

# A gamified career guidance platform with the potential to motivate young people intrinsically

Jessica Brandenburger<sup>1</sup> and Monique Janneck<sup>1</sup>

<sup>1</sup>Technische Hochschule Lübeck, Institute for Interactive Systems (ISy), Lübeck, Germany

## Abstract

Digital offerings for young people's career orientation are on the rise, but it is a challenge to design digital applications that are used voluntarily outside of school. In this paper, we present a gamification and design concept of a career guidance platform and results of a field phase (n = 35) at a German school (grade 8) in which we investigated the perceived intrinsic and extrinsic motivation as well as the usefulness of the elements of the platform. Our results show that perceived intrinsic motivation is higher than perceived extrinsic motivation for all elements; **badges, items, progress indicator, challenges & quests, buddy with feedback function, story, vision board, interactive graphics, todo list**, and a **certificate**. The perceived intrinsic motivation and the usefulness of all elements correlate positively (highly significant). For almost all elements, a significant correlation between intrinsic and extrinsic motivation is also evident, except for the **story**.

## Keywords

User Interface Design, Gamification, Education, Career Guidance Platform, Motivation

## 1. Introduction

Career orientation often takes place in the school context, in higher grades. In order to enable an early extracurricular engagement with the topic of career orientation, we are developing a digital application with a playful approach that is intended to support adolescents from 12 years and older in their decision-making processes and to be used outside of school on a voluntary basis, as intrinsically motivated as possible. The application, as an extra-institutional offering, is intended to prepare young people for career orientation and provide them with individualized assistance to gain an overview of their own strengths, career options, and goals. The platform uses scrollytelling (composed of *to scroll* and *storytelling*, of content that reacts to the user's scrolling behavior [1]) and metaphorically visualizes the career choice jungle. Young people can scroll through a jungle world and can explore

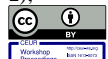
different topics - expeditions with corresponding discovery paths (demo video, [2]).

Interesting other instruments for supporting career orientation exist, like the recently launched career choice app with an integrative gamification approach [3]. Few platforms take a gamification approach, when they do, they are often limited to job-related quizzes or skills tests. Moreover, most platforms do not specifically target younger kids. Especially the spatial context that young people from rural areas often face in their career and migration decisions is seldom taken into account.

Gamification in career counseling can reduce uncertainty about career choice and increase interest [4]. The use of game mechanics, aesthetics, and game thinking is intended to motivate youth to take action [5]. Many studies refer to commonly used gamification elements, such as points, badges, and leaderboards [6], [7]. In this paper, we present gamification and design elements for a career guidance platform and their effects. We report on a field test with n = 35

---

7th International GamiFIN Conference 2023 (GamiFIN 2023),  
April 18-21, 2023, Lapland, Finland  
EMAIL: Jessica.Brandenburger@th-luebeck.de (A. 1);  
Monique.Janneck@th-luebeck.de (A. 2);  
ORCID: 0000-0003-0478-1353 (A. 1); 0000-0003-4269-009X (A.  
2);



© 2023 Copyright for this paper by its authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

CEUR Workshop Proceedings (CEUR-WS.org)

students at a German school in a rural region, where we investigated the perceived intrinsic and extrinsic motivation as well as the usefulness of the career guidance platform elements.

## 2. Related Work

Motivation is multidimensional and has varying degrees of autonomy [8]. Intrinsic motivation is achieved when individuals have pleasure and interest in performing an activity [9]–[11]. According to flow theory, intrinsically motivated activities can induce flow when one is fully focused on the activity [12]. In this regard, a desired behavior that is achieved through external incentives is more extrinsically motivated [9], [10]. Thereby, according to Deci & Ryan's self-determination continuum, extrinsic motivation consists of [8]); external regulation, elicited exclusively by external incentives, introjected (elicited by fear, avoidance of shame, guilt at failure, ego enhancement) or identified regulation, triggered by a slightly higher level of self-determination because one feels that he or she caused the action, and integrated regulation, which is the highest level of self-determination of extrinsic motivation, where one feels that the action is consistent with one's own values and needs [10]. Furthermore, according to Deci and Ryan, there are still unmotivated individuals who have no intention to perform a certain behavior [9], [11], [13].

According to Self-Determination Theory (SDT), in order to specifically promote intrinsic motivation, attention should be paid to the experience of autonomy, the experience of competence, and relatedness [14]. This means that if we do something completely voluntarily, without external pressure, in a self-determined manner, and have the freedom of choice (experience of autonomy), as well as feeling of competence [10] through positive feedback for a performance for which we feel responsible [15], and we feel connected (social relatedness), then we may be intrinsically motivated. If these innate psychological needs [16] are not met, it can have negative effects on performance [10].

Both intrinsic and extrinsic motivation can promote performance enhancement [17] but only intrinsic motivation has also been associated with better learning outcomes, improved psychological well-being, and increased creativity [8], [10].

Dan Pink identified in addition to autonomy as a motivation driver also mastery and purpose.

Mastery describes the desire to improve one's skills at something that is important and often requires perseverance and purpose is our need for meaning in our actions [18].

There are several frameworks for designing gamified systems, e.g., Marczewski's RAMP Framework [19], which includes essential four motivational drivers of gamified systems, **Relatedness, Autonomy, Mastery and Purpose**.

Among the best known frameworks is certainly the Octalysis Framework by Yu-Kai Chou [20]. He found in many experiments that motivation and related behaviors only occur when one or more of the eight core drives (CD) are behind the actions: CD1: Epic meaning & Calling, CD2: Development & Accomplishment, CD3: Empowerment of Creativity & Feedback, CD4: Ownership & Possession, CD5: Social Influence & Relatedness, CD6: Scarcity & Impatience, CD7: Curiosity & Unpredictability, CD8: Loss & Avoidance, as well as the hidden (physical) core drive: sensation, which is about physical feelings such as hearing and seeing that give us pleasure.

In the literature there are some approaches to cluster game elements into main categories or similar. Blohm & Leimeister, for example, group game mechanics and game dynamics under game design elements and describe activated motives. Dynamics stands for the user experience triggered by the mechanics [21], [22]. The subjective user experience, in turn, is related to the user motivations [21]. Hunnicke et al. (2004) makes a similar attribution earlier with the MDA framework [23]. In his framework, he also mentions the aesthetic component, which describes the emotionally evoked state of the users. Game mechanics, represent the components of a game at the level of data representation. Dynamics describe the runtime behavior of the mechanisms and the aesthetics describe the desired emotional responses.

In the classic case of extrinsic motivation, external regulations [10], such as through typical gamification elements, can potentially promote autonomous motivation if extrinsic incentives are not perceived as controlling [8], [24], [25]. However, it is known, that engagement-based, completion-based, and performance-based rewards can also undermine intrinsic motivation [6], [25].

Manzano-León et al. examined studies from the years 2016 - 2020 and concluded that points, badges and leaderboards are generally used most frequently [26] in the education sector [27] and predominantly promote extrinsic motivation [28],

[29]. Rewards, like badges can increase motivation to learn [30] and engagement [31] but should not be given for trivial actions, but for tasks that require special effort so that they are meaningful rewards for users [29] otherwise activities that were originally intrinsically motivated can also shift to extrinsically motivated activities [32] and intrinsic motivation can even be inhibited [33]. However, the elements of narratives and challenges are also used more and more frequently [27].

Studies by Lemos and Veríssimo (2014) show that intrinsic and extrinsic motivation can coexist and are not in conflict to each other [34]. Furthermore, studies by Wu and Santana (2022) also observed that intrinsically motivating as well as extrinsically motivating elements have an influence on the perceived enjoyment and, for example, positively influence the purchase intention [35]. Perceived usefulness, motivation, and satisfaction also appear to have an impact on learners' ongoing intentions [36]. Based on the literature we derive following hypotheses:

- H1: There is a correlation between the perceived intrinsic and extrinsic motivation of gamification elements.
- H2: Perceived intrinsic motivation and perceived value/usefulness of a gamification element correlate positively.

Some standardized questionnaires are available for measuring intrinsic and extrinsic motivation, such as the Academic Self-Regulation Scale [37], which is based on SDT and assesses the four regulatory styles (external, introjected, identified, and intrinsic) with 32 Items and the Motivated Strategies for Learning Questionnaire (MSLQ) [38] investigated by Tine Nielsen in a higher education context [39]. Furthermore, there exists the Intrinsic Motivation Inventory (IMI) Scale [40], which was developed by a research group at the University of Rochester [41] and contains 22 items in its standard form and nine items in its short form. Years later, a German short version with 12 items was developed: the Intrinsic Motivation Short Scale [42]. Many questionnaires contain many items to capture the overall motivational impact of an application, for example.

### 3. Gamified career orientation platform

In the conceptualization and design of the gamified career guidance platform, we considered heuristics for the design of gamified systems by van Roy [13] as well as the Core Drives (CD) of the Octalysis Framework by Yu-Kai Chou [20].

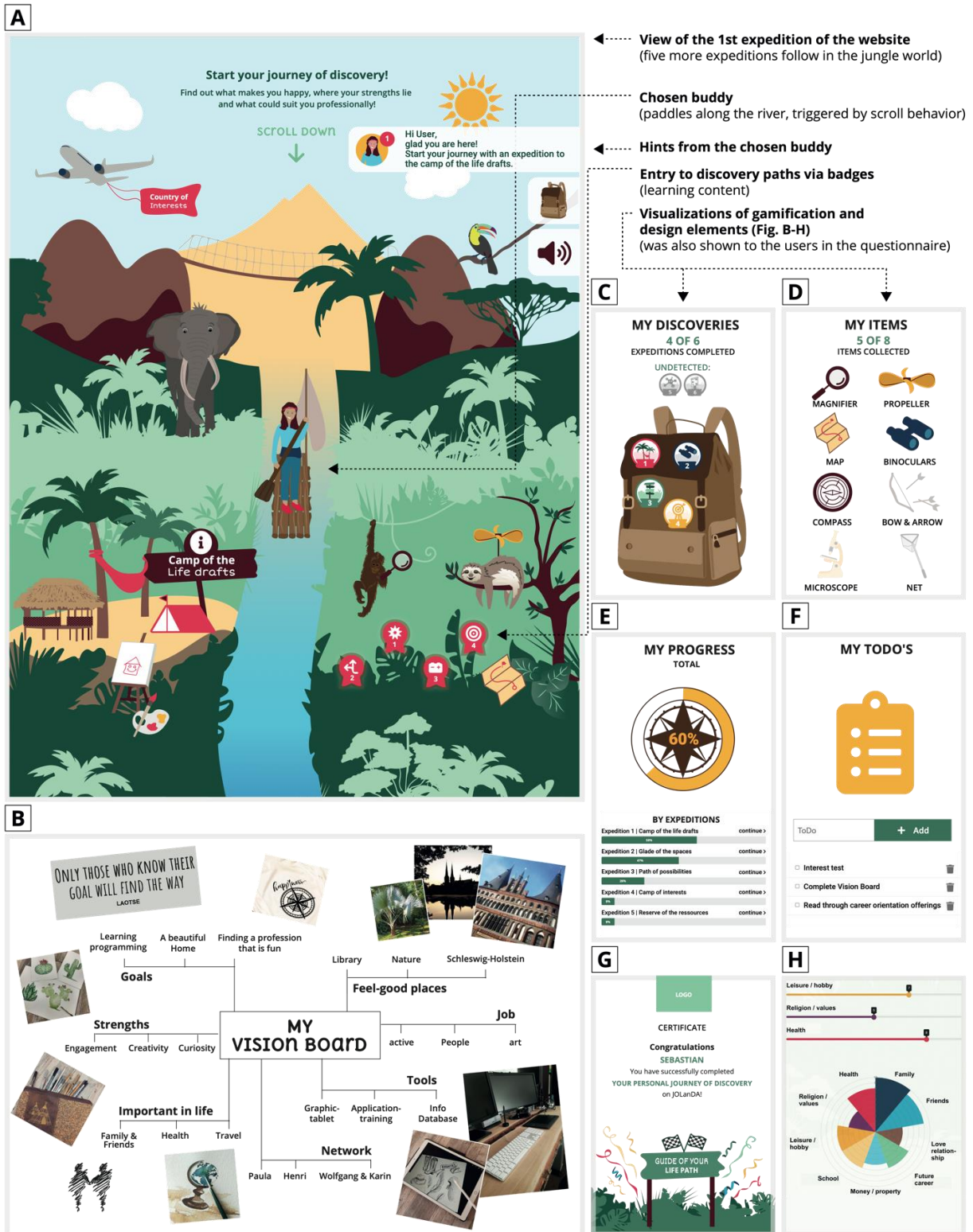
Furthermore, we also followed the Human-Centered Gamification Process [43] when implementing our gamification concept into the practical application of our career guidance platform.

Essentially, the novel interaction concept (different from the usual course platforms) is intended to be unpredictable and to arouse curiosity (CD7, [20]). Students can go on a personal journey of discovery on the website. They can identify where their strengths lie, what makes them happy and what might suit them professionally. The *story* – the journey through the jungle (Fig. 1, A) – is reminiscent of a trip, a scavenger hunt or the last visit to the zoo. It is designed to connect and promote empowerment and create meaning (CD1, CD3, CD5 [20]). Furthermore, expeditions can be "traveled" with *challenges & quests* designed to encourage the pursuit of progress and the development of skills. Students can obtain unpredictable *items* (Fig. 1, D) and also *badges* (Fig. 1, C) for their backpacks by going through different discovery paths with learning materials and completing expeditions. They can see their *progress* (Fig. 1, E) on their dashboard (*challenges & quests, items, badges, progress indicator* linked to CD2, [20]). Upon successful completion of all expeditions, the user will receive the "Guide of your life path" *certificate* (Fig. 1, G), which is also aimed at fulfilling CD2 and CD4, CD5 [20], but until then, for many expeditions, the order in which the expedition paths are completed can be determined by the user. At the beginning, when users enter the platform, they can choose from a wide range of possible *buddies* (example of chosen buddy in Fig. 1, A) to join them on the platform and give users feedback (linked to CD3, CD4 and CD5 [20]). In addition to classic gamification elements, there will also be a few design elements that weave themselves into the game concept of the career guidance platform. There will be a *vision board* (Fig. 1, B), that contain goals, wishes and visions (linked to CD1, CD3 & CD5, [20]). The vision board is partially generated from data participants enter when using the platform. They can also add to it at any time. Afterwards, they can also print it out. *Interactive graphics* (Fig. 1, H) can be discovered by the users, results are visible at real-time (linked to CD1, CD3 & CD5, [20]).

**Table 1**

Gamification and design elements on the career guidance platform and potentially fulfilling basic needs according to the SDT.

Gamification & design elements			Potential need satisfaction		
Mechanics	Dynamics	Aesthetics	Competence	Autonomy	Relatedness
Badges	Collection [21]	Challenge, Discovery, Expression [23]	Assessm. of progress & feedback [13], [44]–[48], (CD 2 [20])	(Decision) freedom which path to take [13], [44], [45], [47]	Status [19], [45]
Items	Collection [21]	Challenge, Discovery, Expression [23]	Assessm. of progress & feedback [13], [45]–[48], (CD 2 [20])	Feedback to progress [45]	Status [19], [45]
Progress	Challenge, Exploration [21]	Challenge, Discovery [23]	Performance feedback [13], [45], [47], [48], (CD 2 [20])	(Decision) freedom [13], (Direct) feedback [45]	
ToDo List	Organization, Developm. [21]	Challenge, Discovery [23]	Support learner's competence [13], Feedback [47]	(Decision) freedom Choice, Responsibility [13], [19], [44], [45], [47], [49]	connection through contributions [49]
Certificate	Challenge, Exploration [21]	Challenge, Expression [23]	(Positive) feedback [13], [44], [45], [47] (CD 2 [20])	Feedback to progress [45]	Status (sharing) [19], [49], (CD 5 [20])
Challenges & Quests	Challenge, Exploration, Developm. [21]	Challenge, Discovery, Expression [23]	Manageable goals/options, Challenging (meaningful) tasks [13], [44], [45] (CD 2 [20])	(Decision) freedom, Involvement, Creativity, Task meaningfulness [13], [44], [45], [47] (CD 3 [20])	Sense of relatedness (through contributions) [45], [49]
Buddy & Feedback	Developm., Exploration, Challenge [21]	Challenge, Discovery, Expression, Fantasy, Narrative [23]	(Positive) feedback [13], [44], [45], [48]	(Decision) freedom, Creativity, Self-expression [13], [44]–[47], (CD 3 [20])	Connection, Meaningful role [19], [44], [45], [47], (CD 5 [20])
Story	Developm., Exploration, Challenge [21]	Challenge, Sensation, Discovery, Fantasy, Narrative [23]	Journey directly connected to the actions of users [47]	Creativity, (Decision) freedom, Journey of discovery [19], [45], [46], (CD 3 [20])	Social relatedness [46], [47], [50], (CD 5 [20])
Vision Board	Developm., Exploration, Challenge [21]	Challenge, Discovery, Fantasy, Expression [23]	(Customizable) goals, Connected to the actions of users [13], [47], [50]	Creativity, (Decision) freedom, own values/interests [19], [44], [45], [47], (CD 3 [20])	Social relatedness [19], [45], [47], Connection through contributions [49], (sharing) (CD 5 [20])
Interactive Graphics	Developm., Exploration, Challenges [21]	Challenge, Discovery, Expression [23]	Freedom, Challenging tasks, Connected to users action, Feedback [19], [45], [47], [48]	Creativity, (Decision) freedom, Feedback, own values/ interest [19], [44], [45], [47] (CD 3 [20])	Status [19], connection through contributions [49], (sharing) (CD 5 [20])



**Figure 1:** Career orientation platform design and visualization of gamification and design elements

Furthermore, a *todo list* (Fig. 1, F) enable users to organize themselves.

Based on Section 2, we categorized relevant mechanics of game design as used or intended to be used on the career guidance website according to Hunicke et al. (2004) [23] and Blohm and

Leimeister (2013) [21] for a better overview and identified which needs could potentially be met by the elements based on the gamification heuristic by van Roy & Zaman [13], parts of the RAMP Model by Marzewski [19], the Octalysis Framework of Yu-Kai Chou [20] according to the

SDT (see Table 1). We also included design and functional elements, such as the *interactive graphics*, *vision board*, *certificate*, and *todo list*, in the table. We made the assignments based on or following the literature and based on the deployment and use of the elements on our platform.

## 4. Method

In a field phase in November 2022, a total of 41 students participated in two 90-minute school workshop sessions. In total (group session 1 = 17, group session 2 = 18)  $n = 35$  students of grade 8 (females = 14, males = 20, divers = 1 (average age = 13.75 years, indicated by  $n = 32$ )) answered the questionnaire implemented on the career orientation website<sup>2</sup> regarding their perception of intrinsic motivation (IM), extrinsic motivation (EM), and value/usefulness (V/U) of the gamification and design elements on a 5-point scale ranging from 0-4 (0 = not at all true to 4 = completely true).

At the beginning of the workshop, the youth had time to freely explore the career orientation website and complete discovery path 1 & 2 of the first expedition. Finally, they were asked about the individual gamification and design elements (see Table 1 & Fig. 1) by means of the questionnaire. Next to each gamification and design element was a picture of the element that was to be evaluated, as well as descriptive texts for more complex elements, so that a clear reference could be made when answering the question. Standardized questionnaires were not used to their full extent, as motivational questionnaires often have between 10-30 items. The single-item indicator for perceived IM is based on the subscale enjoyment/interest of the Intrinsic Motivation Inventory (IMI) [40], the Short Scale Intrinsic Motivation (KIM) of [42] and the Motivated Strategies for Learning Questionnaire (MSLQ) [38] and includes the question of whether displaying or interacting with the element is enjoyable. The item for perceived V/U- thus the significance of an element is based on the IMI [40], and the EM item for querying perceived extrinsic motivation is based also on (MSLQ) [38] and focuses on external regulation. The item includes the question whether it is important for the adolescents to e.g. collect *badges* to show others their

achievements/progress or whether it is important for them to e.g. create a *vision board* so that others can see their abilities. It does not target all facets of extrinsic motivation according to self-determination theory [51] in detail in order to maintain the brevity of the questionnaire. We used a short response scale for children/adolescents. Therefore, instead of a 7-point scale (as is often used), we used a 5-point scale (0 = not at all to 4 = completely true).

### 4.1. Results

Students reported the most fun and interest in the use of *interactive graphics* ( $M = 3.03$ ,  $SD = 1.058$ ), *challenges & quests* ( $M = 2.86$ ,  $SD = 0.845$ ) the *story* ( $M = 2.71$ ,  $SD = 0.893$ ) and a *progress indicator* ( $M = 2.71$ ,  $SD = 1.017$ ) followed by the possibility to receive a *certificate* ( $M = 2.65$ ,  $SD = 1.152$ ), the *buddy with feedback* function ( $M = 2.60$ ,  $SD = 0.914$ ), the possibility to create a *vision board* ( $M = 2.54$ ,  $SD = 1.010$ ), *items* ( $M = 2.54$ ,  $SD = 1.291$ ), a *todo list* ( $M = 2.43$ ,  $SD = 1.243$ ) followed by *badges* ( $M = 2.37$ ,  $SD = 1.114$ ) (see Fig. 2).

The external incentive to do something also plays the biggest role in the use of *interactive graphics* ( $M = 2.68$ ,  $SD = 1.121$ ) and *challenges & quests* ( $M = 2.60$ ,  $SD = 0.847$ ) followed by *buddies with feedback* function ( $M = 2.37$ ,  $SD = 1.140$ ) and *progress indicator* ( $M = 2.37$ ,  $SD = 1.114$ ). *Badges* seem to stimulate the least and thus only slightly intrinsic as well as extrinsic motivation on this career orientation platform, in addition to the other gamification and design elements. They were also rated least and thus only slightly useful compared to the other elements.

In contrast, *interactive graphics* ( $M = 3.00$ ,  $SD = 0.953$ ), a *vision board* ( $M = 2.71$ ,  $SD = 0.957$ ), a *certificate* ( $M = 2.68$ ,  $SD = 1.065$ ), the *buddy with feedback* function ( $M = 2.66$ ,  $SD = 0.968$ ) and the *story* ( $M = 2.63$ ,  $SD = 0.942$ ) were rated most valuable/useful, followed by a *progress indicator* ( $M = 2.57$ ,  $SD = 0.979$ ), a *todo list* ( $M = 2.57$ ,  $SD = 1.092$ ), *items* ( $M = 2.49$ ,  $SD = 1.197$ ), *challenges & quests* ( $M = 2.46$ ,  $SD = 0.886$ ) and *badges* ( $M = 2.17$ ,  $SD = 1.098$ ).

We observed a significant positive correlation (Spearman rank correlation) between intrinsic and extrinsic motivation for almost all elements, especially a high significant positive correlation for the achievements: *badges* ( $r(33) = .571$ ,  $p <$

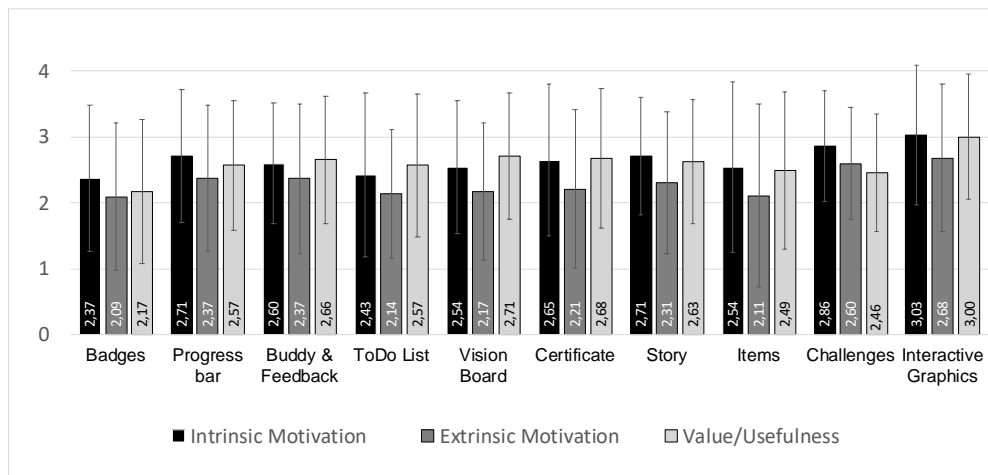
<sup>2</sup> [https://berufsorientierung-jolanda.de/?page\\_id=6782](https://berufsorientierung-jolanda.de/?page_id=6782)

.001) and *items* ( $r(33) = .737, p < .001$ ) (see Table 2). In contrast, no correlation between intrinsic and extrinsic motivation was observed for *story* ( $r(33) = .084, p = .632$  (two-sided)). Thus, the results confirm hypothesis 1 that there seems to be a correlation between the perceived intrinsic and extrinsic motivation of the participants regarding most elements, which is positive.

Furthermore, a strong positive correlation between the variable of intrinsic motivation (IM) of all gamification and design items and the variable of value/usefulness (V/U) of all gamification and design elements could be demonstrated, which turned out to be highly significant, thus confirming hypothesis 2 (Table 2).

Regarding gender differences, hardly any significant differences could be found, except for the *vision board* with regard to intrinsic  $\chi^2(2,$

$n_1=14, n_2=20, n_3=1) = 8.075, p = .018$  and extrinsic motivation  $\chi^2(2, n_1=14, n_2=20, n_3=1) 7.294, p = .026$ , Kruskal-Wallis test). Post-hoc tests (Dunn-Bonferroni tests) show that only "female" and "male" groups differ significantly ( $z = 2.440, p = .044$ ). A descriptive comparison of mean values shows that boys ( $M = 2.85, SD = 0.875$ ) perceive higher intrinsic motivation than girls ( $M = 2.00, SD = 0.961$ ) when viewing the *vision board*. It is a medium to strong effect  $r = 0.42$  according to Cohen (1988). Perceived extrinsic motivation is also higher in boys ( $M = 2.45, SD = 0.999$ ) than in girls ( $M = 1.64, SD = 0.842$ ) when considering the *vision board*, but no longer significant ( $p = .088$ ) after Bonferroni correction. The same is true regarding the assessment of usefulness of *certificates* and the extrinsic motivation of *items*.



**Figure 2:** Perceived intrinsic and extrinsic motivation and usefulness of gamification & design elements by participants (N=34-35)

**Table 2**

Spearman rank correlation of gamification elements and variables (IM, EM, V/U)

	Gamification & Design Elements	Extrinsic Motivation (EM)	Value/Usefulness (V/U)
Intrinsic Motivation (IM)	Badges	.571***	.571***
	Progress indicator	.362*	.610***
	Buddy & Feedback	.531** (+*)	.563***
	Story	.084	.743***
	Items	.737***	.805***
	Challenges & Quests	.428* (+*)	.639***
	Interactive Graphics	.496**	.833***
	ToDo List	.412* (+*)	.797***
	Vision Board	.466**	.639***
	Certificate	.419* (+*)	.749***

Correlation coefficients, \*\*\* =  $< .001$ , \*\* =  $< .01$ , \* =  $< .05$  (two-sided) ((+\*) one-sided (additional star))

Furthermore, the results show us that positive correlations also exist with regard to perceived value/usefulness and extrinsic motivation (two-sided); *badges* ( $r = .565, p < .001$ ), *progress indicator* ( $r = .534, p < .001$ ), *items* ( $r = .640, p < .001$ ), *certificates* ( $r = .537, p = .001$ ), *interactive graphics* ( $r = .488, p = .003$ ), *vision board* ( $r = .435, p = .009$ ), *todo list* ( $r = .473, p = .004$ ). Only weak to moderate effects were observed for *challenges* ( $r = .317, p = .063$ ), *story* ( $r = .003, p = .985$ ), and the *buddy with feedback* function ( $r = .248, p = .151$ ).

## 5. Discussion & conclusion

We developed a career guidance platform with gamification and design elements specifically intended to promote intrinsic motivation so that the platform is used by youth voluntarily outside of school. In doing so, students should have as much freedom of choice as possible to promote autonomous motivation [16], because according to van Roy's heuristics, forcing users to use (part of) the gamified system should be avoided [13].

The results of our field phase with  $n = 35$  students of a German school (grade 8) show trends in perceived motivation (intrinsic and extrinsic) and usefulness of gamification and design elements in practice. We observed that for all elements, perceived intrinsic motivation is higher than perceived extrinsic motivation, even though at this stage we only checked one facet (limitation) of extrinsic motivation. Previous studies show that points, badges, and leaderboards primarily promote extrinsic motivation [28], [29]. Our results suggest higher perceived intrinsic motivation of *badges* and *items*, as they may seem meaningful [29] in this context, but they seem to be perceived as less useful compared to other elements.

EM and IM seem to be intertwined, as observed in other studies [17]. This may be because, for example, the design and aesthetics of the elements appeal to young people. We have been able to determine this in previous studies (usability tests, group discussions), including the VisAWI Short Scale (Short Visual Aesthetics of Websites Inventory [52]) as well as by positively surprised statements of students who stated that they did not expect the playful design, that everything is presented like a real journey. We assume that for elements that have a rather extrinsic motivating effect, high aesthetics can

also positively influence intrinsic motivation. This is because high aesthetics, in addition to fulfilling basic needs, can also give pleasure, it influences the first impression, usability as well as the willingness to recommend again and can be perceived very quickly [52]. If, in addition, the elements are also useful/valuable for the test persons, this can possibly also lead to longer-term use of the platform.

We received – in other evaluations as well – consistently enthusiastic feedback on the implemented *interactive graphics* (Chart.js), which update in real time, and students also had the most fun and interest in the *challenges & quests*, the jungle *story*, and the *progress indicator*. This is in line with the findings of Zeng et al., that game mechanics which stimulate users' imagination, such as stories, promote intrinsic motivation [28].

There were highly significant positive correlations especially for Achievements – *badges* and *items* – but no correlation between intrinsic and extrinsic motivation was found for *story*. The correlations could possibly be even stronger if extrinsic motivation reached a higher level of self-determination [10]. According to Dahlstrøm, it is often internalized extrinsic motivation that motivates users to engage with a system (for example when it comes to learning new skills) and should therefore not be considered undesirable in gamification [53].

A positive predictor of intrinsic motivation seems to be usefulness, i.e., how valuable meaningful a gamification or design element seems. Chou also emphasizes the importance of meaningfulness: "a badge or trophy without a challenge is not meaningful at all" (p. 26 [20]). By embedding the elements in a *story* – a personal journey of discovery – we hope that long-term use of the platform will also be motivating for young people, as Nicholson (2015) stated: "for true long-term change, the gamification system needs to be designed as a journey" (p.14 [7]).

The *interactive graphics*, the *vision board*, *certificate*, *buddy with feedback* function and *story* seem to be most useful and valuable. This suggests that a *vision board* can be a valuable tool for identifying goals in a career orientation context. Waalkes et al. (2019) report on a case study in which *vision boards* were successfully used to promote identity exploration and the development of career and educational aspirations in adolescents and to strengthen self-efficacy beliefs [54].



Limitations of the study include the fact that single indicators were used to measure one construct. Multi-item scales or item sets would have exceeded the reasonable length of a questionnaire in the young age group at a school workshop, in our opinion. We are aware of the fact that these are complex constructs and that essential factors of the construct should be collected via further studies. Even though we did not use a fully standardized instrument for testing the gamification and design elements as existing instruments did not seem suitable for assessing so many elements and we needed short and few items for the young target group, we were able to gather important insights for the further development of the platform. It remains to be noted that similar gamification elements used differently in a different context can have a different effect.

Furthermore, the conditions during field phases are always somewhat different, due to the technical equipment in schools, the internet connection in rural/urban regions, but also due to the mood within groups or peer group effects. All this can inevitably lead to a variance of the results.

Nevertheless, the elements were presented after the exploratory exploration of the platform and in school workshops, compared to online questionnaires, there is the possibility to discuss open questions in order to reach approximately common sense of the respondents

For further development as well as for other platform developments, it is interesting that the interactive elements such as *interactive graphics* and *challenges & quests* seem to trigger the most fun and interest. Both perceived intrinsic and extrinsic motivation was highest among the participants through these elements. The *interactive graphics*, which allowed participants to prioritize areas of their lives, for example, also seemed to be the most useful.

We continue to develop the platform with the involvement of students in iterative development steps and have tested the effect of individual elements in order to identify which elements are inspiring. These should be part of the platform when completed and possibly contribute to a long-term use of the platform by the users.

The preceding exploratory research within the school workshop as well as the resulting overall impression of the gamified platform certainly also have an influence on the evaluation of the elements, but through quantitative and qualitative investigations we are approaching an overall solution that should be interesting for as many young people as possible.

In the future, it should also be possible to share core results of the personal journey on the platform with family members/career guidance counselors, so that the CD5: Social Influence can be taken into account even more strongly and connectedness can be strengthened [20].

Furthermore, the design offers the possibility for easter eggs to be placed in the jungle, thus addressing CD7: Unpredictability even more strongly. We have integrated *challenges & quests* on the platform to promote the experience of competence. It is and remains a challenge to achieve an optimal sense of competence [13] among students of different grades with different levels of education.

In future studies, we will further investigate the construct of perceived motivation and possible influences of motivation on decision-making processes. In addition, we will specifically examine the intrinsic effect of the entire gamified platform using the multi-item scale of the short scale intrinsic motivation and look at the use of the platform over time through collaborations with schools in further school workshops.

## 6. Acknowledgements

This work was funded by the Federal Ministry of Education and Research of the Federal Republic of Germany (BMBF FKZ 13FH033SA8/THL 13FH033SB8). The authors would like to thank Jan Schametat (HAWK Holz Minden) for organizing the field phase at a German school.

## 7. References

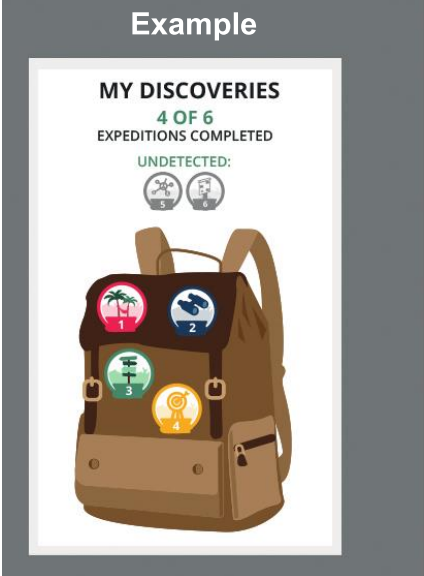
- [1] D. Seyser, M. Zeiller, and A. V. Storytelling, "Scrollytelling – An Analysis of Visual Storytelling in Online Journalism," in *22nd International Conference Information Visualisation*, 2018, pp. 401–406.
- [2] J. Brandenburger, H. Mergan, J. Schametat, A. Vergin, A. Engel, and M. Janneck, "A Digital Application for Digital Natives to Improve Orientation Competence and Career Choice Decisions," in *Proceedings of Mensch und Computer 2022*, 2022, pp. 601–604.
- [3] T. Brüggemann *et al.*, "Vom Berufswahlpass zur Berufswahlapp," Universität Bremen, 2020.
- [4] L. M. Putz, V. Doppler, and V. Stockhammer, "Gamified workshops in

- career choice: Gamification to reduce the lack of personnel in the logistics sector,” *CEUR Workshop Proceedings*, vol. 3147, pp. 124–134, 2022.
- [5] K. M. Kapp, *The Gamification of Learning and Instruction. Game-Based Methods and Strategies for Training and Education*. Pfeiffer, 2012.
- [6] J. Hamari, J. Koivisto, and H. Sarsa, “Does Gamification Work? -- A Literature Review of Empirical Studies on Gamification,” in *2014 47th Hawaii International Conference on System Sciences*, 2014, pp. 3025–3034.
- [7] S. Nicholson, “A recipe for meaningful gamification,” *Gamification in Education and Business*, pp. 1–20, 2015.
- [8] R. M. Ryan and E. L. Deci, “Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions,” *Contemporary Educational Psychology*, vol. 25, pp. 54–67, 2000.
- [9] E. L. Deci and R. M. Ryan, “Handbook of Self-Determination Research,” 2002.
- [10] E. L. Deci and R. M. Ryan, “The ‘What’ and ‘Why’ of Goal Pursuits: Human Needs and the Self-Determination of Behavior,” *Psychological inquiry*, vol. 11, no. 4, pp. 227–268, 2000.
- [11] M. Vansteenkiste, E. Sierens, B. Soenens, K. Luyckx, and W. Lens, “Motivational Profiles From a Self-Determination Perspective: The Quality of Motivation Matters,” *Journal of Educational Psychology*, vol. 101, no. 3, pp. 671–688, 2009.
- [12] M. Csikszentmihalyi, *Beyond boredom and anxiety*. San Francisco, CA: Jossey-Bass, 1975.
- [13] R. van Roy and B. Zaman, “Why Gamification Fails in Education and How to Make It Successful: Introducing Nine Gamification Heuristics Based on Self-Determination Theory,” in *Serious Games and Edutainment Applications: Volume II*, M. Ma and A. Oikonomou, Eds. Springer International Publishing AG, 2017, pp. 485–509.
- [14] E. L. Deci and R. M. Ryan, “Self-determination theory: A macrotheory of human motivation, development, and health,” *Canadian Psychology*, vol. 49, no. 3, pp. 182–185, 2008.
- [15] C. D. Fisher, “The effects of personal control, competence, and extrinsic reward systems on intrinsic motivation,” *Organizational Behavior and Human Performance*, vol. 21, no. 3, pp. 273–288, 1978.
- [16] S. Deterding, “The lens of intrinsic skill atoms: A method for gameful design,” *Human-Computer Interaction*, vol. 30, pp. 294–335, 2015.
- [17] C. P. Cerasoli, J. M. Nicklin, and M. T. Ford, “Intrinsic motivation and extrinsic incentives jointly predict performance: A 40-year meta-analysis,” *Psychological Bulletin*, vol. 140, no. 4, pp. 980–1008, 2014.
- [18] D. H. Pink, *DRIVE The Surprising Truth About What Motivates Us*. Penguin Group, 2009.
- [19] A. Marczewski, “A Simple Gamification Framework | Cheat Sheet,” 2014. [Online]. Available: <https://www.gamified.uk/gamification-framework/>.
- [20] Y. Chou, *Actionable Gamification Beyond Points, Badges, and Leaderboards*. Packt Publishing Ltd, 2019.
- [21] I. Blohm and J. M. Leimeister, “Gamification: Design of IT-based enhancing services for motivational support and behavioral change,” *Business and Information Systems Engineering*, vol. 5, no. 4, pp. 275–278, 2013.
- [22] K. Huotari and J. Hamari, “Defining gamification - A service marketing perspective,” *Proceedings of the 16th International Academic MindTrek Conference 2012: “Envisioning Future Media Environments”*, *MindTrek 2012*, pp. 17–22, 2012.
- [23] R. Hunicke, M. Leblanc, and R. Zubek, “MDA: A formal approach to game design and game research,” *AAAI Workshop - Technical Report*, vol. WS-04-04, pp. 1–5, 2004.
- [24] E. D. Mekler, F. Brühlmann, A. N. Tuch, and K. Opwis, “Towards understanding the effects of individual gamification elements on intrinsic motivation and performance,” *Computers in Human Behavior*, vol. 71, pp. 525–534, 2017.
- [25] E. L. Deci, R. M. Ryan, and R. Koestner, “A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation,” *Psychological Bulletin*, vol. 125, no. 6, pp. 627–668, 1999.
- [26] G. Zichermann and C. Cunningham, *Gamification by design: Implementing game mechanics in web and mobile apps*. O’Reilly Media, Inc., 2011.

- [27] A. Manzano-León *et al.*, “Between level up and game over: A systematic literature review of gamification in education,” *Sustainability (Switzerland)*, vol. 13, no. 4, p. 2247, 2021.
- [28] Z. Zeng, J. Tang, and T. Wang, “Motivation mechanism of gamification in crowdsourcing projects,” *International Journal of Crowd Science*, vol. 1, no. 1, pp. 71–82, 2017.
- [29] A. Rapp, “A qualitative investigation of gamification: Motivational factors in online gamified services and applications,” *International Journal of Technology and Human Interaction*, vol. 11, no. 1, pp. 67–82, 2015.
- [30] D. Gibson, N. Ostashewski, K. Flintoff, S. Grant, and E. Knight, “Digital badges in education,” *Education and Information Technologies*, vol. 20, no. 2, pp. 403–410, 2015.
- [31] J. A. Ruipérez-Valiente, P. J. Muñoz-Merino, and C. D. Kloos, “Detecting and clustering students by their gamification behavior with badges: A case study in engineering education,” *International Journal of Engineering Education*, vol. 33, no. 2, pp. 816–830, 2017.
- [32] M. R. Lepper, D. Greene, and R. E. Nisbett, “Undermining children’s intrinsic interest with extrinsic reward: A test of the ‘overjustification’ hypothesis,” *Journal of Personality and Social Psychology*, vol. 28, no. 1, pp. 129–137, 1973.
- [33] M. D. Hanus and J. Fox, “Assessing the effects of gamification in the classroom: A longitudinal study on intrinsic motivation, social comparison, satisfaction, effort, and academic performance,” *Computers and Education*, vol. 80, pp. 152–161, 2015.
- [34] M. S. Lemos and L. Verissimo, “The Relationships between Intrinsic Motivation, Extrinsic Motivation, and Achievement, Along Elementary School,” *Procedia - Social and Behavioral Sciences*, vol. 112, no. Icepsy 2013, pp. 930–938, 2014.
- [35] X. Wu and S. Santana, “Impact of Intrinsic and Extrinsic Gaming Elements on Online Purchase Intention,” *Frontiers in Psychology*, vol. 13, no. June, pp. 1–12, 2022.
- [36] R. Rohan, D. Pal, S. Funilkul, W. Chutimaskul, and W. Eamsinwattana, “How Gamification Leads to Continued Usage of MOOCs? A Theoretical Perspective,” *IEEE Access*, vol. 9, pp. 108144–108161, 2021.
- [37] R. M. Ryan and J. P. Connell, “Perceived Locus of Causality and Internalization: Examining Reasons for Acting in Two Domains,” *Journal of Personality and Social Psychology*, vol. 57, no. 5, pp. 749–761, 1989.
- [38] P. R. R. Pintrich, D. Smith, T. Garcia, and W. McKeachie, “A manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ),” *Ann Arbor. Michigan*, 1991.
- [39] T. Nielsen, “The intrinsic and extrinsic motivation subscales of the motivated strategies for learning questionnaire: A Rasch-based construct validity study,” *Cogent Education*, vol. 5, no. 1, pp. 1–19, 2018.
- [40] IMI, “Intrinsic Motivation Inventory (IMI),” 1994. [Online]. Available: <https://selfdeterminationtheory.org/intrinsic-motivation-inventory/>.
- [41] R. W. Plant and R. M. Ryan, “Intrinsic motivation and the effects of self-consciousness, self-awareness, and ego-involvement: An investigation of internally controlling styles,” *Journal of Personality*, vol. 53, no. 3, pp. 435–449, 1985.
- [42] M. Wilde, K. Bätz, A. Kovaleva, and D. Urhahne, “Überprüfung einer Kurzskala intrinsischer Motivation (KIM) Testing a short scale of intrinsic motivation,” *Zeitschrift für Didaktik der Naturwissenschaften (ZfDN)*, vol. 15, pp. 31–45, 2009.
- [43] A. Thomas, F. Bader, J. Thomaschewski, and M. Rauschenberger, “Integrating Gamification: The Human-Centered Gamification Process,” in *WEBIST*, 2021, pp. 430–435.
- [44] C. P. Niemiec and R. M. Ryan, “Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice,” *Theory and Research in Education*, vol. 7, no. 2, pp. 133–144, 2009.
- [45] R. E. Saputro, S. B. Salam, and M. H. Zakaria, “A review of intrinsic motivation elements in gamified online learning,” *Journal of Theoretical and Applied Information Technology*, vol. 95, no. 19, pp. 4934–4948, 2017.
- [46] M. Sailer, J. Hense, H. Mandl, and M. Klevers, “Psychological Perspectives on Motivation through Gamification,”

- Interaction Design and Architecture(s) Journal - IxD&A*, no. 19, pp. 28–37, 2013.
- [47] M. Sailer, J. U. Hense, S. K. Mayr, and H. Mandl, “How gamification motivates: An experimental study of the effects of specific game design elements on psychological need satisfaction,” *Computers in Human Behavior*, vol. 69, pp. 371–380, 2017.
- [48] C. Dichev, D. Dicheva, G. Angelova, and G. Agre, “From gamification to gameful design and gameful experience in learning,” *Cybernetics and Information Technologies*, vol. 14, no. 4, pp. 80–100, 2014.
- [49] L. Shi and A. I. Cristea, “Motivational Gamification Strategies Rooted in Self-Determination Theory for Social Adaptive E-Learning,” in *International Conference on Intelligent Tutoring Systems*, 2016, pp. 294–300.
- [50] S. Deterding, “Meaningful Play - Getting Gamification right,” *Google Tech Talk*, 2011. [Online]. Available: <https://www.slideshare.net/dings/meaningful-play-getting-gamification-right>.
- [51] R. M. Ryan and E. L. Deci, “Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being,” *American Psychologist*, vol. 55, no. 1, 2000.
- [52] M. Moshagen and M. T. Thielsch, “A short version of the visual aesthetics of websites inventory,” *Behaviour and Information Technology*, vol. 32, no. 12, pp. 1305–1311, 2013.
- [53] C. Dahlström, “Impacts of gamification on intrinsic motivation,” *Education and Humanities Research*, pp. 1–11, 2012.
- [54] P. L. Waalkes, L. M. Gonzalez, and C. N. Brunson, “Vision Boards and Adolescent Career Counseling: A Culturally Responsive Approach,” *Journal of Creativity in Mental Health*, vol. 14, no. 2, pp. 205–216, 2019.

## 8. Appendix



### Badges

	not true at all	agrees little	partly true	partly true	true	agrees quite	agrees completely
1. I would enjoy collecting badges on this website.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I find collecting badges on this website useful.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. It is important for me to collect badges to show my achievements to others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Figure 3:** Excerpt from the questionnaire on how the individual elements were queried (the complete questionnaire (german) can be viewed at: [https://berufsorientierung-jolanda.de/?page\\_id=6782](https://berufsorientierung-jolanda.de/?page_id=6782))