching a series of free webinars for the training of digital skills and Industry 4.0 through its dedicated Academy.

2.2.2 The Effectiveness of Multimedia Interaction

Researchers in the field of education have recently shown an increased interest in determining the effectiveness of multimedia interaction for promoting microlearning. By providing learning opportunities in various formats and spacing them out over time, Fox [23] believes it is possible to create training that appeals to different learning styles, including Millennials, who are mainly used to having easy access to the resources they need. According to Shaffie Rad [30] and Kusmana et al.'s research [22], improving problem-solving, analytical skills, and creativity can be used for interactive and competency-based activities to involve and encourage the learning process more effectively than passive activities. Due to the application of technological tools, the limited time for learning, and the availability of lectures whenever needed, individuals can participate actively in interactive tasks without getting bored. Therefore, in addition to multimedia content, interactive components like videos, quizzes, and blank questions can increase engagement time, as claimed by Javorcik et al. [31].

Moreover, adopting well-known tools that students are familiar with can improve engagement, participation, and motivation. Conde-Caballero [32] argues, indeed, that students feel more comfortable asking peers questions when social media activities are implemented. As Sumarni and Salsabila [25] proved TikTok, YouTube, and other social media platforms are used by 40% of Gen-Z to obtain relatively short and demandable information. In addition to social media, gamification is the new trend. It consists of applying game-playing principles to unrelated activities and is expected to shape the future of microlearning. Therefore, Marcelle and Brahim [27] believe learners can be motivated and prompted to finish the learning tasks by including game elements in microlearning sessions.

To summarise, microlearning can be a highly effective and engaging educational approach, especially when incorporating interactive elements, social media, and gamification techniques. However, due to the novelty of this approach and its related studies, it is essential to investigate its effectiveness over time, carefully consider the learning outcomes and accordingly design a well-rounded approach that meets the needs of all learners.

2.2.3 Challenges

Despite the promising potentials of microlearning, there are inherent challenges to consider as well, mostly related to the inconsistent findings in the literature regarding the effectiveness of microlearning as a teaching method. Firstly, Sankaranarayanan and Mithun [24] argue that one of the causes could be related to the fact that microlearning in higher education is still a relatively new phenomenon, so additional research should be conducted. Secondly, the process of deconstructing major and complex topics into smaller, comprehensive chunks can be challenging and require special attention, as per Sumarni and Salsabila [25]. Fidan [28] agrees with them by claiming that otherwise, there might be the risk of creating fragmented microlearning content that can lead to distractions by making students concentrate on different things simultaneously. Thirdly, the time duration of each section, according to Marcelle and Brahim [27], is still debatable and dependable on the singular case, as also stated by Tipton [33], “as long as necessary and as short as possible”. Moreover, one of the most significant issues that Fidan [28] pointed out the difficulty of ensuring deep learning while providing small bits of information. Lastly, in order to keep the training relevant, Fox [23] observed that it is necessary to frequently update the content when incorporating components such as hands-on, real-world activities and virtual learning options.

In conclusion, microlearning offers a promising approach to overcoming the many obstacles to the learning process, as long as its platforms are developed carefully considering potential challenges and limitations that can impact the effectiveness and efficiency of this approach.

2.3 Future Thinking

2.3.1 The Concept of Future Thinking

Future thinking, as conceptualised by the futurist Jane McGonigal in her book "Imaginable" [34], involves considering multiple possible futures rather than predicting a single outcome: "Future, we usually say with an 's'— 'futures'—so we can keep an open mind to many different things. We're not trying to predict a singular future. We're trying to consider possibilities so we can shape it to be more like the future we want", as reported by Violante [35]. McGonigal highlights the importance of dealing with the concept of "possible futures" in order to shape the future in ways that align with desired outcomes. Her work often involves creating large-scale future simulations that allow participants to experience and reflect on different future scenarios. This helps participants to be prepared and resilient for whatever the future may hold.

2.3.2 Impact on the Learning Process

Future thinking can significantly enhance the learning process by introducing a dynamic and interactive approach to education. As shown by Pawlak and Moustafa's study [36], future-oriented thought improves the learning process by increasing academic engagement and performance. It was shown that individuals with higher levels of future orientation tend to exhibit more classroom attendance, engagement, grade-point average (GPA), and hours of study completed.

Moreover, in her article, Violante [35] stated that McGonigal believes that by incorporating elements of gaming and simulation, learners are exposed to a variety of future scenarios, encouraging critical thinking, problem-solving, and adaptability skills. These types of activities make learning more engaging and, at the same time, give students the ability to anticipate and respond to changes, preparing them for real-world challenges. The psychological shift that takes place throughout these simulations, from anxiety to readiness and empowerment, underlines the effectiveness of this method in improving educational outcomes.

2.3.3 Expected Outcomes

According to Pawlak and Moustafa [36], the integration of future-oriented thinking in educational curricula, among other aspects highlighted above, presents that of helping enhance decision-making skills. Thinking ahead by predicting risks and planning appropriate strategies improves students' capacities to make wise choices, both in their academic and personal lives. It prepares students to face the complexities of adult life with greater resilience and adaptability.

2.3.4 Relation to Education about Risks

Education about risks is closely related to future thinking. By engaging in future simulations, McGonigal [34] believes that students can gain firsthand experience with various risks, such as pandemics, natural

disasters, and technological disruptions. This experiential learning approach gives them the chance to gain a deeper understanding of the challenges and uncertainties associated with these circumstances. Moreover, it promotes a proactive attitude towards risk management, encouraging students to seek out opportunities for preparation and adaptation actively. Through future thinking, education about risks becomes less about fearing the unknown and more about embracing it as a source of growth and innovation.

Additionally, the process of participating in future simulations can lead to increased optimism and a sense of readiness among participants. As they navigate through simulated scenarios, they become more confident in their ability to handle real-world challenges, which improves both individual and societal preparation. McGonigal's creative process of designing simulation, according to Violante [35], starts by writing scenarios as if they were a script for a video game. Considering a general decline in attention levels, the adoption of detailed future and imaginary scenarios, as in a large collective game, is stimulating and engaging and involves an interactive education more responsive to the changing needs and preferences of the new generations.

2.4 State of the Art

Risk Education

In today's society, according to Russel [37], the concepts of risk, risk analysis, risk management, and risk-based decision-making are widespread. In a world with rapid changes due to emerging technological features, there is an evident need to include the study of risk in the students' curricula. "Students need to 'survive' in our 'risk-driven' world." [37]

The state-of-the-art "Education about risks" comprehends various approaches to teaching and learning about multiple risks, such as environmental, health, safety, financial, and technological. The main goal of this education is to provide people with the needed knowledge and skills to recognise, assess, and effectively manage risks.

Firstly, as per Schenk et al. [38], risk identification and assessment include teaching students how to identify potential risks and assess their probability and impact. It involves critical thinking and problem-solving skills.

Secondly, Borovcnik [39] asserted that risk management strategies provide learners with diverse strategies for managing risks, such as mitigation, avoidance, transfer, and acceptance, as well as the understanding of the trade-offs between different risk management approaches. Technology and its tools may also be useful, such as risk assessment software and simulation models, to improve the learning experience and keep it up to date.

In addition, as stated by Rizvi [40], ethical considerations must be made in the field of risk management, such as finding the balance between safety and freedom and determining the impact of different decisions on the stakeholders.

The evident need to research new approaches to improving the effectiveness of risk education means that the state of the art in risk education is, therefore, in continuous evolution. At the moment, the real meaning of risk and everything related to it remains inconclusive.

A clear example is given in the recent popularity of social network sites (SNS), whose primary users are young people, particularly teenagers. For this reason, this phenomenon has been raising concerns among parents, educators, and researchers about privacy, security, and unsafe and uncontrolled behaviour. However, a substantial gap still exists between the actual concern and the content material generally taught in schools on risk education. Material related to risks, if existent in schools, is usually not theoretically grounded, not directly linked to risks that teenagers may encounter on SNS platforms, and there is a lack of teaching methods to evaluate their effectiveness.

Furthermore, according to Vanderhoven et al., in both their studies [41] [42], it was proved that a skill-based approach to media literacy education is favourable for young learners, with a more significant focus on practical abilities, such as accessing, analysing, evaluating, and creating messages across various contexts.

To summarise, according to the state of the art, while the need to educate people about risks is generally recognised, an evident gap exists between standard school content and educational and communicational materials about risks.

At the European level, according to the European Agency for Safety and Health at Work [43], there is a common idea of including safety and risk education in curricula. At the moment, however, they are not treated as autonomous subjects but are instead part of the learning objectives of other curricular subjects. In some Member States, such as Sweden, risk education is linked to a safe learning environment for teachers

and students and their health at school. Some initiatives promote risk education in schools, helping them improve the safety of their buildings. In some Member States, there is an obligation to appoint representatives for the safety of pupils.

The major challenge is to integrate the culture of risk into university education, where future professionals, such as engineers, architects, doctors, and business managers, are trained and require greater autonomy. Examples of good practice in this area are mainly found in the field of engineering.

Ultimately, actions to integrate risk education into courses are primarily sporadic and incomplete and often depend on the interests of the singular teacher. Teachers, on the other hand, usually perceive this theme of safety as an additional burden on students.

Creating a new culture requires the adoption of new teaching methods adapted to the latest needs of students. It is necessary to speak their language and use the web and mobile devices. In response to rapid technological developments, the wide range of communication channels and the decrease in attention levels, the adoption of new ways of communication and learning approaches is therefore necessary. Traditional lectures, often seen as long, tedious, and discontinuous, can be replaced or accompanied by bits of information through images, videos, and interactive tools that create curiosity and interest. In this way, the student is encouraged to go back to the subject by memorising the topics, with an approach to continuing education.

3. METHODOLOGY

The methodology for developing the education platform about risks through microlearning consists of four main phases: ideation, specification, realisation, and evaluation. This structure is inspired by the design process outlined by Mader and Eggink [44], where a balanced combination of Divergence-Convergence and Spiral models of design practice is emphasised. By following this methodology, the project aims to create a platform where the principles of creative technology and user-centred design are leveraged to ensure its innovative and effective approach to achieving its educational goals.

3.1 Ideation

The ideation phase is the project's foundation, where the initial concept is developed through different steps. Firstly, a problem is identified: *How to engage users in learning about risks through microlearning*. Secondly, background knowledge and state-of-the-art are used to define the starting point. Thirdly, the stakeholders and the requirements of the projects will be determined. In addition, a wide range of ideas will be created through brainstorming sessions that will be refined and developed into a coherent concept later.

3.2 Specification

Following the ideation phase, the specification involves refining the ideas into a detailed plan to formulate functional and non-functional requirements. This includes defining the platform's features, such as the types of videos, the interactive activities provided, and the technologies used to develop the platform.

In this phase, the outline of the user interface and experience design will be presented to ensure the platform's user-friendliness and accessibility to the target audience. This will help set clear objectives and requirements for the development phase.

3.3 Realisation

The realisation phase corresponds to the development phase of the platform. It involves the technical implementation of the features and functionalities and, simultaneously, the creation of the content for the videos and the interactive activities. This process should be aligned with the principles of user-centred design because the platform must meet the needs and preferences of the target audience. In this phase, testing and iterating on the design based on user feedback are included in order to ensure that the platform is compelling and engaging.

3.4 Evaluation

The final phase, namely evaluation, involves determining the platform's effectiveness in achieving its educational objectives. It includes conducting user testing to gather feedback on the platform's usability and efficiency in teaching about risks.

Moreover, in this phase, the platform's impact on the user's knowledge and attitudes towards risk awareness will be analysed, which could be further used for future improvements and iterations.

4. IDEATION

Ideation is the dynamic and collaborative process of generating, developing and perfecting innovative ideas to achieve a precise goal. This creative approach, rooted in brainstorming, intercepts and solves problems, creates innovative products or services and discovers new opportunities for companies and social growth. Ideation is the process that feeds an organisation's culture of innovation. Below are the steps of this process.

Identification of the problem: as already mentioned in the Introduction of this thesis, faced with the emergence of ever-new risks, globalisation of risks and a huge possibility of choice, there is a strong need, especially for young people, to be able to make considered choices. Thus, it is needed to learn to take risks. This can be done by starting to change the teaching method.

State of the art: traditional methods based on lectures, such as long, discontinuous, demanding, and tedious e-learning sessions, are no longer feasible, as extensively explained in Chapter 2.3 of this thesis.

Context Analysis: in the age of the web and social media, a new form of communication/education that responds to the multitasking needs of today's generation is needed.

Creativity and Inspiration: starting from market trends with fellow students, the problem has been evaluated from different perspectives, and many hypotheses have been elaborated, even extravagant and not easy to use.

Critical evaluation: finally, the ideas were evaluated based on feasibility criteria, alignment with the objectives, and the resources and time needed for implementation. The user and their needs have always been at the heart of the process.

4.1 Stakeholder Analysis

Understanding each stakeholder group's needs, expectations, and constraints is necessary to ensure the platform meets its educational and design objectives. Stakeholders can determine a project's success by providing valuable support, resources, and information. Understanding who they are and what they want is, therefore, fundamental for the project's success. Below is the list of the main internal and external stakeholders.

- Students are the platform's primary users, aged 16 to 30. Their interests lie in the availability of engaging the educational content, the variety of available learning formats and ease of access to the platform.
- Educators must ensure the platform's content aligns with their objectives. Their interests include the platform's effectiveness in improving risk education and its flexibility in teaching methods.
- Companies are interested in the platform's potential to improve their employees' risk awareness and decision-making skills. They are concerned with the platform's flexibility in integrating existing systems and its impact on the company's safety and security.
- Government Bodies are interested in the potential platform's ability to support national policies on risk education and safety and its role in addressing societal challenges related to risk management.

They can be concerned about the platform's role in supporting initiatives to increase equity for under-represented groups and in responding to emerging societal challenges.

- Local communities with particular issues may be interested in increasing awareness of the risks typical of their area and individual responsibility in case of disaster. This is the case, for instance, of the areas at risk of flooding, those affected by volcanic eruptions or even those in which an industry dealing with dangerous substances is located.
- The client is the Formal Methods & Tools group at the University of Twente, whose focus is making scientific models and methods to analyse these models. In particular, this graduation project is led by Professor Mariëlle Stoelinga, a member of this group and Professor of Risk Management in High-tech systems. Her research focuses on methods and tools to support risk-taking decision-making. In a hyper-technological and complex society, the risks are also complex. This graduate project starts with this understanding. The aim is to design educational products capable of raising awareness and explaining to individuals the basic concepts of risk.

The Formal Methods & Tools group of the University of Twente, among all of them, is undoubtedly the key stakeholder for the valuable collaboration provided in terms of expertise on the subject and supervision. On the other hand, as a training project, the students are no less important. Being able to support them in orienting themselves in a sea of new risks with a method adapted to their needs is what determines the success and the possibility of the project remaining on the market. The training videos will, therefore, be short, engaging, interactive and mobile-optimised.

With a low level of influence but a high level of interest, there are trainers/educators. The classical school methods with long and tedious frontal lessons nullify their efforts both in educational terms in school institutions and monetary terms in organisations and companies. In the latter case, in particular, the expenditure on training is often significant and fruitless.

4.2 Preliminary Requirements

Based on the stakeholder analysis, it is possible to determine the preliminary requirements as follows:

- Length: as the name implies, the first feature is brevity. Each subsection is meant to be completed in a few minutes. The logic followed is "only if necessary and the shortest possible".
- Focus: each subsection provides 1—to 2-minute videos and an answer focused on a single topic or question.
- Variety: content types are diverse and include videos, presentations, interactions, scenarios, assessments, text-based practice guides and short online lessons.
- Interface: accessible and intuitive.
- Implementation and customisation: simple in order to allow educators to tailor the content to their specific needs and contexts.
- Feedback tools: allowing users to recognise their strengths and weaknesses.
- Mobile-friendly: micro-content must be accessible when needed. This makes microlearning a great way to learn on a smartphone or tablet, even during breaks.

4.3 Brainstorming Process

There were two brainstorming sessions in the ideation process.

Brainstorming Session One

The first one started by presenting the general topic and stating the problem, namely how to engage young people in learning about risks.

The starting idea was to develop a standard minicourse similar to the online training offered on GoodHabitz. They usually include features like bite-sized lessons, interactive quizzes, and the ability to track progress and performance. They may also provide various multimedia materials, such as videos, graphics, and audio files, to suit different learning styles. Additionally, they may provide access to instructors or mentors who can offer guidance and support throughout the course. However, implementing a whole course in that style requires a significant amount of materials and time, and it would primarily suit desktop users rather than mobile users. Thus, a different concept was developed with this type of implementation in mind.

One of the prerequisites to satisfy was the style of the videos, which were meant to be short and engaging. Therefore, the first idea was to make videos in TikTok style, namely 1 to 2-minute-long videos, and record them vertically on a full screen. One additional feature that characterises this type of video is the pope-in-the-pool technique, which is believed to make the storytelling way more engaging. According to Snyder [45], it consists of having two things going simultaneously: one is the exposition of the content, and the other is doing something entertaining to distract the audience from noticing that they are being fed exposition. For instance, on TikTok, many people do their make-up while telling a story of whichever type. In this way, they have thousands of views.

Secondly, the TikTok interface was also the inspiration to make the platform interface easy and accessible and, at the same time, mobile-friendly, particularly regarding the feature of scrolling down to watch the following video.

Moreover, various activities that could be entertaining, stimulate curiosity and be suitable for this interface were discussed. The two that mainly emerged were quizzes and interactive real-case scenarios. Instead of asking all the questions at once, placing the questions below each video was suggested to test the understanding of the explained content and prevent users from losing focus. Users would be able to move to the next video only after answering the question, with the correct answer being highlighted once answered. Regarding the scenarios, they would be depicted as a comic where the blank bubble must be filled in with the correct answer by selecting the appropriate option. In this way, the user can better relate to the real-life situation and enhance retention.

The final idea was eventually to implement a mobile application. Figure 5 represents an overview of the complete interactions from a Home Page where it is possible to select the topic for the first section of the video, followed by a quiz. Scrolling down makes it possible to go to the second part of the video and the related question in the same way explained before. At the end of all sections of the video and its questions, a scenario will appear by swiping to the right. By swiping to the left, a page with additional information will be provided if the user is interested in learning more about the topic.

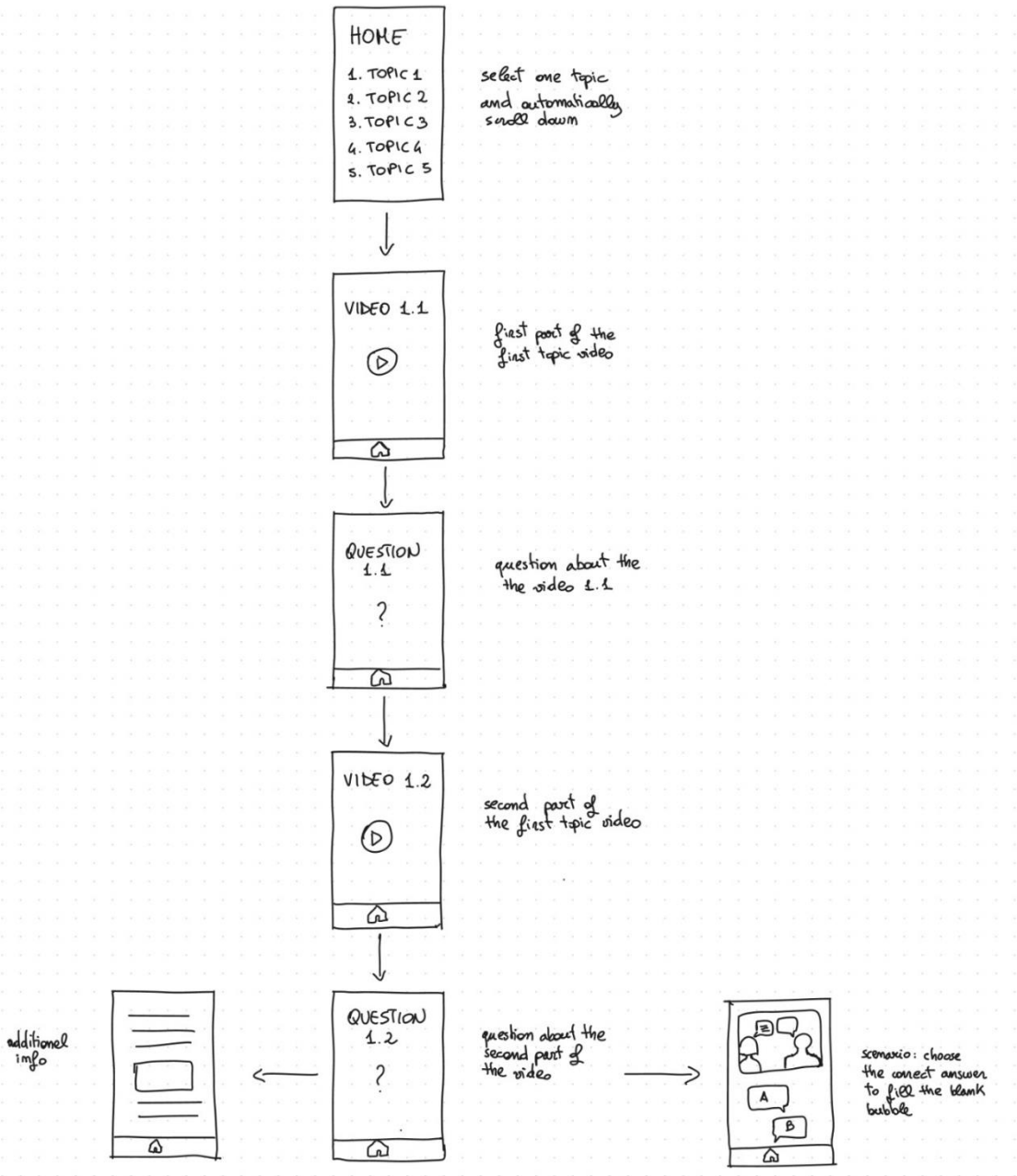

Figure 5: An overview sketch of the interactions

Brainstorming Session Two

The second brainstorming session focused on the ease and feasibility of the implementation due to the limited time and resources available. Various ideas were discussed and evaluated during the second session.

Firstly, the idea was to upload a playlist of YouTube Shorts. However, the issue was that it would be impossible to implement the activities on YouTube unless an external link was provided. It was thought it would be inefficient since linking an external website would demotivate users to continue learning and break their learning flow. Hence, the idea was dropped.

Secondly, TheLeap.co was found on the internet. It is a website where it is easily possible to build your own micro-content in an interface similar to Instagram stories. Its downside is that it is still in its beta version. Thus, the customisation is very limited.

Lastly, the selected final idea combines elements that emerged in the two sessions. This new approach involved creating a new website featuring the content displayed in Figure 5. Instead of scrolling down, users would swipe right, as in the second idea. Developing a new website would require more time than using TheLeap.co but would be less time-consuming than creating a whole new application. Moreover, building a new website would provide more flexibility for designers to customise the platform according to their preferences, which is a significant advantage.

Moreover, potential integration on the last page of the "Future Thinking" concept came up as a takeaway activity. In other words, to stimulate creativity, a sense of self-management/empowerment, and greater confidence in the future, a scenario will be illustrated that describes an absurd situation in which the user is encouraged to find a creative solution.

5. SPECIFICATION

5.1 Goal

The goal of this project is to implement an innovative educational method focused on risk management by applying microlearning principles. The idea is to create and improve user perception and risk management skills through short, mobile-optimized content in accordance with the multitasking preferences of today's learners.

Traditional educational methods are no longer adequate in the age of social media and low attention levels. They are mostly considered dull, complex, and discontinuous, thus not very effective. For this reason, the project proposes microlearning as a solution to deliver straightforward answers to complex decisions through short, focused learning modules that can be easily accessed anywhere also via mobile devices.

The project introduces the concept of future thinking to improve the learning experience even further. Simulating unimaginable future scenarios could allow users to become more confident in facing unexpected risky situations. Therefore, the ultimate goal of this project is to create a new culture of risk education that speaks the language of today's students and professionals, using innovative methods that respond to the latest generation's needs.

Innovation is the key to success. This project, in particular, while not creating new inventions or discoveries, can be among the disruptive technologies. It involves applying existing technologies in new ways to solve problems or meet previously neglected or ignored needs. The platform, called EduRisk, offers personalised and engaging concrete experiences with the aim of challenging traditional educational methods and promoting continuous risk learning. The name symbolises the importance of generalised risk education. Learning to manage unpredictable and uncertain situations without anxiety and fear independently is not only possible but necessary for everyone to handle daily. Mass risk literacy is, indeed, the stage at which contemporary society, not surprisingly defined as a risk society, must strive to create that climate of social well-being that allows harmonious and sustainable growth. Cheaper and more straightforward than the dominant solutions on the market, this technology can create new value propositions by transforming expectations, stimulating new needs and developing new skills in users.

5.2 Requirements

Considering both functional and non-functional requirements allows for defining the characteristics and qualities that the system must possess to meet user expectations.

5.1.1 Functional Requirements

Functional requirements describe what the system must do, in other words, the specific actions and processes that the system should execute to satisfy its main objectives.

Must

- Mobile Optimization: The platform must be fully optimised for mobile devices, ensuring smooth navigation and viewing of content across various phone screen sizes.
- Video Content Delivery: In order to bring the content to the people, the focus is on user satisfaction. For this reason, a virtuous cycle capable of creating, sharing, observing and modifying will be adopted continuously.
- Interactive Quizzes: Incorporation of interactive quizzes after each video to determine understanding without needing to track progress over time.
- Realistic scenarios are used to increase engagement.
- Hypothetical future scenarios are proposed to stimulate decision-making in unpredictable situations.

Should

- Offline Access: Enable offline access to content for users who may not have a consistent internet connection.
- Social Sharing Options: Allow users to share their achievements or favourite content via social media to create a sense of community and encourage engagement.
- Multilanguage support for a potential international audience

Could

- Push Notifications: Sending push notifications for timely reminders or updates in order to increase user engagement.
- Content Recommendation Engine: Using AI-driven algorithms to suggest content based on user interactions and preferences in order to improve the learning experience.
- Gamification elements to motivate engagement.

5.1.2 Non-Functional Requirements

Non-functional requirements focus on the system's performance, usability, and other operational characteristics. They ensure that the system performs efficiently and meets user expectations.

Must

- High availability and reliability to ensure uninterrupted service.
- Responsiveness and load times that meet industry standards.

Should

- Scalability to handle increased user numbers and content volume.
- Complying with accessibility standards to ensure the platform is usable by people with disabilities.
- Performance optimisation for smooth playback of video content across devices.

Could

- Integration with third-party analytics tools for monitoring user behaviour and feedback.

- Customisable themes or branding options for educational institutions or organisations.

5.3 Use Scenario

5.3.1 Interaction Description

Figure 6 shows the schematic of the interaction flow through the usage of proper symbols and colours. Every page of the platform is represented by a particular icon that intuitively recalls the content. The interactions were classified into four categories based on their specific functionality, each of which was represented in different colours. Multi-Action Navigation page allows users to select an option from a list of choices; Single-Action Navigation requires users to press a specific button to move forward; Informative display serves to define the context by providing guidance and does not require user interaction; Instant Feedback Selection allows users to get immediate verification of the selected option.

By pressing the link https://martacorrado02.wixstudio.io/edurisk on the laptop, the home page opens as shown in Figure 33. So, the user is invited to take their mobile phone and scan the QR code.

Once opened on their mobile phone, the start page (Figure 24) appears, and by pressing the 'Start' button, the interaction can start. On the home page (Figure 25), the list of topics is presented and numbered to guide the user in following the order recommended. Moreover, at the bottom, there is an 'X' button that stands for 'exit' if the user wants to go back to the start page. When one of the topics is selected, for instance, 'Introduction', then the first video appears (Figure 26), and the user can press play to watch it. The videos are short, and their length ranges from 30 seconds to one minute and a half. The user can press the arrow on the right to continue. Following the video page, there is the first multiple-choice question (Figure 27). If the selected answer is correct (Figure 21), then a positive message with a short explanation appears, and the user can continue. Otherwise, they are invited to retry (Figure 22). The second question appears to have the same design. Then, the second part of the introduction starts with another short video followed by two more multiple-choice questions. Once all the questions are completed, there is the scenario (Figure 28) depicted by an image where the speech bubble needs to be filled with one of the possible answers shown below, with the same check mechanism implemented as the questions. The last activity is the Future Thinking part (Figure 29), where the user is asked to imagine the scenario described and think about possible solutions. On the top left side of the page, there is the information button (Figure 30) for a clearer understanding of the activity's purpose and the recommended approach. The thinking process is guided by the points of reflection shown below. The topic ends on the last page (Figure 31) where the user is congratulated on having finished the first topic and is invited to proceed to the next section, namely 'What is risk?'. In this way, users keep track of their progress and know what to do next.

This interaction flow is quite the same for the first three topics. In the section related to the last topic, namely 'Conclusion', there are two videos. The last video ends with a wish that contains the philosophy of all EduRisk: "If you are ready to take risks, your life can be spectacular". This is to follow the concept expressed in the introductory videos by Professor Stoelinga, namely, by learning to manage risks, it is possible to live life to the fullest, without anxiety, maximising fun and minimising risks. Moreover, on the last page, as shown in Figure 32, there is a 'Learn more' button that brings the user to an external link, namely https://ftvisualisations.wixsite.com/ftvisualisations. Here, it will be possible to get additional insights about the risks and the importance of formal methods for scientifically managing risks

in certain situations. For example, safety-critical systems are a field where risk management is strongly recommended but still poorly applied.

5.3.2 Navigation

The navigation through the pages is ensured by the presence of the arrows on both sides of the pages, except for the 'start', 'home' and 'end' pages. As shown in Figure 6, the arrows are double-sided because the user is free to go back and forth if they want to revise some parts of the videos or one of the previous questions. The start page has the 'Start' button that allows users to begin their learning journey, while the home has the buttons to go to the different topics. Still, also on the bottom, an 'X' button symbolises 'exit', allowing the user to go back to the start page. The end pages have one-way arrows because they can only go back to the Future Thinking section. Moreover, after the selection of the topic, every page has a home button to allow users to go back to the home page.

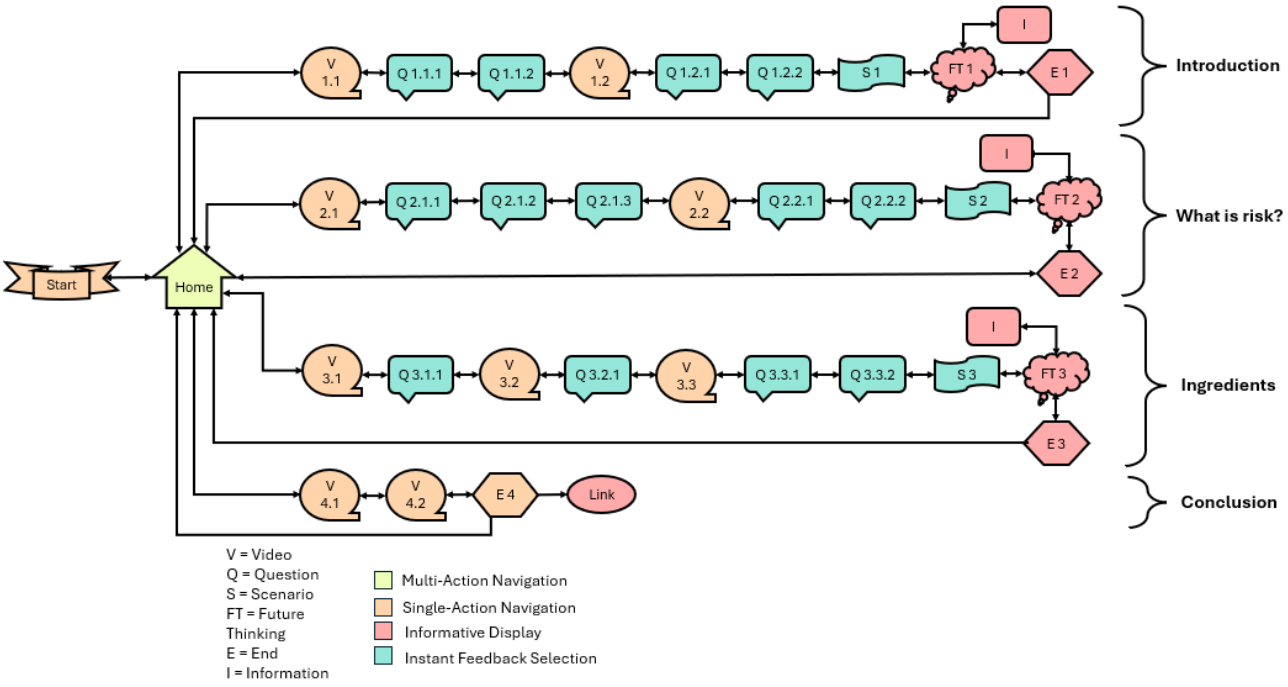

Figure 6: Schematic Interaction Flow

5.3.3 Content Outline

The entire content of the platform was inspired by the tutorial 'No risk, no fun – a tutorial on risk management' by Stoelinga [46].

Topic 1: Introduction

- Video 1.1: Introduction Part 1
- Question 1.1.1: What allowed Homo sapiens to survive?
    a. Heuristics (correct)
    b. Biases
    c. Rational thought

Explanation: Heuristics are skills acquired by the brain in the course of evolution. In many situations, it is not appropriate to stop and think about the best strategies to achieve a certain goal. It is necessary to act intuitively.

- Question 1.1.2: What is the objective of a risk response strategy?
    a. Avoid, accept
    b. Mitigate, transfer
    c. Enhance, exploit
    d. All of the above (correct)

  Explanation: There are two main ways to respond to risks: negative and positive. Positive responses involve enhancing the opportunity or exploiting the benefits that risks can offer, such as extra time or resources. Negative responses, on the other hand, focus on mitigating or eliminating the potential adverse impacts of risks through avoidance, transfer, reduction, or acceptance strategies.
- Video 1.2: Introduction Part 2
- Question 1.2.1: What are the risks of a security-critical system failing?
    a. Potentially irreparable economic damage
    b. Death or injury of persons, serious environmental damage (correct)
    c. Reputational damages

  Explanation: A critical system is a generic system that can cause unacceptable damage in the event of failure. For instance, nuclear installations and medical devices.
- Question 1.2.2: A method can be defined as formal when it makes use of
    a. Informatics
    b. Mathematics and logic
    c. Logical mathematics and computer science (correct)

  Explanation: The software engineering method is considered "informal" if the use of mathematics and logic is not essential to obtain useful results. On the other hand, it is considered "formal" if mathematics or logic are used to obtain valid results reliably. However, it is crucial to include computer science to have a broader perspective and ensure that formal methods are not only theoretically sound but also practically applicable to software engineering through computational tools and techniques.
- Scenario 1: What makes you feel comfortable? - The mum and the son

Figure 7: Scenario 1

a. You don't have to take risks: studying in your hometown and doing your father's job.
b. You need to learn to face risks, and you need to learn to take risks. (correct)

Explanation: Option A suggests a safer, more predictable path. However, it may limit personal growth and opportunities. Option B encourages risk-taking. Facing challenges, learning from them, and taking calculated risks can lead to personal development, new experiences, and potentially greater fulfilment.

- Future Thinking 1: Space agencies have detected an asteroid approaching Earth. You don't know its size, but it can hit an area of the planet, including your country. Scientists are working out measures to deflect the asteroid. This has never happened before, so we don't know if it will work.
  - How do you prepare for this situation?
  - What other similar planetary emergencies could occur and prompt you to plan in time strategies to adopt?

Topic 2: What is risk?

- Video 2.1: What is risk?
- Question 2.1.1: What constitutes a risk?
  a. A shark at sea
  b. Swimming near a shark (correct)

  Explanation: A risk refers to the potential for harm or loss associated with a specific action or situation. In this case, swimming near a shark poses a risk due to the danger it presents.
- Question 2.1.2: The ISO 31000 standard...
  a. May be used for certification.
  b. Enables organisations to compare their risk management practices with internationally recognised benchmarks. (correct)

  Explanation: The ISO 31000 principles provide related guidelines to improve a risk management process. Best practices can be used by any company, regardless of the size of the organisation or industry.
- Question 2.1.3: Compliance with ISO standards is:
  a. Voluntary (correct)
  b. Mandatory

  Explanation: Compliance with these standards is generally voluntary. However, adherence to them may be required by industry regulatory authorities or through commercial contracts.
- Video 2.2: Risk Matrix
- Question 1.2.1: According to the WORLD ECONOMICS FORUM, what risks will the world face in the short term?
  a. Environmental risks
  b. Disinformation (correct)

  Explanation: Environmental risks such as natural disasters, loss of biodiversity and climate crisis are the biggest threats for the next decade. In the short term, they are mainly concerned with fake news and social polarisation.
- Question 2.2.2: Which of the two events do you think has a higher position in the ranking of risks?
  a. A risk event with low probability and high impact (correct)
  b. A risk event with a high probability of low impact

Explanation: A low probability/high impact risk event has a higher score than a high probability/low impact event. This is because probability scores are defined on a linear scale, while impact scores are on a logarithmic scale. The effect is to put more emphasis on impact rather than probability, e.g., in the case of a nuclear power plant explosion.

- Scenario 2: Three friends seated in a café

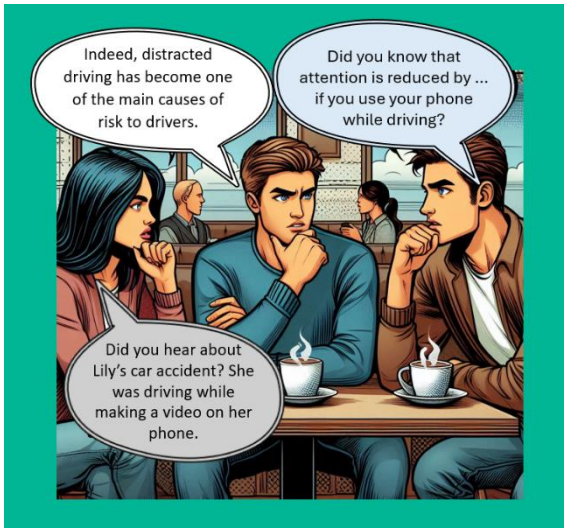

Figure 8: Scenario 2

c. 7%
d. 37% (correct)

Explanation: Using a cell phone while driving reduces brain activity associated with driving by 37%.

- Future Thinking 2: Geoengineering has implemented technology to cool the earth and counteract the climate crisis. It involves spraying sulfate particles to reduce some of the incoming solar radiation by lowering temperatures. The risks are very high. We could thin the stratospheric ozone layer that protects us from ultraviolet radiation, causing acid rain and unpredictably changing climatic conditions in some areas. This would have dramatic consequences for agriculture and food security.
  - If you were asked to vote, what would you choose?
  - Are you prepared to endure at least ten years of winter?
  - And to live under a leaden sky?
  - What would be the effects on children?

Topic 3: Ingredients

- Video 3.1: Goal
- Question 3.1.1: Which of these statements can be considered a S.M.A.R.T. goal?
  a. I want to start living healthier: eat better, exercise more, and use less social media.
  b. From tomorrow, to live healthier, I will stop drinking alcohol, I will exercise three times a week, I will use social media two times a day for a maximum of 15 minutes at a time. (correct)

Explanation: A S.M.A.R.T. goal is a specific, measurable, achievable, relevant, and time-bound objective.

- Video 3.2: Impact
- Question 3.2.1: A sixth impact element has recently been added. Which one?
    a. Ecological
    b. Sustainable (correct)
    c. Ethical

  Explanation: Sustainability is a broad and multifaceted term that includes environmental, economic and social responsibility. It is an essential concept to preserve our planet for future generations.
- Video 3.3: Uncertainty
- Question 3.3.1: How do you define the uncertainty related to the result (number) of the roll of a dice?
    a. Aleatoric (correct)
    b. Epistemic

  Explanation: Although we know that the result depends on many factors, such as the force of the launch, the possible rotation, and the surface, we are not able to calculate them all with accuracy. Thus, it is impossible to predict the result because of the inherent unpredictability of the process itself.
- Question 3.3.2: What are the characteristics of the Black Swan?
    a. Rarity
    b. High Impact
    c. Retrospective Predictability
    d. All of the above (correct)

  Explanation: The Black Swan is an isolated event that falls outside of normal expectations. It has a huge impact, and despite its isolated character, human nature tends to justify its appearance as a posteriori to make it explainable and predictable.
- Scenario 3: In a company meeting, the first topic on the agenda is discussed

Figure 9: Scenario 3

a. Stochastic uncertainty, also called aleatoric uncertainty. It can be defined as “intrinsic randomness in the behaviour of the system being studied”.
b. The striking image used by the Bank for International Settlements to indicate the risks arising from climate change in relation to global financial stability. (correct)

Explanation: The first definition refers to the so-called "dying swan". Namely, fallacious predictions can also be caused by the aleatoric nature of many complex systems, in which small stochastic errors can be combined and lead to large prediction errors. The second refers to the fact that climate change is a source of financial and price instability, and for this reason, central banks are called upon to implement greater coordination between their policies and those of governments and private sector initiatives.

- Future Thinking 3: During a typical working day, our mobile phone makes a strange sound. After the first seconds of fear, we realise that a message has arrived. It says that due to a computer emergency, the internet will be blocked for a few days. It remains a short time before the phone turns off.
  - Do you remain paralysed by the fear of a new situation that you do not understand, or, in those few minutes, you try to act? In that case, what do you do?
  - What other ways of communicating can you use?

Topic 4: Conclusion

- Video 4.1: Conclusion Part 1
- Video 4.2: Conclusion Part 2
- End 4: https://ftvisualisations.wixsite.com/ftvisualisations

5.4 User Scenario

5.4.1 Persona Description

Anna is a 26-year-old young professional who works as a marketing manager for a mid-sized tech company. She uses her smartphone most of the time for both personal and professional tasks. Anna tries to have a balanced lifestyle while managing different responsibilities at her job. When faced with decision-making, she feels stressed and anxious because she cannot say when the best solution is “no risk, no fun” or “better safe than sorry”. She would like to know how to make the right choice. Thus, she wants to improve her risk management skills to make better strategic decisions both at work and in her daily personal choices. However, her schedule is packed. She does not have time for long traditional courses.

5.4.2 Scenario

Morning Routine: Anna starts her day with a quick workout and then makes some coffee to get ready for the workday. While sipping her coffee, she opens the “Education about risks” platform on her smartphone to watch a short video. The video is the starting point of the new module she has just selected from the main page of the platform.

Interactive Learning: After watching the first video on the selected topic, Anna takes a quick quiz to review the key concepts she has just learned. She gets the second question wrong, and thanks to the explanation, she now understands her mistake. However, she wants to be sure she has understood it completely, so she goes back to the video. Now, she feels like she has learned something valuable.

Office Breaks: During her lunch break, she finds a few minutes to continue with the second video of the section that started in the morning. Due to the platform's design, it is easy for her to pick up right where she left off, even if she only has a few minutes to spare.

Evening: After having completed all the questions throughout the day, now it is time for the scenario that incorporates all the day's learning. It challenges her to apply the knowledge in a real case situation depicted as a comic to improve her understanding even further. Following that, as a takeaway activity, a futuristic and improbable scenario is presented, and she is asked what she would do in that specific situation. Initially, she has no clue what to answer, so she clicks "next" and successfully completes that section. Later that evening, while trying to fall asleep, the futuristic scenario comes to her mind, and she becomes intrigued by that scenario. With this thought, she falls asleep. The next day, as soon as she wakes up, she might have an answer, and during the lunch break at work, she shares it with some of her colleagues. Some of them seem curious and want to know more about the platform. In this way, the platform slowly becomes more and more popular in the company.

Outcome: Over time, Anna feels more confident in her risk management abilities. She starts applying these skills to her projects at work and in her personal life because she has not only theoretical knowledge but is also trained to face any situation, even the ones that seem impossible. Thanks to the microlearning approach, she was able to integrate education into her busy schedule. Because of the practical cases, she learns how to handle any situation with no more fear or anxiety.

6. REALISATION

In the realisation phase, the development process of the platform is described in detail. It starts with a description of the evolution of the design and the technical implementation to increase the usability of the platform. Following that, the content creation is outlined, namely the video shooting and editing, as well as the activity content.

6.1 Platform Design

The platform's design comes from the need to create an environment where all the content created can be stored, easily accessible, and mobile-optimised. According to the outcome of the brainstorming sessions discussed in the second chapter of this thesis, the idea is to create a web-based platform.

There are many possibilities for creating a website. Creating one from scratch provides complete control and freedom. Still, it also means that it is highly time-consuming to implement, and being responsible for everything leads to being in charge of the security patches and updates. In addition, there are ongoing costs to consider, such as hosting, domain, and maintenance.

Due to the limited amount of time and money resources available and with the goal of making a final usable product that goes further than a showcase prototype, I have decided to use one of the web creation platforms. After analysing different options, I made the first version of the platform on Wix.com, while the second and final one on Wix Studio, which is a more professional version of the same web creation platform. It offers an intuitive drag-and-drop interface, making it more designer-friendly. It also provides flexibility to customise layouts, fonts, and colours. Because of the pre-built components and visual editing, the setup is faster. Moreover, Wix handles hosting, security, and updates and includes hosting and domains in the free version. In this way, I made the process more efficient by saving time and money at the same time.

6.1.1 First Design

The first design was made by using Wix.com. Having the ideas of the last brainstorming session in mind, the basic schematic is shown in Figure 10. From the homepage (Figure 11), by clicking ‘start’ on the arrow, it is possible to go to the index (Figure 12), where the list of topics is shown. Based on the topic selected, the first video (Figure 13) of that section would appear, followed by a multiple-choice question (Figure 14). Again, in the same style, by pressing next, another short video, a question appears. Regarding giving feedback on the correctness of the answer, the answers are buttons. If the pressed button corresponds to the correct answer, then a new page opens saying ‘Correct Answer’ (Figure 15) and a brief explanation below. Otherwise, if wrong, a similar page opens but displays ‘Incorrect Answer’ (Figure 16). Following that, a scenario (Figure 17) is depicted in a comic style, and different options are shown to complete the conversation. The exact implementation of the question is used to check whether the answer is correct or not. The next page describes a potential future scenario (Figure 18) with open questions to aid the thinking process in unpredictable situations. Lastly, the final page (Figure 19) is the end of that topic, and interested

users are invited to learn more about it. Once everything is completed, the user can press the home button and go to the next topic.

The home button is present on every page, and the navigation through the pages is assured with the arrows displayed on both sides to go back or forward. The only pages on which there is only the back arrow are the ones with the questions because moving forward is only allowed if the question is answered.

The chosen colours are pastels, which give the entire platform a softer look. The correct and incorrect pages are pastel green and red, respectively, to emphasise the result of the answer. Meanwhile, the background of the question is white to symbolise neutrality before making a choice. The colour for the 'Start' and next/back buttons is a pastel yellow that matches the cover image.

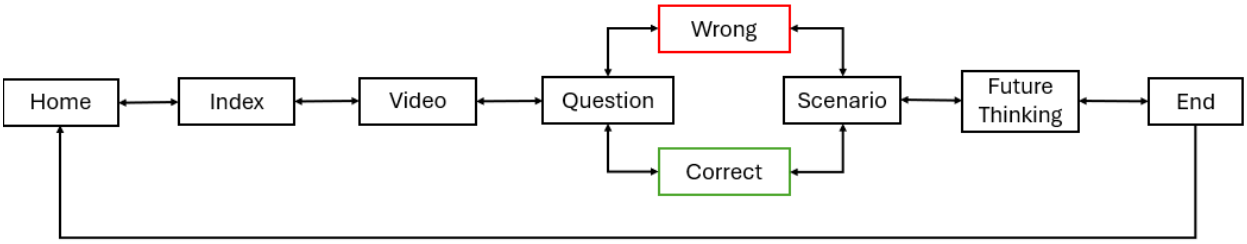

Figure 10: Platform Schematic ver.1

Figure 11: Home page ver.1

Figure 12: Index page ver.1

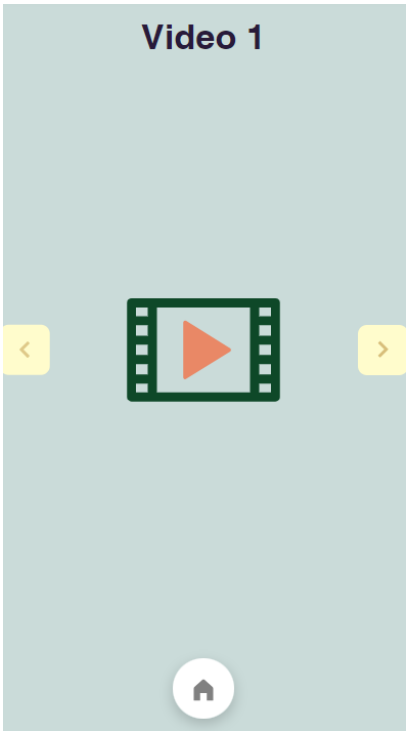

Figure 13: Video page ver.1

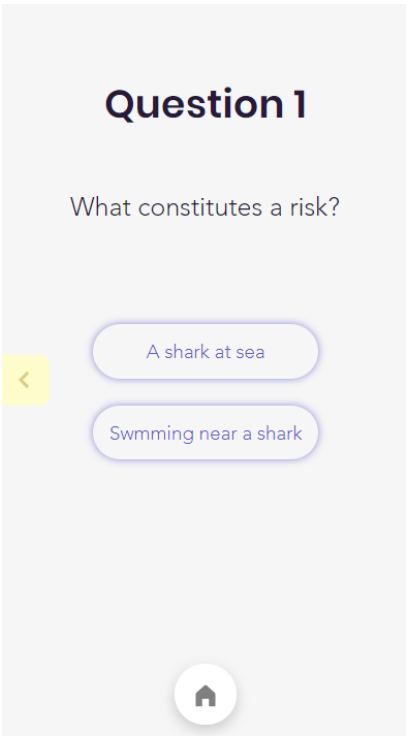

Figure 14: Question page ver.1

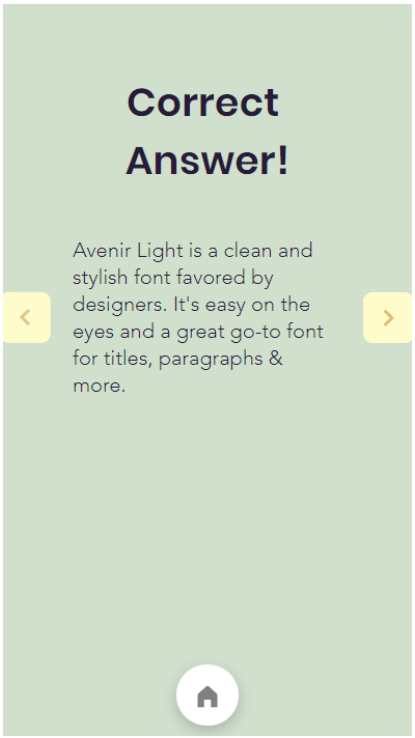

Figure 15: Correct answer page ver.1

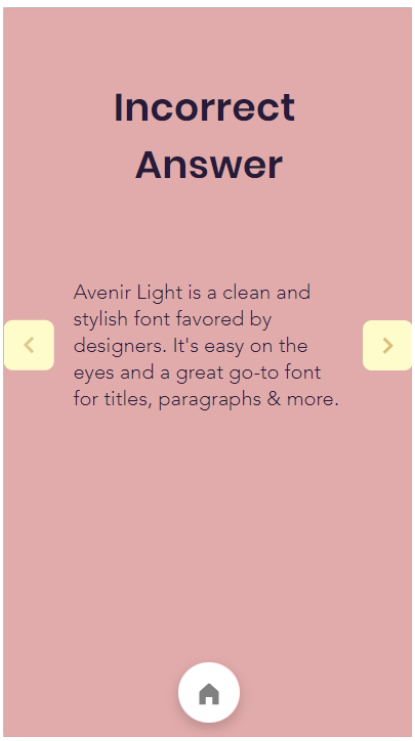

Figure 16: Wrong answer page ver.1

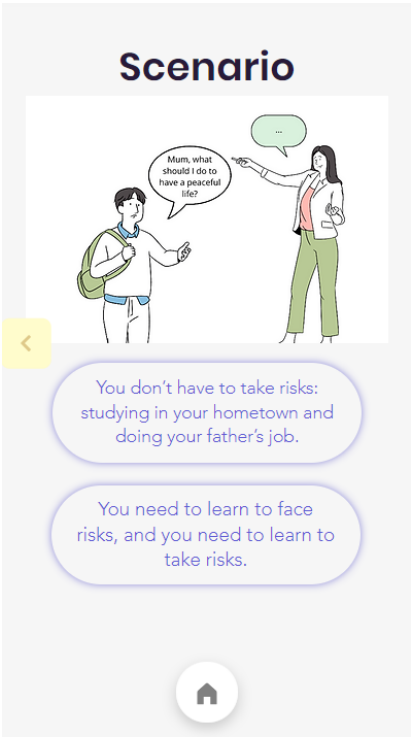

Figure 17: Scenario page ver.1

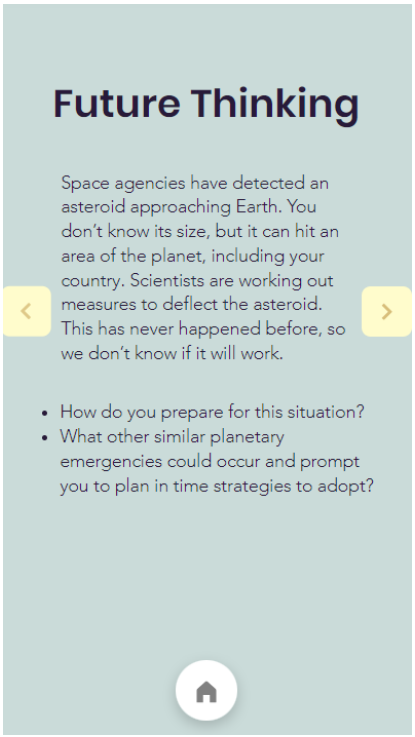

Figure 18: Future Thinking page ver.1

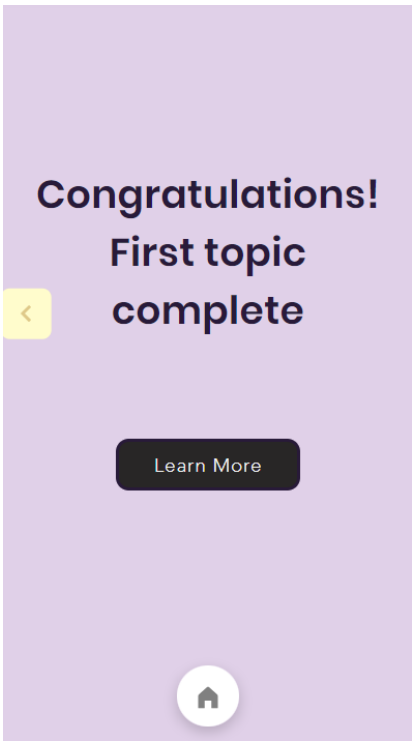

Figure 19: End page ver.1

6.1.2 Second Design

The second version of the design is an optimised implementation of the first one.

The most significant change is the way in which the questions are handled. This time, an HTML code was inserted into the questions and scenarios pages. In this way, the additional two pages for determining the correctness of the answers were deleted, which made the implementation smoother, and the responsiveness of the buttons was increased (Figure 20).

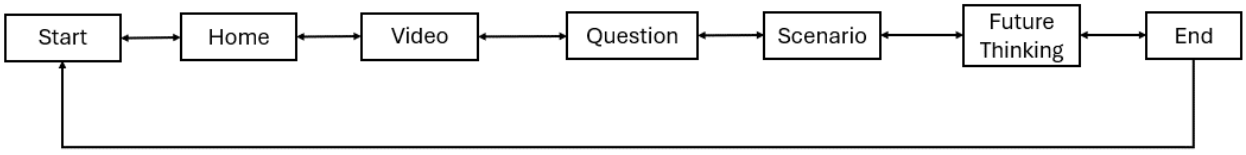

Figure 20: Platform Schematic ver.2

The implemented HTML code defines an interactive quiz page with a clean and centred layout, which can be easily adjusted to each question. The page can contain at least two answers to a quiz question, and it is styled with CSS in order to improve its appearance and interactivity. When hovered over, each answer button changes colours from white to light blue. To check whether the selected answer is correct or not, a JavaScript function named 'checkAnswer' is called. If correct (Figure 21), a message framed in a green box saying 'Correct :)' is displayed along with a brief explanation of the correct answer. Otherwise, if incorrect (Figure 22), a message framed in a red box appears, saying 'Incorrect :(' prompts the user to try again with a 'Retry' button. In both cases, when an answer is selected, the answer options are hidden, and the explanation is shown. The CSS ensures that the page is responsive and visually appealing, with elements such as rounded buttons and shadows to create a 3D effect and smooth transitions.

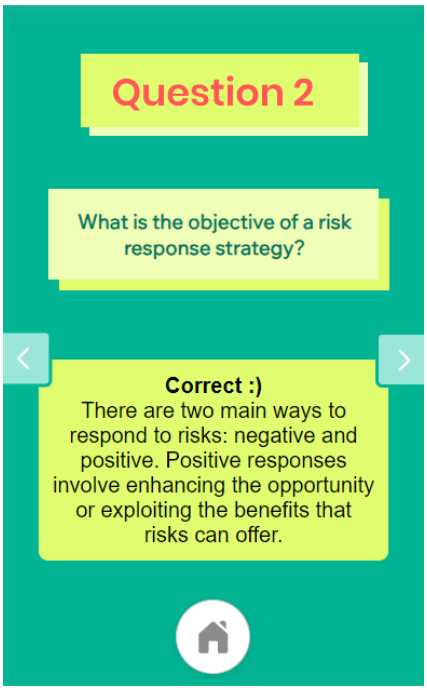

Figure 21: Correct answer ver.2

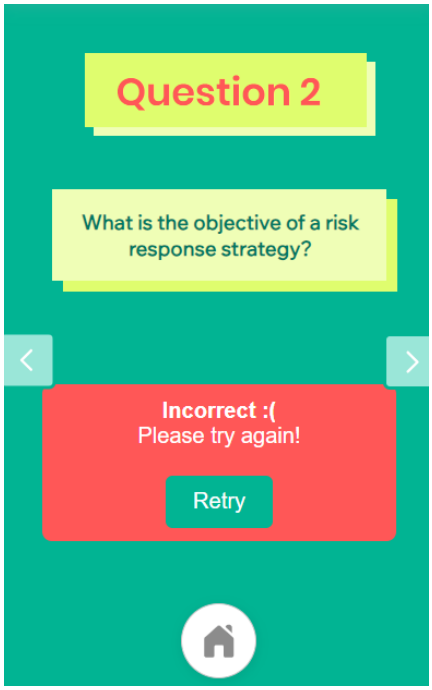

Figure 22: Wrong answer ver.2

The colours were accurately picked. Green has been the primary colour for the whole platform since, according to colour psychology. [47], it is believed to have calming and relaxing effects on the mind. This can create a pleasant user experience by reducing stress and promoting a sense of well-being. Moreover, in marketing, green is often associated with growth, progress and innovation. Thus, brands that aim to project a forward-thinking image can leverage this positive connotation, as in the case of this project. Besides the green picked as the background colour, three more main colours complete the palette that is recalled throughout the whole platform. They are red, orange and a different shade of green, which recall the colours present in the risk matrix (Figure 23), also known as the risk priority heat map, which is a straightforward diagram used to visualise risks rapidly. In it, the likelihood of an event is plotted against its severity.

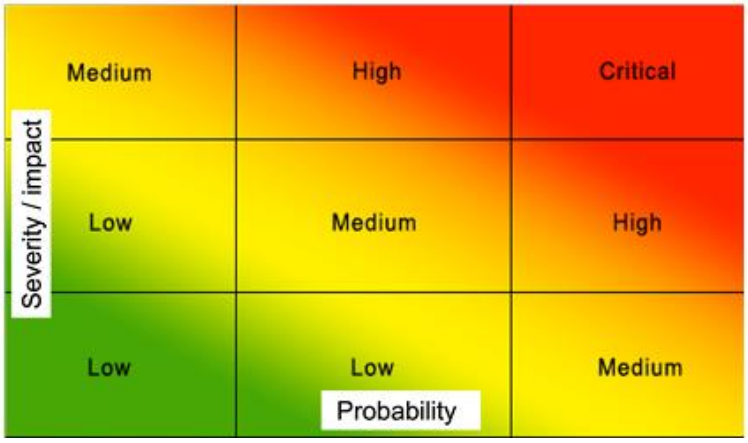

Figure 23: Risk Matrix [18]

The white arrows framed in light blue boxes on both sides of the pages assure navigation through the pages, except for the end pages of each topic, which, when hovered, have inversed colours. Moreover, the home button is white to make it more visible compared to the background, and the 'X' button on the home page has the same style as the home button.

The start page (Figure 24) of the platform shows a person almost falling while trying to find a balance on top of a stack of blocks that spell out "RISK", whose instability is caused by a human hand pushing it. This image conveys the idea of instability and potential danger associated with taking risks that each individual experiences each time they make choices. The image was made from scratch using Canva, an online graphic design tool. Besides the colours, what differs from the previous version is the person on top. This time, the person continuously moves to show better the difficulty and the effort of finding a balance while making the 'right move'. In addition, he is holding a book in one hand and a pen in the other in order to symbolise the importance of having a proper risk culture. Thanks to it, in fact, he succeeds in making considered decisions that allow him to find balance and not fall. Overall, "Education about Risks" is represented in one image.

The home (Figure 25) is the following page, where the list of topics is represented. The design resembles the one on the start page, namely a stack of blocks and a selection of colours. The topics are numbered to highlight the recommended order. On the cover page of the last topic, which deals with the opportunity to learn how to use risk management techniques to cope with the unforeseen events of the future, the hand that appears on the right is, this time, a robotic one that helps the little man find balance.

The video pages only display the video and arrows to navigate backwards or forward. Additionally, before clicking the 'play' button, the video number is shown along with the total number of videos available for that specific topic. Different options are available to personalise the video watching, such as a full screen

or picture-in-picture. In addition, it is possible to go 10 seconds ahead or back, (un)mute the video and speed it up or slow it down.

The quiz pages (Figure 27) have the questions numbered per section. Both the title and the question are highlighted by a double set of boxes of inverted colours that give the idea of a Post-it note.

Regarding the scenarios (Figure 28), these are intended to create real situations to give concreteness to the topic. The situations are different and suitable for a diverse audience. They include the family, the work environment and the social environment. The design is similar to the one for the quiz, but in this case, there is an image with some gaps to fill with one of the options shown below. The images are in a comic style and are made through Dall-E, an artificial intelligence system that can create images from text.

In the pages for Future Thinking (Figure 29), the scenario contains some undefined shapes, such as the future ahead of us. The questions that follow are starting points for reflection and are inside speech bubbles to symbolise that the user is asked to think about that and find appropriate response strategies. To clarify the purpose of this activity and the recommended approach, an information button has been added. By pressing it, it links to an additional page titled 'Information' (Figure 30).

On the last page of each topic (Figure 31), there is the congratulations text, and the user is suggested to go to the next topic by pressing the home button. Moreover, only in the last topic (Figure 32), there is a 'Learn More' button that redirects to https://ftvisualisations.wixsite.com/ftvisualisations to have more insights on risks.

Finally, in line with the microlearning approach, in order to allow maximum usability of the contents of EduRisk and also to those who access the link to this website from a laptop, a solution has been found. In line with the platform's overall design, users are encouraged to scan the QR code displayed on the screen. To make the association even more straightforward, the QR code frame resembles the shape of a smartphone, and a motivational message is shown to encourage users to utilise it.

Figure 24: Start page ver.2

Figure 25: Home page ver.2

Figure 26: Video page ver.2

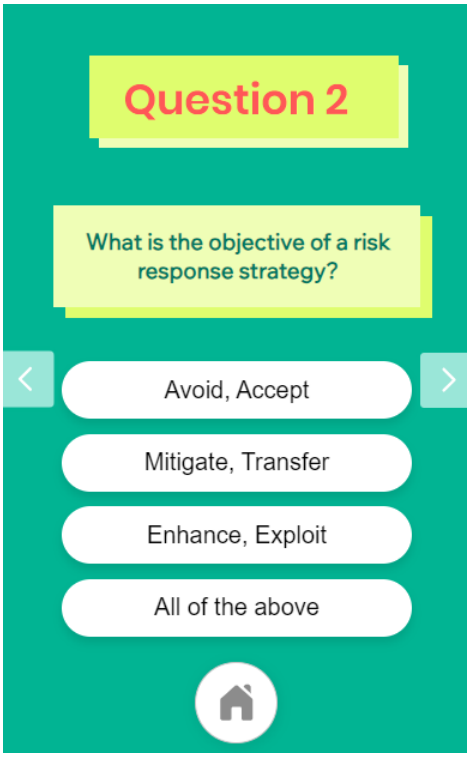

Figure 27: Question page ver.2

Figure 28: Scenario page ver.2

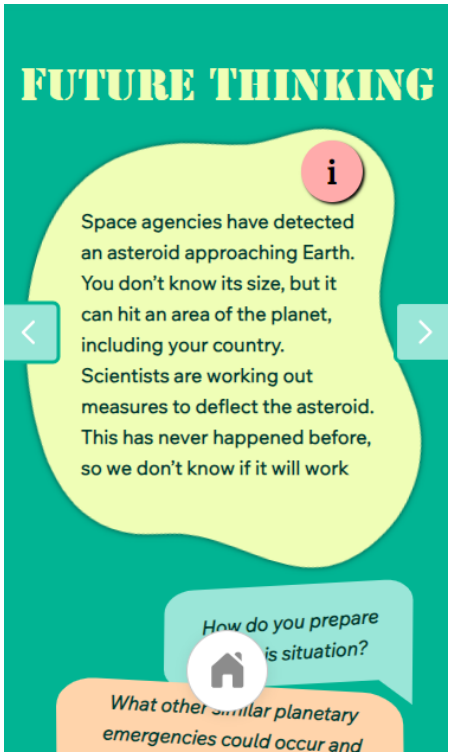

Figure 29: Future Thinking page ver.2

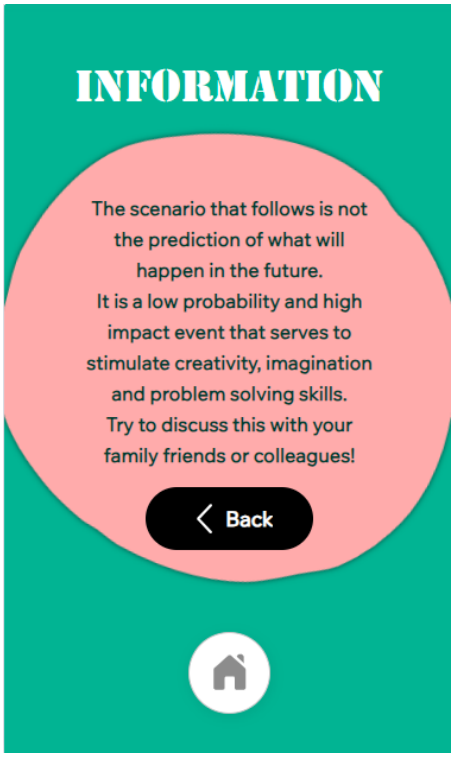

Figure 30: Future Thinking Information page

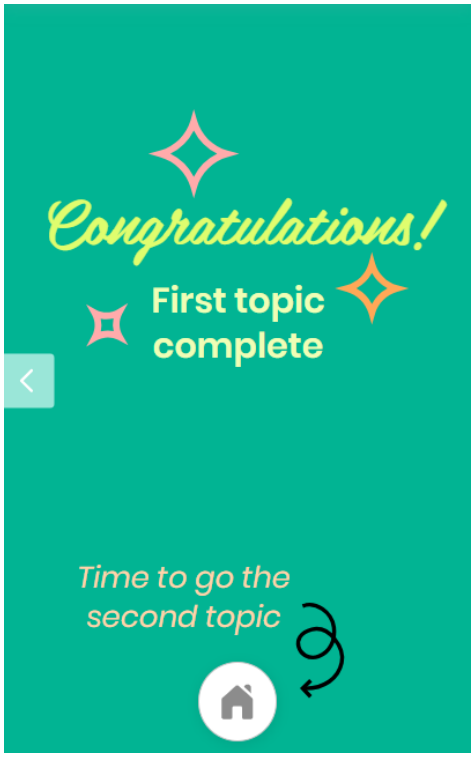

Figure 31: End page ver.2

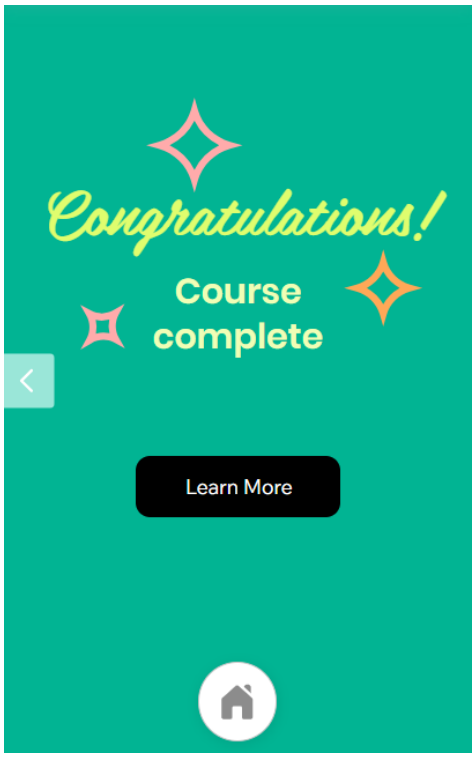

Figure 32: End 4 page ver.2

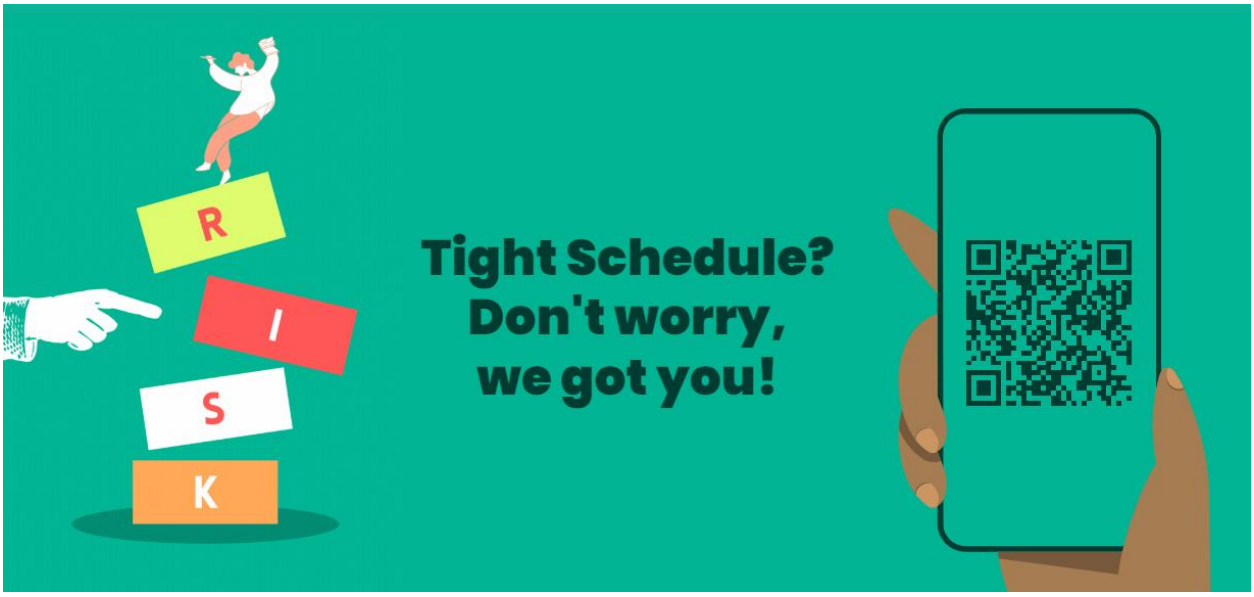

Figure 33: Home page laptop view

6.2 Video

The realisation of the videos consisted of two main phases: shooting and editing with designing.

6.2.1 Video Shooting

The videos were shot in the Digital Workshop of DesignLab, a building located on the campus of the University of Twente, equipped with the necessary videography tools.

The green screen was used to shoot the videos. It is a large green backdrop placed in the background of a shot during filming, which allows for digital effects in post-production. In this way, the moving subjects in front of it are filmed while the background can be later changed. In order to have the best result, there are some requirements and measures to comply with. Considering that this was my first experience in this field, I had to watch several tutorials, and it took many trials to finalise the setup, as shown in Figure 34. One of the most useful sources that I used was Monlux [48], Creative Humans [49] and Amri [50]. According to them, the most essential tips for better shooting are the following:

- Even lighting must be ensured in order to avoid shadows and facilitate keying. For this purpose, softbox lighting (the big black standing boxes) is used.
- Separate the subject from the background by positioning them a reasonable distance away from the green screen to avoid spills and ensure a clean key.
- Lighting the subject separately from the background. In this case, a key light is used.
- Avoiding wearing green is essential. Otherwise, it can interfere with the keying process. Black is always a good option.
- Using a high-quality camera with the right setting to maximise the resolution of the colours is a crucial point.

- Before the actual shoot, the setup, lighting, and keying process must be tested several times in order to identify any issues and make adjustments on time.

Figure 34: Video Shooting Room Set-up

Once the setup was completed, three sessions of around two hours each were necessary to shoot the videos. Two of them were assisted by Prof. Dr. Mariëlle Stoelinga, whose presence was essential as the central character of the majority of the videos.

6.2.2 Video Editing

The editing phase was made through the usage of CapCut (Figure 35). Even though I had some experience in editing, it was my first time using CapCut. Thus, also, in this case, some research had to be done before properly using, and the tutorial by Primal Video [51] has been the most helpful resource.

The actual editing of the videos was made on CapCut. This software was chosen mainly for its features, which fit with videos on social media. However, the critical feature is the so-called 'Chroma Key', which allows in one click to delete the background of the green screen and make it transparent, which makes it easy to replace it with another one. This is made possible by choosing a specific colour, in this case,

green, as the essential colour and the chroma critical feature effect automatically samples the dominant green screen colour in the selected clip. Moreover, to define it, the 'Auto cutout' feature was switched on.

Each shot was analysed singularly, and sometimes, to make some corrections, some small parts from different shots were taken. In addition, within the same shots, the pauses were manually deleted as much as possible, and the fluent transitions matched the video and the audio at the same time. This was possible by using the 'Mix' transition for the video and the 'Fading in/out' transition for the audio. Afterwards, all the videos were slightly sped up by 1.1 times.

Among the different features provided by CapCut, there is an extensive library of free accessible music. In accordance with the content shown, the soundtrack selected for all the videos was 'Content Risk' by DJ Bay. In order to not distract and cover the voice, the volume of the music was decreased to -14.0dB.

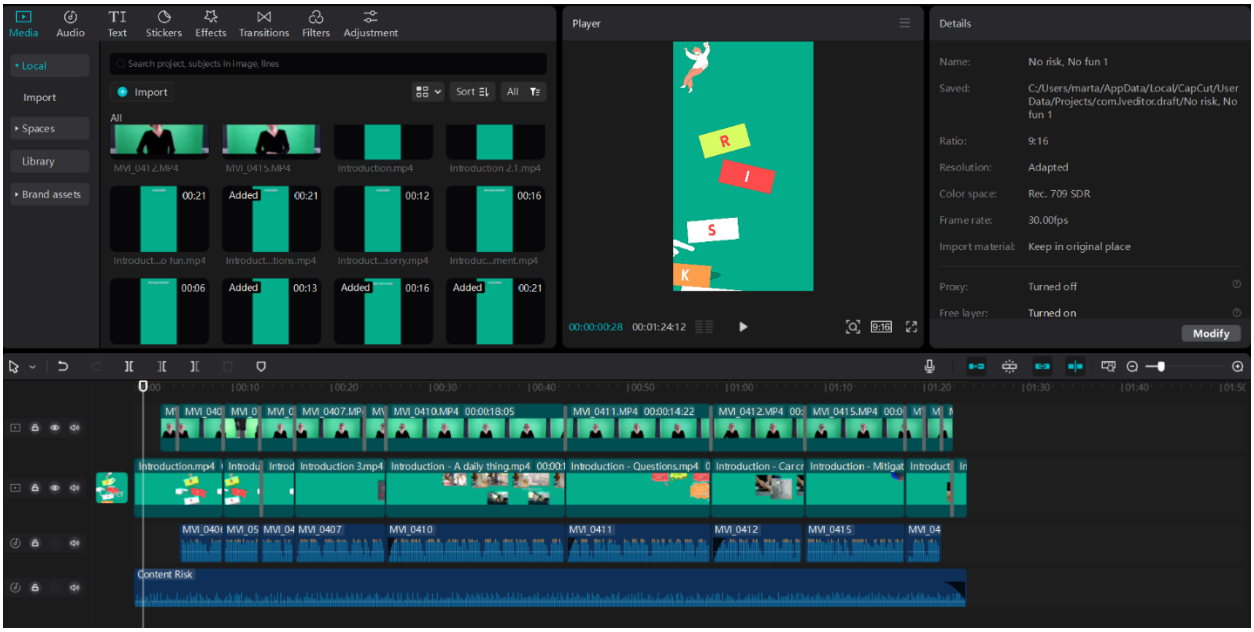

Figure 35: CapCut screenshot

6.2.3 Video Design

The videos were designed using the premium version of Canva. I have been using Canva for quite some time already, especially when making presentations, so in this case, I was already familiar with the platform's functionalities and interface. Canva was used to make the illustrations and animation of the videos, namely as the backgrounds. Many micro videos were made from scratch to align the sub-content of each video by selecting the appropriate text, images, and icons and synchronising them manually to match the audio-visual elements.

The design of the videos, such as the colours and animations, aligns with the overall design of the platform to ensure a cohesive and seamless user experience. As outlined in StudioLabs [52], consistent design elements across the platform create a unified aesthetic, reinforce brand identity and make navigation more intuitive for users. By maintaining this alignment, the platform has a more professional and polished look, increasing user engagement and satisfaction.

The cover of each video reflects its topic and, besides the colours, features common elements such as animation, namely 'Scrapbook', and the names and titles of the speakers. Moreover, while making the design, careful consideration was given to leaving enough space for the speaker in order to cover as little of the design as possible. The two introduction videos, Figure 36, have the same cover as the platform in order to maintain visual consistency and make it easier for users to identify and associate the videos with the platform. For the second topic, the first video, named 'What is risk' (Figure 37), recalls the same design as the cover, while the second one, through a grid design, tries to replicate the risk matrix. Following that, the 'Ingredients' module tries to simplify, through generally known icons, the key characteristics of each ingredient to help create associations in mind. For goals, a darts board pops up over the 'o' of the title, which clearly signifies aiming for a target, while the letters of the word 'impact' (Figure 40) are represented as a domino game where letters fall one by one after being pushed by a finger. The aim is to demonstrate how one action can create a chain reaction, highlighting the interconnected nature of events. Finally, uncertainty (Figure 41) is symbolised by a question mark, which instantly hints at the concept of unpredictability. Lastly, the last section, namely the conclusion, resembles the design of the introduction cover. However, this time, instead of a human hand unbalancing the stack of blocks, a robotic hand restores the balance by pushing back one block. This simplifies the potential for technology and innovation to address the upcoming challenges. Thus, it visually communicates the idea that the future and the related risks can be positively shaped through smart and informed use of technology.

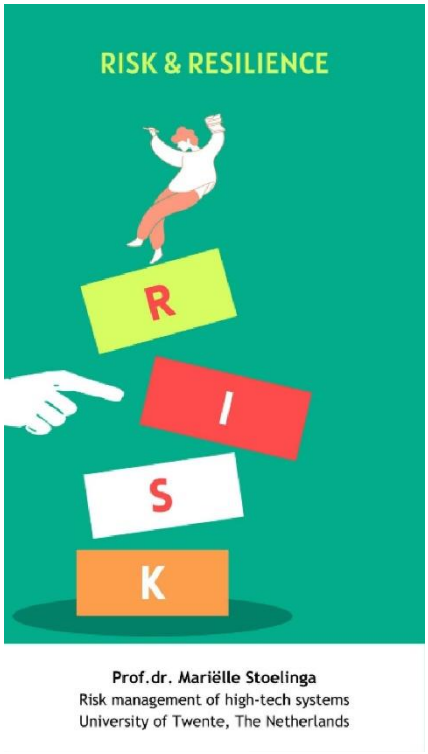

Figure 36: 'Introduction' cover

Figure 37: 'What is Risk' cover

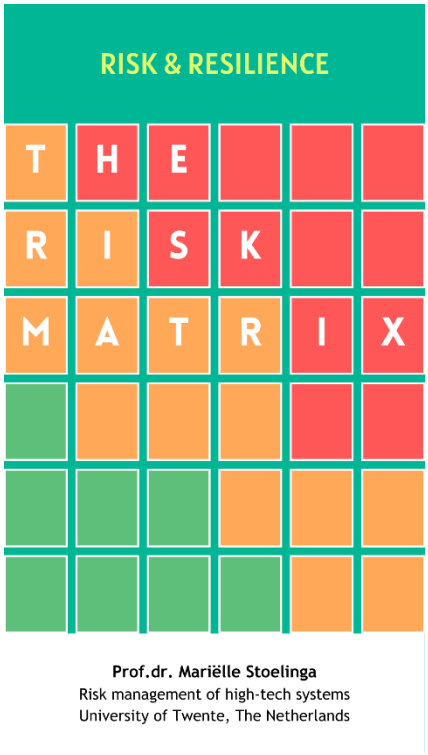

Figure 38: 'Risk Matrix' cover

Figure 39: 'Goal' cover

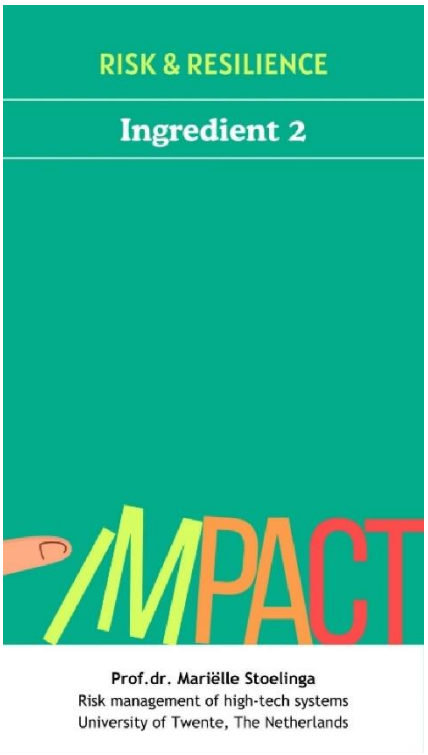

Figure 40: 'Impact' cover

Figure 41: 'Uncertainty' cover

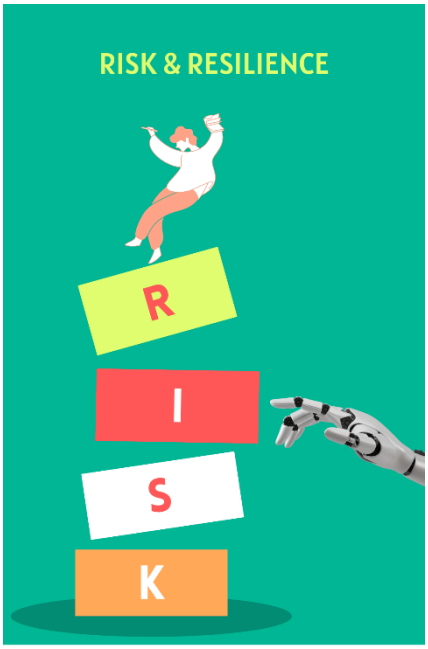

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Figure 42: 'Conclusion' cover

7. EVALUATION

After the prototype is completed, the next step is the evaluation phase. In this phase, the project is tested with users to gather feedback on the platform's usability and efficiency according to customer satisfaction metrics. For this reason, a mixture of exploratory and usability testing was conducted. Moreover, the inclusion of guided activities such as quizzes and scenario-based exercises aims to assess the platform's ability to facilitate learning and engagement.

7.1 User Test Description

The type of user test selected is a combination of qualitative and quantitative methods, focusing on user interaction with the platform, learning outcomes, and feedback collection.

In particular, the test worked as follows. The sessions were approximately 15 minutes long. At the start, users were asked to sign a consent form (A1: Consent Form). Following that, they were introduced to the EduRisk platform, where they had the opportunity to familiarise themselves with its features. This included watching videos, answering short questions, and freely exploring the different sections and contents offered on the platform. As a participant, their role in this study involved watching a video and completing some activities related to it, such as quizzes and real and imaginary scenario-based exercises. In the end, they were invited to fill out the survey. It gathers their opinions regarding the various aspects of the platform, focusing on three key customer satisfaction metrics: Customer Satisfaction (CSAT), Customer Effort Score (CES), and Net Promoter Score (NPS).

Therefore, it is possible to talk about a mixture of testing methods. The exploratory test was helpful in understanding the platform and providing prompt feedback. It helped to evaluate the quality of the product from the point of view of the user since participants had the opportunity to explore the platform, comment on it out loud, write down flaws, and add suggestions freely. Instructional testing, through guided activities such as quizzes and scenario-based exercises, aims to assess the effectiveness of the educational content and the platform's ability to facilitate learning. This method evaluates whether users can successfully engage with and comprehend the material provided. Lastly, usability testing is considered in the last part of the evaluation session, namely when participants are invited to fill out the survey whose questions focus on three customer satisfaction metrics mentioned above: CSAT, CES, and NPS. In this way, the study collects quantitative data on user satisfaction and ease of use. In particular, CSAT measures the users' satisfaction when using the EduRisk platform, specifically focusing on its utility and overall experience; CES evaluates the ease of use and interaction with the platform from the user's perspective; NPS assess users' loyalty towards the EduRisk platform and their propensity to recommend it to friends or colleagues.

7.2 Survey Description

The questionnaire for evaluating the EduRisk platform was made on Google Forms and consists of multiple sections aimed at gathering users' feedback (A2: Survey for User Tests). In the beginning, users are asked to answer some demographic questions, namely age and (current) education, to evaluate the responses

according to the different types of users. Afterwards, users are asked to answer some questions on a scale of 0 to 5, which are grouped based on the three aforementioned customer experience metrics. NPS is determined through the questions of how likely they are to recommend the platforms to others. CSAT is calculated based on the results of questions that aim to measure the perceived improvement in risk management understanding, the usefulness of future thinking scenarios, the engagement level of microlearning modules and the quality of the graphics. Lastly, CES is determined by rating the overall usability, clarity, conciseness and helpfulness of images. Moreover, additional questions are asked to get more insights into the users' profiles, such as their familiarity with similar platforms and the concept of Future Thinking, in order to assess both their baseline knowledge on the topics offered by EduRisk and determine if there are any comparable products available in the market. The last part of the survey includes what users liked the most and what could be improved, offering multiple choice options such as content quality, ease of use, engagement level, and practical application. Finally, users can provide suggestions for improvements.

7.2.1 NPS Score

Net Promoter Score is based on a single survey question, namely, *How likely are you to recommend this product to a friend or colleague?* Based on the ratings from 0 to 5, the respondents are divided into three groups: detractors, passives and promoters. Detractors are the unsatisfied customers who gave a rating from 0 to 2. Passives are the customers with ratings of 3. They generally feel good about the product but are not that enthusiastic about it. Lastly, the promoters are the respondents who are highly satisfied with the platform and give ratings from 4 to 5.

NPS is calculated as a subtraction between the percentage of promoters and the percentage of detractors:

$$NPS = \%\ of\ promoters - \%\ of\ detractors$$

This percentage can range from -100 to 100. In the first case, all customers are detractors, while in the second case, they are all promoters. Any score above 0 is generally a positive sign since it means that the number of promoters is higher than that of detractors. Typically, the overall NPS benchmark is believed to be 32.

7.2.2 CSAT Score

The CSAT score is determined by asking users to rate their experience with the product at the moment. On a scale from 1 to 5, customers' satisfaction can be divided into two main groups: unsatisfied, ranging from 1 to 3, and satisfied, ranging from 4 to 5. CSAT score aims to determine the percentage of satisfied customers by using the following formula:

$$CSAT = \frac{number\ of\ satisfied\ ratings}{total\ number\ of\ ratings} * 100$$

This percentage can range from 0% to 100%. Usually, if this score is below 50%, it is considered concerning because it implies that there are more unsatisfied customers than total.

7.2.3 CES Score

The Customer Effort Score measures the ease of the customer experience through the participants' assessment of how easy it is to complete specific tasks. Participants who rate the platform with 4 or 5 believe that the experience provided by the product is easy. CES score is calculated by dividing the number of 4 and 5 ratings by the total number of ratings and then multiplying by 100:

$$CES = \frac{number\ of\ 4,5\ ratings}{total\ number\ of\ ratings} * 100$$

As for the CSAT score, the percentage can range from 0% to 100% in this case. However, due to its novelty, the benchmark for this metric does not exist yet. So far, it is believed the higher, the better.

7.3 Survey Results

The results of the survey presented in Google Forms provided a general overview of the responses (A3: Results User Test). In particular, it was already possible to deduce the number of respondents (29), the demographics, the user backgrounds and the final open question for additional feedback. However, in order to calculate the different scores and better interpret the evaluative questions, the resultsA3: Results User Test were exported from Google Forms to Google Sheets. In Google Sheets, built-in functions such as CORREL(range 1, range 2) were used to determine correlations and functions like AVERAGE(range) and COUNTA(range). This has made the data analysis possible and then their representation through appropriate graphs.

7.3.1 Demographics

The majority of users who took part in the user testing are aged between 21 and 25, making up 80% of the total participants. Most of them have a university-level education, with 76% holding or in the process of obtaining a bachelor's degree and 21% having a master's degree. Despite being addressed to everyone, the sample polled coincides with the primary target customers of EduRisk.

7.3.2 User Backgrounds

More than 85% of the users declared that they had never used or heard about a similar platform or product for learning how to manage risks. In addition, almost three-quarters of them have never heard of the concept of future thinking.

7.3.3 NPS Score

The question asked to determine the percentage of NPS is: *How likely are you to recommend this product to a friend or colleague?* Based on the survey results, the results are the following (Figure 43):

- Detractors (0 – 2): 10.3%
- Passive (3): 10.3%
- Promoters (4 – 5): 79.3%

Therefore, the percentage can be calculated as follows:

$$NPS = 79.3\% - 10.3\% = 69\%$$

Since the result is positive and above 32%, the majority of the respondents would recommend the EduRisk platform.

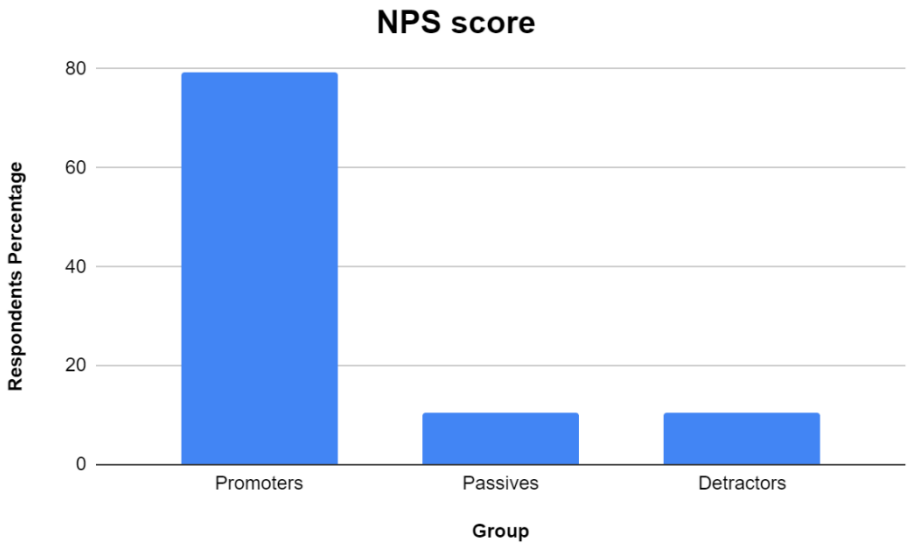

Figure 43: NPS score

7.3.4 CSAT Score

In the survey, four questions can be used to calculate the CSAT score. Based on the survey results, it was found that, by combining the answers, 26 out of 29 participants expressed their positive satisfaction with the platform. Thus, the CSAT score is as follows (Figure 44):

$$CSAT = \frac{26}{29} * 100 = 89.7\%$$

Due to the result, it can be confidently concluded that participants are overall satisfied with the platform.

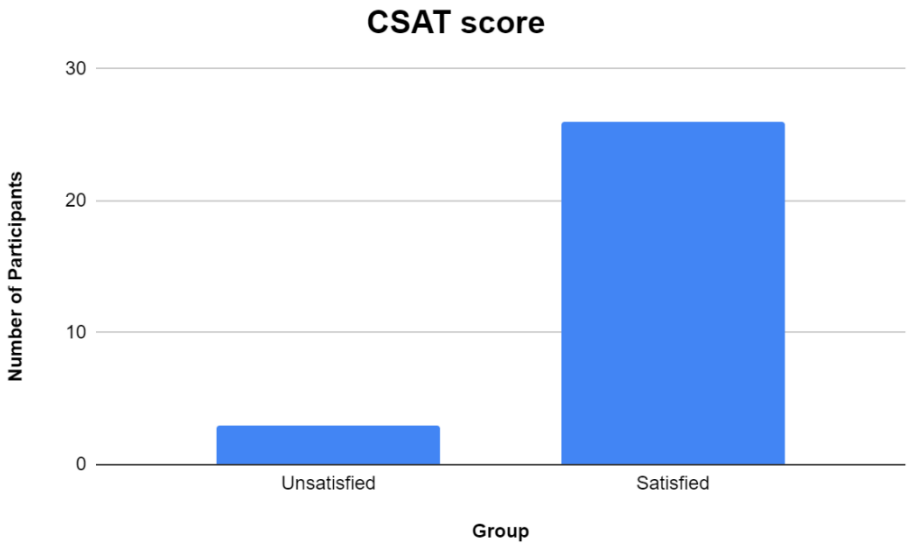

Figure 44: CSAT score

7.3.5 CES Score

The four questions, with a scale of 1 to 5, were formulated in the survey to determine the CES score. Based on them, it was found that 24 participants out of 29 found the platform easy to use (Figure 45). Therefore, the CES corresponds to:

$$CES = \frac{24}{29} * 100 = 82.8\%$$

According to the CES score, the platform is easy to use.

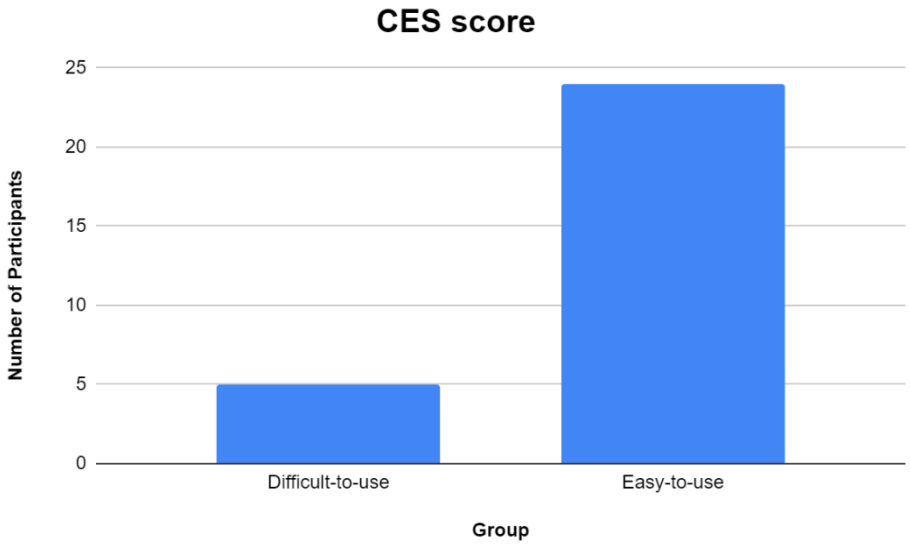

Figure 45: CES score

7.3.6 Evaluative Questions

Based on the survey responses, it was found that 82.8 % of the total users think that the length of the videos is just right and the topics are clearly addressed. In addition, most users (75.9%) appreciate the platform's ease of use, design (65.5%), scenarios (58.6%), and questions (55.2%). Some users (31%) think there is still room for improvement, particularly in the questions and practical applications (27.6%), videos (24.1%), and enhancing engagement levels (20.7%).

Moreover, as shown in the scatter plot of Figure 46, there is no strong correlation between the aspects users liked and their suggestions for improvements, as indicated by the almost flat trendline. This suggests that user preferences and improvement needs are independent of each other. In other words, it means that aspects that are highly liked do not necessarily receive fewer improvement suggestions, and vice versa. Thus, each element of the platform should be evaluated individually, focusing on areas for improvement while maintaining the strengths identified.

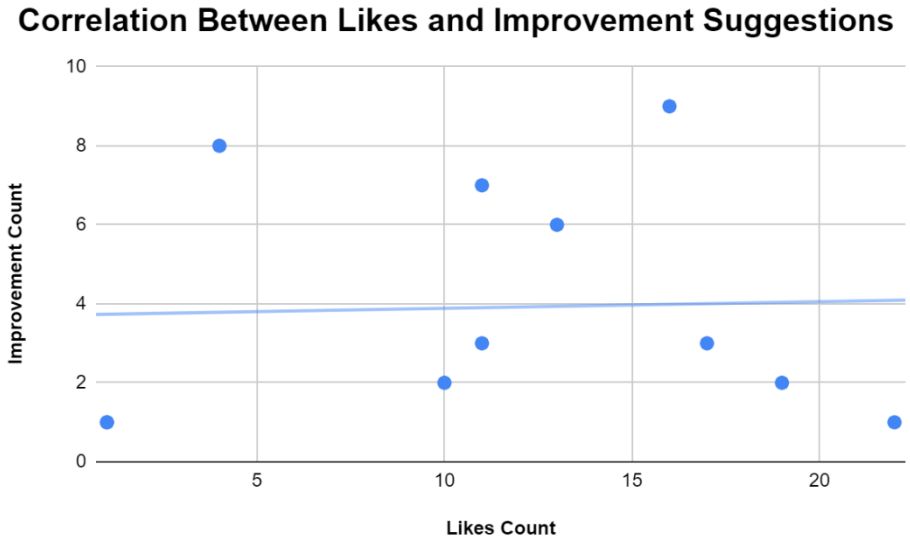

Figure 46: Correlation Between Likes and Improvement Suggestions

7.3.7 Additional Feedback

The user feedback process was completed with the final open question along with verbal comments and suggestions. In general, users had a positive impression of the platform, appreciating the overall design and finding it useful as an introduction to understanding and managing risks. Some users suggested adding an explanation of the objective the platform aims at the start to help them better understand the context and immediately identify the relevance for them. Since EduRisk is a platform that introduces new concepts, many users found that the amount of information was overwhelming when consumed all at once. They recommend focusing on one topic per session, which, indeed, is the standard expectation in a typical situation. To improve engagement, it has been proposed that more interactive elements, such as small games, be added. For instance, some users suggested implementing the provided questions with a scoring system to motivate thoughtful participation. The majority of the users requested that subtitles be added for

better comprehension and to make the info button on the Future Thinking pages more visible. Other suggestions included preventing users from skipping content without having completed it, offering the platform as a course on already existing educational apps, and adding practical examples to contextualise the learning materials better.

Furthermore, it was interesting to observe that only a few participants answered the questions ‘What allowed Homo sapiens to survive?’ and ‘What constitutes a risk?’ correctly. While most of them correctly selected the percentage decrease in attention that a driver's brain experiences when using a mobile phone. Overall, users found the questions to be fun and engaging.

7.4 Revision Prototype

Among the many insightful feedback gathered, those that have been implemented will be explained below.

Firstly, due to high demand, subtitles were added to every video. This was done using the same editing software as before, by turning on the 'Auto caption' feature. However, some adjustments had to be made to the design, size, colour, position, and font of the text. Additionally, some minor fixes were necessary to ensure the timing and accuracy of the detected words.

Secondly, to make the info button on the Future Thinking pages more visible, its position was made ‘sticky’ to the top, which allows the button to be kept in place while scrolling.

Thirdly, to address the suggestion about introducing and explaining the platform as a whole, new versions of the 'start' and 'home' pages have been created. The ‘start’ page (Figure 47) is a welcome page that consists of a brief description of the main content elements. When opening the link, the elements are animated such that they appear one by one. Besides the ‘welcome!’ text, the explicit name of the platform ‘EduRisk’ is shown, which recalls the same stack of blocks style as the previous version. Moreover, the mission of the website is highlighted by the tagline ‘The right place to learn how to manage risks without giving up fun’, displayed on a green oval. An arrow then suggests scrolling down, indicating to the user that there is more content on the same page. By scrolling down or pressing the arrow, the website continues with a series of speech bubbles highlighting different features of the platform. These features include short videos, quizzes, scenarios, and future thinking, each represented by icons alongside the speech bubbles. The icons appear one by one as you scroll through the content. At the bottom of the page, there is the ‘start’ button that invites users to begin their educational journey. Just below it, the platform creator's name is displayed.

As shown in Figure 48, on the home page, there is an arrow that resembles a tortuous road, and the topics covered are highlighted by boxes that recall animated road signs. This is designed to make the order of the topics more understandable, both to encourage users to follow the learning path step by step, improving the overall user experience and ensuring a logical progression through the material provided.

Due to time constraints, all the other feedback received could not be implemented. However, they could be considered for future improvements to the platform.

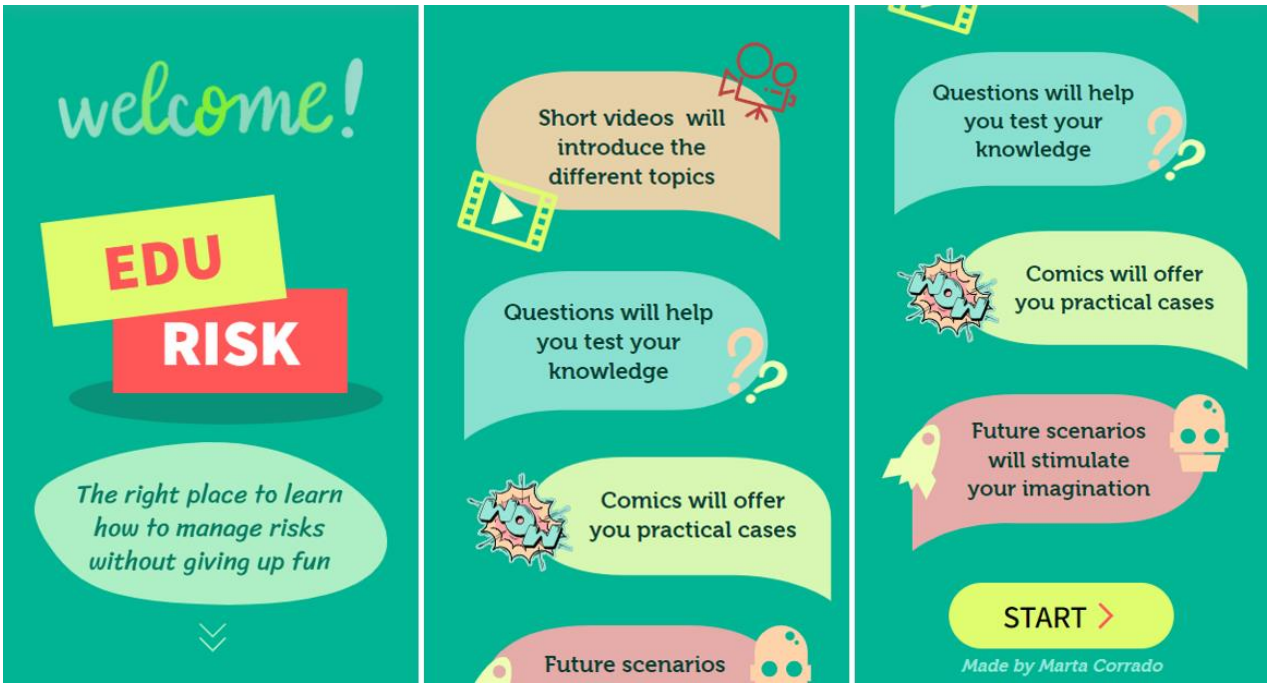

Figure 47: Start page final version

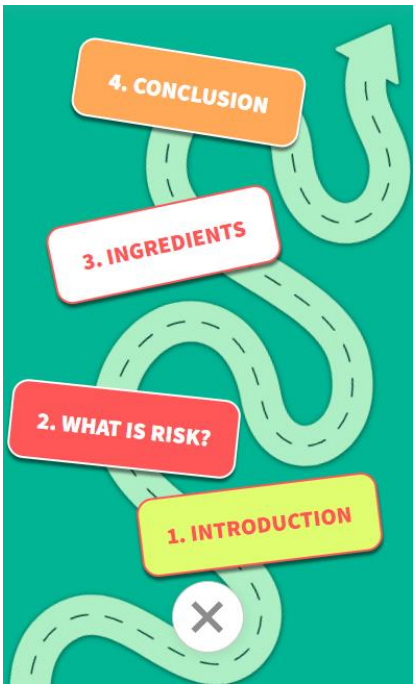

Figure 48: Home page final version

8. DISCUSSION & FUTURE WORK

Valuable insights gained during the evaluation phase can be used as starting points for discussions of this research's limitations and as inspiration for future improvements or projects.

8.1 Research Problem

The research problem that this project aims to solve is the need to educate people about risks in order to improve their perception and management of risk in a complex society increasingly characterised by technological advancements and a constant flow of information. Although technological advances have improved our lives, work and health, one of the main fears of today's society is the potential danger associated with them. This issue has been intensified by the paradox of increased anxiety towards rare technological accidents combined with the emotional chaos generated by the rapid spread of information compared to more dangerous situations with which it is possible to live quietly. In order to deal with this situation, the study explores the effectiveness of microlearning as an innovative educational approach for risk education. The goal is to develop a user-centred learning platform called 'EduRisk' that makes use of microlearning and future thinking principles to contribute to the creation of a risk culture that empowers non-experts in understanding and managing risks effectively.

8.2 Key Findings

From the survey results, it is possible to reveal several key findings. Demographically, the majority of the participants in the study were between 21 and 25 years old and had university-level education. Over 85% had never used or heard of a similar platform, and nearly 75% were unfamiliar with the concept of future thinking. A substantial likelihood (69%) of recommending the platform to others was registered. Additionally, the CSAT was almost 90%, reflecting overall positive satisfaction, and the CES was nearly 85%, showing the platform's ease of use.

Regarding the platform's video length and topic clarity, the feedback was generally positive. Positive aspects with rates higher than 50% included ease of use, design, scenarios, and questions. However, users also highlighted areas of improvement related to practical applications, including additional videos and an explanatory introduction to the platform. Most of the users suggested adding subtitles, while some others recommended more interactive elements such as games.

Based on the feedback gathered, some improvements have been implemented. Subtitles were added to all videos, the info button was made more visible, and new 'start' and 'home' pages were created to give more context to the whole platform and improve the user experience. Additional suggestions were made, which could not be implemented due to time constraints. However, they can be considered for future improvements to the platform.

8.3 Result Interpretation

The survey results provide a comprehensive overview of the perception and effectiveness of EduRisk in meeting the specified functional and non-functional requirements. First of all, demographic data show that the users tested fall within the primary target: young adults not older than 30 years old. Moreover, the fact that almost all respondents had never encountered a similar platform and most were unfamiliar with the future thinking concept highlights the novelty and potential impact of EduRisk in intriguing people and innovating in risk management education.

The positive feedback on mobile optimisation, video content delivery, and the inclusion of interactive quizzes highlights the platform's success in meeting functional requirements. The high NPS score implies the platform's appeal and effectiveness. In addition, the positive CSAT indicates the high satisfaction level of the participants with their experience, reinforced by the CES score, which highlights the platform's user-friendliness, making it accessible and easy to navigate for the majority of the users.

The evaluative feedback highlights further the positive aspects, suggesting the platform effectively meets user expectations regarding content delivery and overall design. However, areas for improvement have been identified that align with some functional requirements, suggesting the inclusion of offline access, social sharing options, and multi-language support.

Among the users tested, some of them then stated that they found the amount of information overwhelming when consumed all at once. This speaks in favour of the nature of microlearning. Its effectiveness indeed depends on delivering content in small, easily digestible segments, allowing for frequent revisits, even during short breaks, to ease content assimilation.

In conclusion, the survey results and subsequent improvements indicate that EduRisk is a valuable tool for educating users about risk management. It has intense user satisfaction and significant potential for further development based on their feedback.

8.4 Overall Project Limitations

Despite the overall positive outcomes and success of the EduRisk platform, several limitations should be acknowledged.

First of all, the survey conducted had a limited sample size of 29 participants, predominantly young adults with a university background. Even though this demographic represents the target audience, it may not fully represent the diverse range of potential users. This could limit the generalizability of the findings and the broader applicability of the platform.

Secondly, although the platform is optimised for mobile devices since it is a website, it relies highly on internet connectivity to access it. The lack of an offline access feature may discourage individuals from using it, especially for those with inconsistent internet access.

Thirdly, engagement and comprehension can be enhanced, for instance, by including gamification elements as suggested by users, as well as push notifications and social sharing options.

Fourthly, even though the implementation of subtitles and the visibility of information buttons enlarge the potential user range, standards to accommodate users with disabilities remain areas for development.

The survey results offer a snapshot of user satisfaction and engagement. Still, they do not provide any insights into the platform's long-term effectiveness in changing user behaviour and improving risk management skills.

8.5 Recommendations and Future Work

Although the approval ratings were high, EduRisk has vast room for improvement. Even when implementing the recommendations received, it is necessary to consider that the sector is constantly expanding and evolving. Other possible implementations could involve activities aimed at increasing usage, e.g. through a sharing option, and retention rates. For instance, sending push notifications at times that align with the user's habits. However, it's important to remember that EduRisk is mainly a training platform and needs to consider personal growth and freedom of choice, especially for younger users. The idea of not pressuring users to engage could increase its educational value and serve as a unique and strategic feature.

Additional implementation can, on the other hand, include the possibility of guaranteeing broader accessibility. For instance, by adhering to global standards such as the Web Content Accessibility Guidelines (WCAG), features like screen reader compatibility and keyboard navigability can better accommodate users with disabilities by promoting inclusivity and usability.

In terms of future research and development, longitudinal studies can be conducted to provide additional insights into the long-term effectiveness of the platform. In this way, it will be possible to assess knowledge retention and application over time to validate its educational impact. In the same type of study, the platform's influence on user behaviours and decision-making in real-life risk situations can be analysed by observing how users apply the learned concepts, thus demonstrating the platform's practical benefits. Moreover, through the conduction of cross-cultural studies, the platform's relevance and effectiveness can be assessed in different cultural contexts in order to make it globally accessible. In addition, researching the potential for integrating EduRisk with formal education curricula, which includes collaborations with educational institutions, organisations and bodies to incorporate risk management training into their programs. Another interesting approach would be the implementation of advanced technologies, such as artificial intelligence, to personalise learning paths and augmented reality to create immersive scenarios to improve the learning experience.

Last but not least, in line with increasing environmental awareness, especially among younger generations, and with the primary educational purpose, EduRisk could aim to choose ecological hosting that uses renewable energy and becomes an ecological platform that promotes sustainable practices.

The implementation of these recommendations and advancing research initiatives can transform the EduRisk platform into an even more effective tool, enhancing its educational impact, accessibility, and global user engagement over time with the goal of achieving growth and ensuring a sustainable future.

9. CONCLUSION

This is the final chapter of this thesis, where the conclusion regarding the conducted research is represented by providing the main findings related to the principal and sub-research as formulated in Section 1.1. Finally, the last paragraph summarises the overall argument of this project.

9.1 Research Findings

In this section, the answers to each subquestion (SQ) are presented in order to address the final main research question (RQ).

***SQ 1**: How can microlearning principles be applied to enhance learning about risks effectively?*

Learning fragmentation is a positive and defining element of microlearning and a strong point of EduRisk. Security and risks are usually addressed in long, dull, and discontinuous sessions. As a result, they are not very effective and are often perceived as a duty rather than an opportunity.

EduRisk offers a broad perspective on risk, considering both the negative impacts and opportunities. It also allows users to digest its content in manageable parts, preventing information overload that could discourage them from engaging with unfamiliar yet valuable topics. This is supported by the high level of interest from respondents and their willingness to recommend the platform to others.

***SQ 2**: What are the main differences between the traditional teaching approach and the one proposed by microlearning in terms of risks?*

Compared to traditional teaching methods, EduRisk micro-lessons are short and minimal. However, they are taught by highly qualified experts in this field. Each module can be completed in a few minutes, ensuring a fast response to a specific question. By avoiding unnecessary details, they help users stay focused on the topic. Tested users showed high interest and were never bored. They completed all modules and tasks, and they stated that they do not use or know platforms similar to EduRisk.

***SQ 3**: How can future thinking and simulation of potential scenarios improve individuals' confidence and their preparedness to face uncertain events of the future?*

The project introduces, as a further element of novelty, the concept of future thinking. As in the risk management process, a detailed context analysis can help identify signals of potential future scenario changes and prepare response strategies in advance. Through the simulation of future scenarios, now considered absurd but that one day could become a reality, the user is stimulated to use creativity, problem-solving abilities and divergent thinking. In this way, they could develop greater awareness and confidence necessary to manage, without anxiety, even in unexpected and unpredictable situations that the future holds. From the user test, it emerged that few know the Future thinking, but almost all appreciate its value.

RQ: How to provide an effective risk education in a society in a hurry?

Teaching to recognise hazards and manage risks by implementing appropriate and timely response strategies is not only necessary but possible. It needs to start from the teaching methods. Traditional education, provided by experts and institutions, is no longer enough in the era of social media and low

attention spans. On the other hand, individuals, bombarded with constant flows of news and information from all directions, have less and less time to stay up to date. Strategic communication and a form of education that guarantees small but continuous training are needed.

This is the challenge of this project, which has a dual innovative effect. Firstly, it provides the possibility of communicating with a simple and concise method suitable for the multitasking needs of non-expert users, the key concepts of as complex as essential topics that would otherwise remain ignored. Secondly, but not less importantly, EduRisk has the potential to generate an unmet need among individuals, thus being able to be classified among disruptive innovations. The results of the test showed that, beyond the learning of the basic concepts, the platform has the potential to stimulate curiosity and interest in the topic of risks.

9.2 Final Takeaways

This project aims to investigate how to provide risk education that is attractive, stimulating interest, and, therefore, effective while respecting the needs and preferences of individuals, especially the youngest.

Starting from the possibility of using the well-known microlearning method, a platform named EduRisk was created. It proposed an introduction to risk management divided into four modules. The ultimate goal was to demonstrate that it is possible to develop resilience and manage future uncertainties through it.

The study and, in particular, the responses gathered during the user test have highlighted a lack of ability to distinguish real situations of danger, a lack of recognition of cognitive biases, and a poor appreciation of the value of heuristics. Additionally, it was observed that alternative methods and tools for risk education beyond the traditional ones are scarce. There was also an expressed interest in EduRisk as a new means of communicating and teaching essential concepts, along with a suggestion to integrate it into formal education and training programs. What has just been described tends to confirm that communication and training adapted to the needs and preferences of contemporary humans are necessary and appreciated.

Ultimately, as argued by the economist Daniel Kahneman [21], two types of thought coexist in our brain and are both useful. System 1 is fast and instinctive, while System 2 is slow and reasoned. Just as both systems were necessary for our survival, rationality and quick thinking are also needed in our hyper-technological, complex, and in-a-hurry society.

The project developed has some limitations and certainly cannot be exhaustive. However, it can offer some ideas for future studies. Heuristics are as crucial as rational thought and can be changed over time with the right approach. Due to known cognitive biases, systematic and analytical risk management methods must be placed alongside the heuristics. In a society governed by the web and social networks, it is appropriate to use the same language to communicate effectively.

As a Chinese proverb says, *A journey of a thousand miles begins with a single step*, and the first step is to capture the attention by stimulating curiosity and interest. This is the challenge posed by EduRisk. If this initial step were to be pursued further, through thorough research and in-depth analysis, possibly even on a personal level, it might be feasible to ultimately achieve the desired goal of establishing a profound and deep-rooted ‘culture of risk.’

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APPENDIX

A1: Consent Form

Informed consent form template for research with human participants

Authors: BMS Ethics Committee with input from Human Research Ethics TU Delft
Last edited: 20-01-2022

Dear Participant,

Thank you for agreeing to take part in this research study. The aim is to explore the effectiveness of microlearning in enhancing learning about risks. Your participation is crucial in contributing to our understanding of educational methodologies.

The session will be approximately 15 minutes long. At the start, you will be introduced to the EduRisk platform, where you'll have the opportunity to familiarise yourself with its features. This includes watching videos, answering short questions, and freely exploring the different sections and contents offered on the platform.

As a participant, your role in this study involves watching a video and completing some activities related to it, e.g. quizzes and scenario-based exercises. In the end, you will be invited to fill out a survey. It will gather your opinions regarding the various aspects of the platform, focusing on three key customer satisfaction metrics: Customer Satisfaction (CSAT), Customer Effort Score (CES), and Net Promoter Score (NPS).

The general topic of the videos and activities is risk management, structured as follows:

- Introduction: An overview of risk management concepts is explained by comparing individual's approach in their daily lives versus the company's approach.
- What is Risk?: The term risk and the difficulties of defining it uniquely are presented. Thus, different researchers' perspectives and theories will be explained.
- Ingredients: The ingredients of risk will be explained, namely the elements that define them: goals, impact and uncertainty.
- Conclusion: It emphasises the importance of integrating a robust risk analysis and management approach in both personal and institutional contexts, highlighting the need for a proactive attitude towards future uncertainties and challenges.

Your participation in this study is entirely voluntary. You can withdraw from the research at any time without explanation/justification. All information collected will be kept confidential, and any data obtained will be used solely for research purposes and reported anonymously.

If you have any questions or concerns, please feel free to contact the researcher Marta Corrado at m.corrado@student.utwente.nl, supervised by professor Mariëlle Stoelinga m.i.a.stoelinga@utwente.nl. For ethical considerations, you can contact the Ethics Committee of Computer and Information Science via ethicscommittee-CIS@utwente.nl.

Thank you once again for your contribution to our research, and I look forward to your participation.

Kind regards,

Marta Corrado

UNIVERSITY OF TWENTE.

Consent Form for [*Education about Risks*]

YOU WILL BE GIVEN A COPY OF THIS INFORMED CONSENT FORM

Please tick the appropriate boxes.	**Yes**	**No**
Taking part in the study		
I have read and understood the study information dated [___/___/_____], or it has been read to me. I have been able to ask questions about the study, and my questions have been answered to my satisfaction.	○	○
I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions. I can withdraw from the study at any time without having to give a reason.	○	○
I understand that taking part in the study involves an interview, and the researcher will take notes. After the finalisation, the notes will be discarded.	○	○
Use of the information in the study		
I understand that the information I provide will be used for refining the design discussions regarding the most effective designs to educate people about risks, and it will be paraphrased to be used as a part of the report of the thesis of this study. The main points could have a secondary use since they may be discussed with the project supervisor.	○	○
I understand that personal information collected about me that can identify me, such as [e.g. my name or where I live], will not be shared beyond the study team.	○	○

Signatures

_____	_____	_____
Name of participant [printed]	Signature	Date

I have accurately read out the information sheet to the potential participant and, to the best of my ability, ensured that the participant understands what they are freely consenting.

_____	_____	_____
Researcher name [printed]	Signature	Date

Study contact details for further information:

Marta Corrado, m.corrado@student.utwente.nl

Contact Information for Questions about Your Rights as a Research Participant

If you have questions about your rights as a research participant or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher(s), please contact the Secretary of the Ethics Committee of Computer and Information Science via ethicscommittee-CIS@utwente.nl

UNIVERSITY OF TWENTE.

A2: Survey for User Tests

EduRisk Survey

Sign in to Google to save your progress. Learn more

* Indicates required question

What's your age? *

- ◯ 16 - 20
- ◯ 21 - 25
- ◯ 26 - 30
- ◯ over 30

What's your current education? *

- ◯ High School graduate
- ◯ Bachelor's degree
- ◯ Master's degree
- ◯ Phd
- ◯ Other: _____

Have you ever used or heard about a platform or product for learning how to manage risks? *

- ◯ Yes
- ◯ No

How would you rate the overall usability of the EduRisk platform? *

	1	2	3	4	5	
Very Poor	○	○	○	○	○	Excellent

On a scale from 0 to 5, how likely are you to recommend the EduRisk platform to a friend or colleague? *

	0	1	2	3	4	5	
Not at all likely	○	○	○	○	○	○	Extremely likely

How much do you feel your understanding of risks and opportunities to manage them has improved after using the EduRisk platform? *

	1	2	3	4	5	
Not at all	○	○	○	○	○	A lot

Have you ever heard about Future Thinking? *

- ○ Yes
- ○ No

Future thinking scenarios aim to make you ready to face unpredictable events. How useful are they? *

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very Useful

How engaging did you find the microlearning modules (videos, quizzes, scenarios)? *

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very engaging

How do you rate the clarity of the content provided in the platform? *

	1	2	3	4	5	
Very poor	○	○	○	○	○	Excellent

How would you rate the conciseness of the content provided? *

	1	2	3	4	5	
Very poor	○	○	○	○	○	Excellent

How would you rate the graphics of EduRisk? *

	1	2	3	4	5	
Very poor	○	○	○	○	○	Excellent

How useful are the selected images in aiding your understanding of the content? *

	1	2	3	4	5	
Not at all	○	○	○	○	○	Very useful

How would you rate the length of the videos? *

- ○ Too short
- ○ Too long
- ○ Just right

What did you like most about the EduRisk platform? *

- ☐ Content quality
- ☐ Ease of use
- ☐ Engagement level
- ☐ Design
- ☐ Practical application
- ☐ Videos
- ☐ Questions
- ☐ Scenarios
- ☐ Future Thinking
- ☐ Other: _____

What aspects of the EduRisk platform do you think could be improved? *

- [ ] Content quality
- [ ] Ease of use
- [ ] Engagement level
- [ ] Design
- [ ] Practical application
- [ ] Videos
- [ ] Questions
- [ ] Scenarios
- [ ] Future Thinking
- [ ] Other: _____

Do you have any additional comments or suggestions for improving the EduRisk platform?

Your answer

Submit Clear form

A3: Results User Test

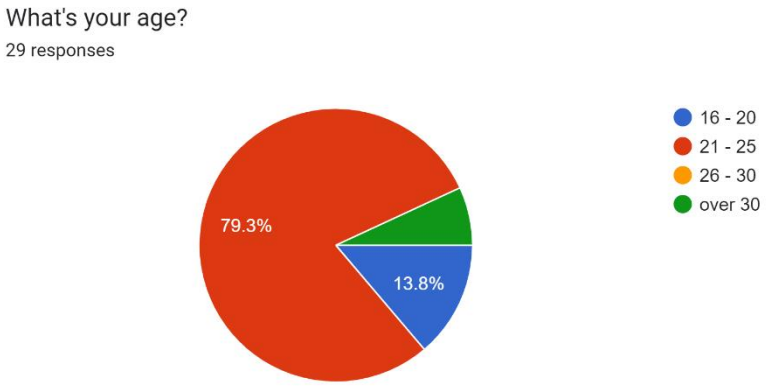

Figure A1: Survey Question 1 Result

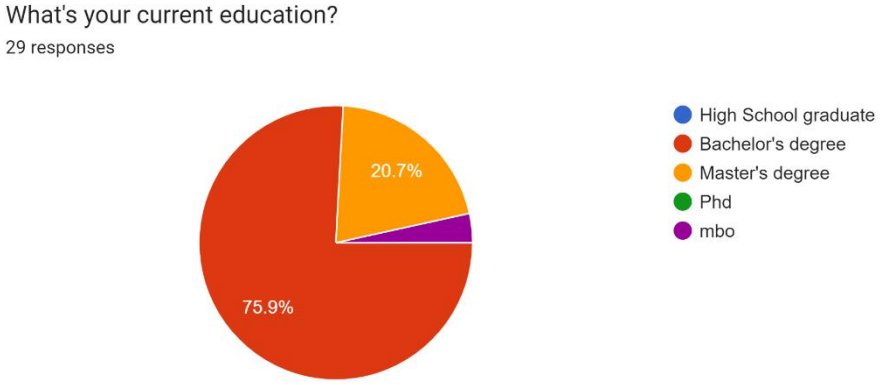

Figure A2: Survey Question 2 Result

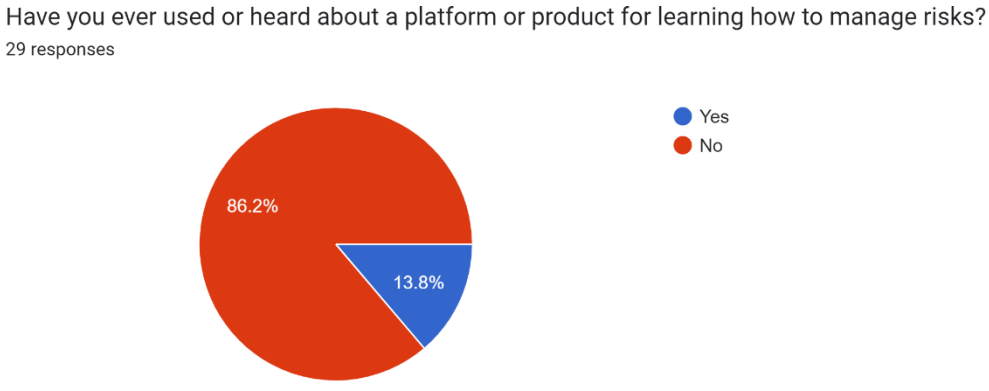

Figure A3: Survey Question 3 Result

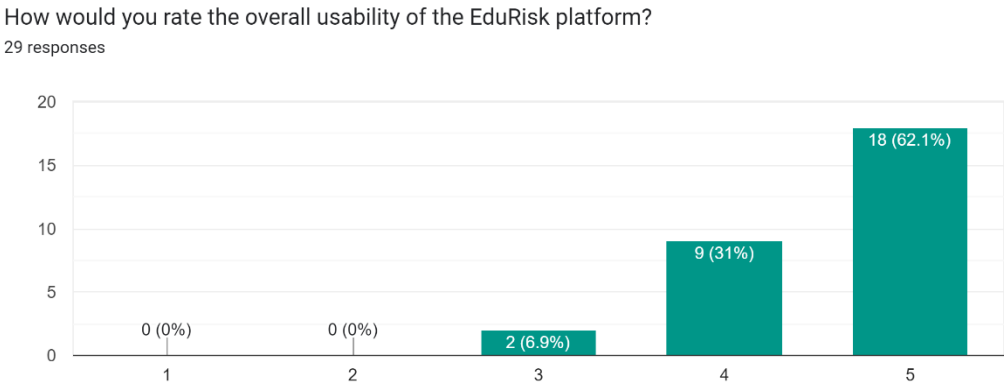

Figure A4: Survey Question 4 Result (CES)

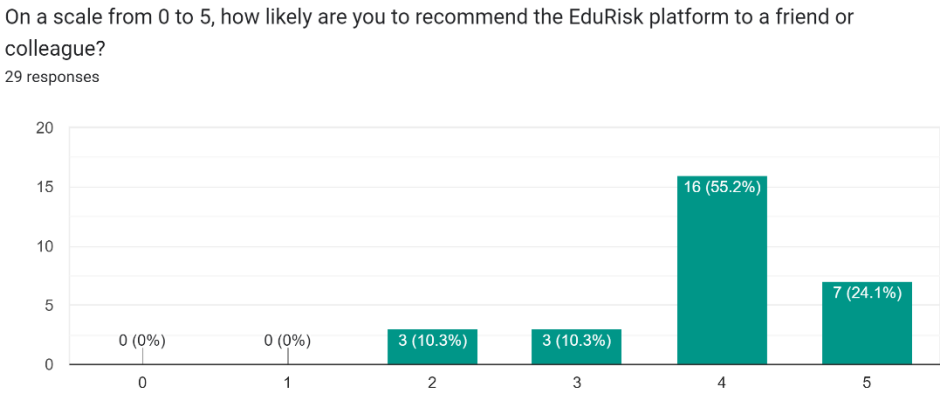

Figure A5: Survey Question 5 Result (NPS)

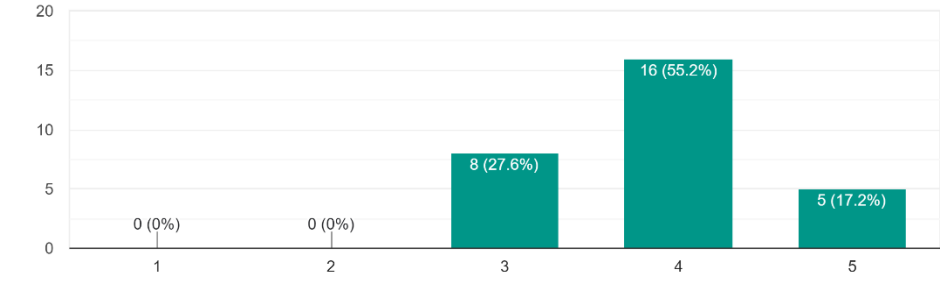

Figure A6: Survey Question 6 Result (CSAT)

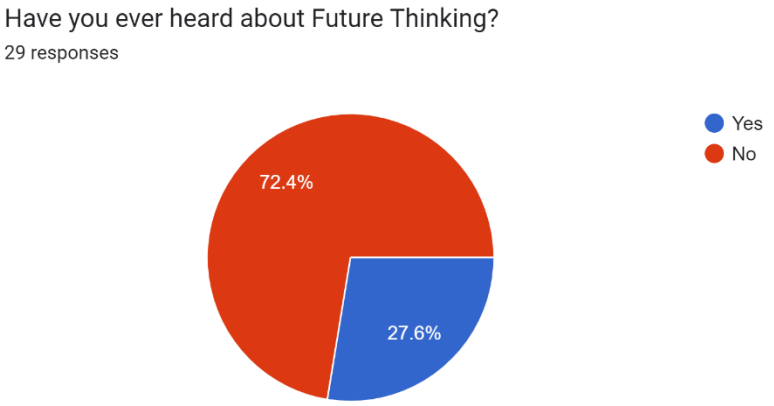

Figure A7: Survey Question 7 Result

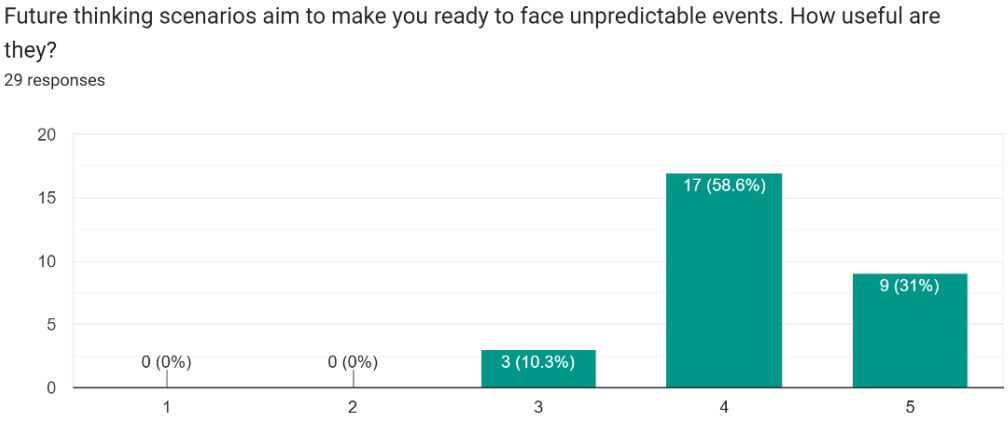

Figure A8: Survey Question 8 Result (CSAT)

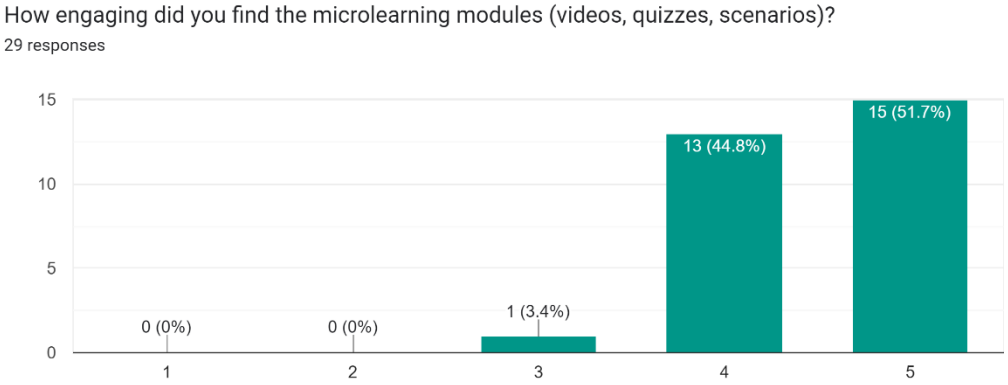

Figure A9: Survey Question 9 Result (CSAT)

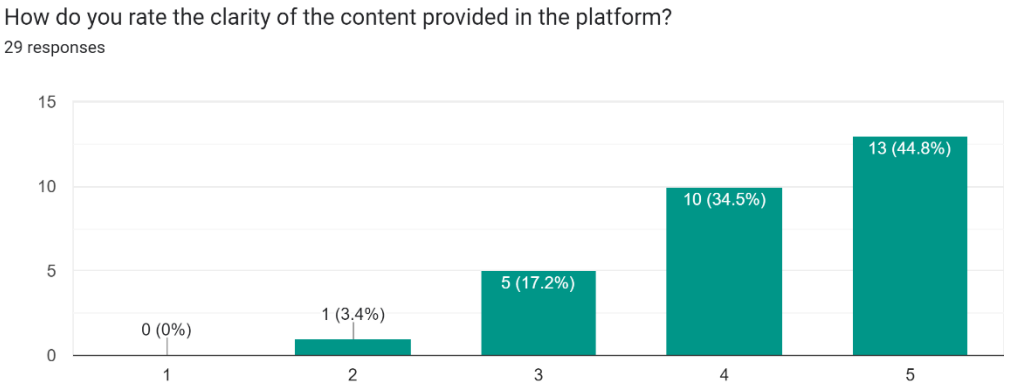

Figure A10: Survey Question 10 Result (CES)

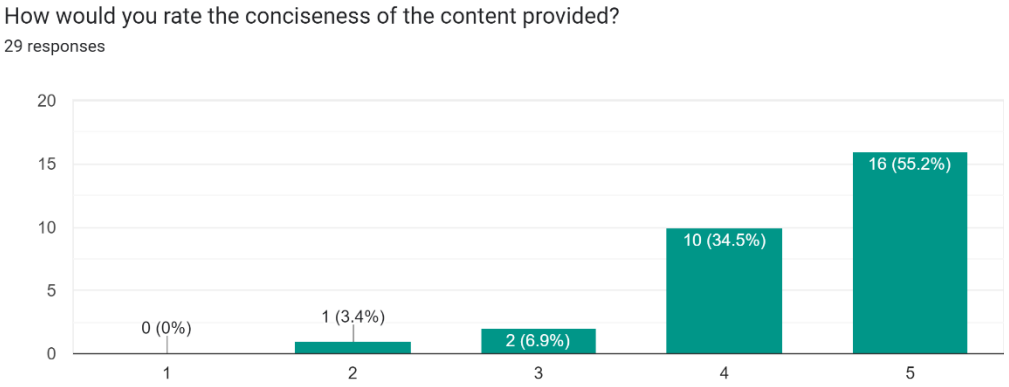

Figure A11: Survey Question 11 Result (CES)

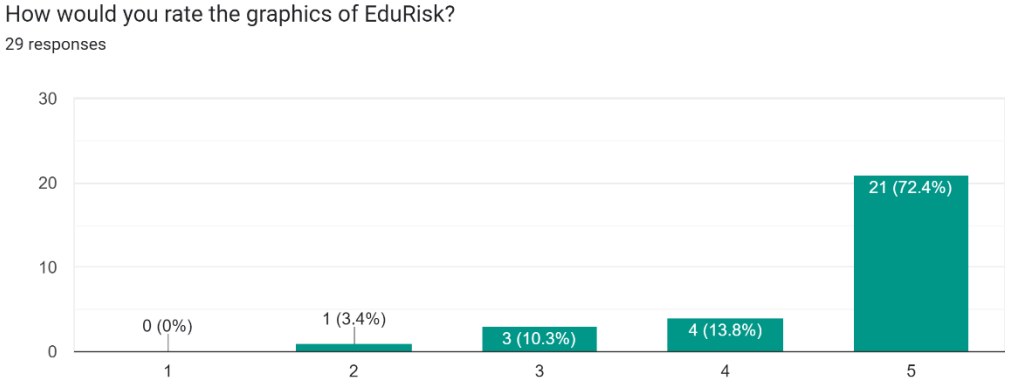

Figure A12: Survey Question 12 Result (CSAT)

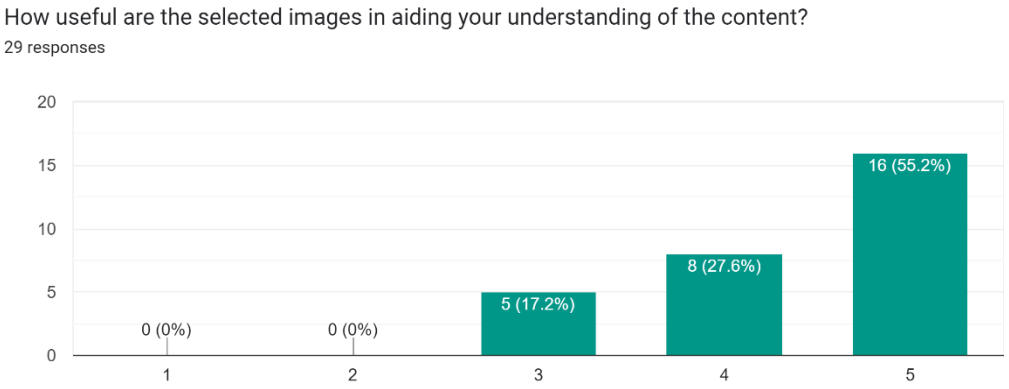

Figure A13: Survey Question 13 Result (CES)

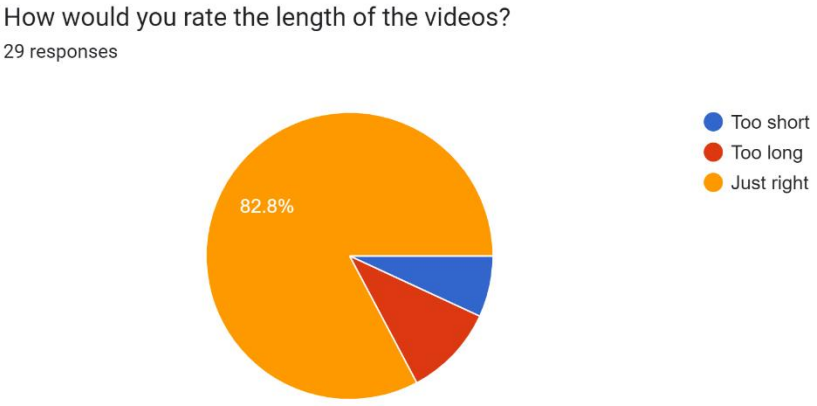

Figure A14: Survey Question 14 Result

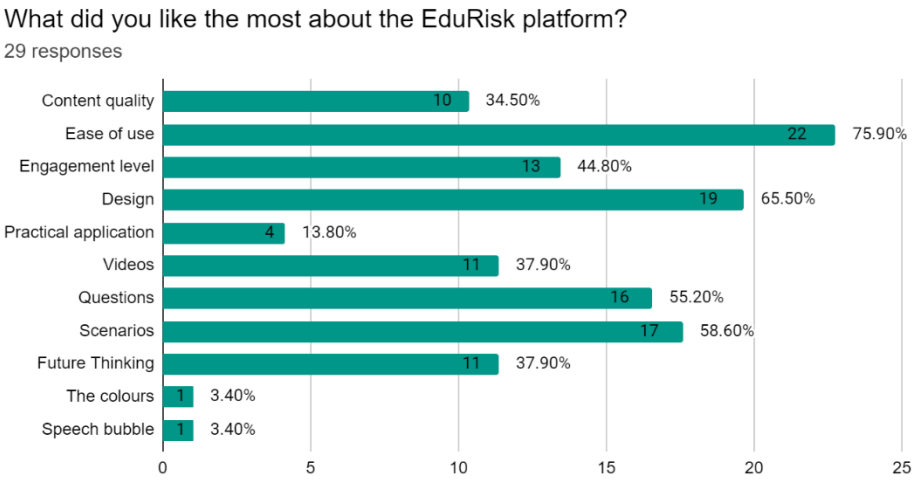

Figure A15: Survey Question 15 Result

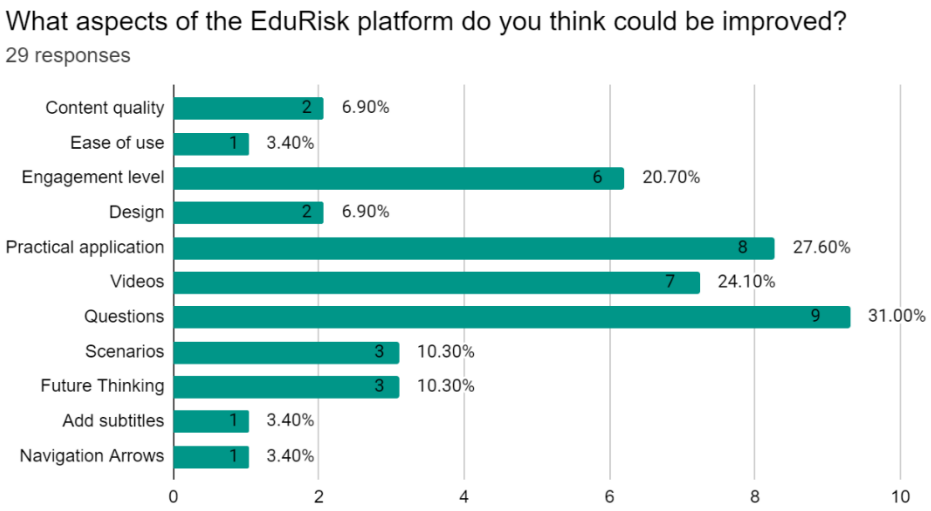

Figure A16: Survey Question 16 Result

Do you have any additional comments or suggestions for improving the EduRisk platform?

Looks amazing!

Maybe don't let people skip pages if they haven't completed the video or question

It is a useful tool to better understand risk and how to deal with it because unconsiouslessly you deal with it everyday.

very nice! maybe a bit more context as to in which scenario this is applied. So more context in the beginning for the whole application.

Looks good!

Context within which the knowledge can be used is not fully clear, especially when it comes to target audience (knowing that the videos are made specifically for students, for example, would make it easier to contextualise)

The application provided a lot of information, maybe a bit too much to process at one go. Seeing many videos after each other can be a bit overloading

The idea of being able to methodically manage daily risks is interesting. I would like to know more

Maybe you can also implement a really small game or something in which you can learn about the consequences of the risks. (maybe 30 s) Or you can maybe just add some scenarios in which you can choose your action and see the consequences.

I think the tool is already very nice, however maybe adding subtitles would be helpful.

i think it would be nice to have in an app format, maybe include it as a course in already available platforms for courses.

a score after each segment indicating how well you understand the provided content.

shorter question and answer text

I thought at first, oh i have to watch videos. But i found them really engaging because of the animaton, something was changing every second so it was interesting to look at. Also I sometimes thought " Oh i know this question maybe" and skipped over the vidoeo, then I did not know the question but still wanted to find out so skimmed through the video to find the answer. Engaging!

Some of the elements looked clickable but weren't, like the letters in the start menu. Also the play and forward icons were visible upon watching the video, I like that it does not have that.

Overall nice coherent design

It's usefull to know how much our attention is reduced by looking at our phone while driving. It should be shown to young people!

I would have loved if my score was being tracked somehow, of course i get the opportunity to select answers more times, but maybe somehow if there was a point system i would resist just trying everything without thinking about it too hard. And perhaps the videos could benefit from subtitles so that i experience the more traditional approach to learning (text) as well as video.

Subtitles and send me the link

Maybe put some more examples of practical scenarios so its easier to contextualise the content for real life situations

Figure A17: Survey Question 17 Result