Design and Evaluation of a Collaborative Writing Process with Gamification Elements

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DESIGN AND EVALUATION OF A COLLABORATIVE WRITING PROCESS WITH GAMIFICATION ELEMENTS

Research paper

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Abstract

This paper aims at studying the influence of gamification elements on collaboration processes in terms of increasing the hedonic motivation as well as the quality of outcomes. We evaluate, how the collaboration process for collaborative story writing is amendable to be supplemented with gamification elements. Additionally, specific gamification elements are considered for successfully accomplishing the process. To approach this aim, Action Design Research is conducted in a common iterative structure. This involves in the first stage building, observing and reflecting on the analog collaborative writing process. Next, design principles are derived and the process is remodeled and implemented via a web-application instantiation to evaluate them. The evaluation reveals the success of the developed design principles to reach higher hedonic motivation. Additionally, the results show the potential to manage the shift towards digital collaboration processes that motivate people to participate and produce promising outcomes that do not vary that much from outcomes in an analog setting.

Keywords: Gamification, Collaboration Processes, Collaborative Writing, Motivation.

1 Introduction

In recent years collaborative writing (CW) gained in importance in several areas covering among others education, research and business. Though there are various interpretations, CW usually covers the act of writing in a form of group work (Debs, 1991; Forman, 1991). We use the definition of CW as “any piece of writing, published or unpublished, ascribed or anonymous, to which more than one person has contributed, whether or not they grasped a pen, tapped a keyboard, or shuffled a mouse” (Rimmershaw, 1992). While potential advantages are among others socialization, joint knowledge, writing expertise and higher document quality, interdisciplinary issues need to be considered, e.g. satisfaction, creativity and effective use of technology (Lowry, 2004). The latter issue comes from the field of Computer Supported Cooperative Work (CSCW). Research in this area aims at enabling virtual teams to work together regardless of temporal or local constraints (Leimeister, 2014). Due to this growing area of virtual collaboration (Curtis and Lawson, 2001; Johnson and Johnson, 1996; Richter, 2018) and the trend of social technologies including blogs, wikis, forums and Google Docs, CW and CSCW gained a lot more attention and popularity (Storch, 2011; Suwantarathip and Wichadee, 2014). Hence, with the increased use of computer supported tools more research is required on computer-mediated collaborative writing (Forman, 1991). One question, that arises, is, how to encourage satisfaction and creativity within a virtual environment (Lowry, 2004). With collaboration research showing potential towards better group outcome (Bittner and Leimeister, 2014; Bowers and Pharmer, 2000; Langan-Fox, 2004; Wegge, 2008), research on collaborative writing provides evidence of positive influence on quality of texts as well as
on self-esteem of involved participants (Suwantarathip and Wichadee, 2014; Yarrow and Topping, 2001). Additionally, motives and motivation of the group participants have a crucial role. Also “mixed-motive situations” (Forman, 1991) need to be considered, i.e. taking care of individuals’ conflicting interests (Forman, 1991). According to the need of individuals’ motivation, the Multimotive Information Systems Continuance Model (MISC) shows the coherence of motives, satisfaction and performance. Hereby it considers hedonic, intrinsic and extrinsic motivation on performance (Bhattacherjee and Premkumar, 2004; Lowry, 2015). Research on gamification elements has proven positive impact on triggering hedonic and intrinsic motivation (Steffens, 2014). According to Vanduhe and Nat (2020) “the activation of direct intrinsic behavior is one of the most vital features of gamification”. In the context of information systems several benefits come along, e.g. for Knowledge Management Systems, “[intrinsic] motivation has proven to be the most supportive motivational type […] because of its lasting effects and its positive impact on […] quality” (Friedrich, 2020). Additionally, extrinsic motivations, which involve rewarding, may even suppress the positive effects of intrinsic motivation demanding for a careful balance of both (Friedrich, 2020; Zhao and Sun, 2019). However, the design and integration of gamification elements according to the MISC in CW environments has recently been identified as a gap (Briggs, 2010; Seeber, 2018; Richter, 2018). This paper aims to contribute in this regard by conducting action design research to design a digital collaboration process (CP) to create texts by CW. Therefore, we address the research questions: Q1: Which parts of the collaborative writing process are suitable to be supplemented with gamification elements? Q2: Which gamification elements are appropriate for encouraging motivation and successfully accomplishing the process?

To support collaborative writing, we design a dedicated collaboration process by means of Collaboration Engineering (CE) and implement it on a web platform. CE is an approach to develop and perform collaboration processes, that are carried out by practitioners to accomplish recurring high value tasks (Kolfschoten and Vreede, 2009). The developed collaboration process at hand enables the practitioners to collaborate creatively in writing a story.

2 Theoretical Background

2.1 Motivation through Gamification in Software Collaboration Teams

A similar problem to the research at hand is addressed by Marczak et al. (2015) and Steffens et al. (2014). They examined the impacts of gamification elements on software collaboration teams. They investigate essential factors having impact on the quality of collaboration output and focus on opportunities delivered by gamification to motivate a collaboration team to reach its goal. Therefore, they developed a framework on gamification elements matching appropriate collaboration activities to achieve a desired behavior in a software collaboration team as well as a qualitative outcome considering usability, performance and functional requirements (Marczak, 2015; Steffens, 2014). Nevertheless, there is also some criticism on the use of gamification elements in the context of motivation improvement, especially considering extrinsic motivation like rewarding. Therefore, the paper by Meske et al. (2016) shall be brought to attention. They criticize the use of gamification elements in social software, strictly speaking the “trend in which gamification solutions majorly focus on rewarding quantitative improvement of work activities, neglecting qualitative performance” (Meske, 2016). Meske et al. (2016) claim that gamification elements including points, leaderboards, levels or badges, which are designed for increasing users’ extrinsic motivation, will eventually decrease their intrinsic motivation. Thereby, they refer to the “overjustification effect” (DeCharms, 1968), which addresses the phenomenon of a secondary extrinsic motivation affecting the primary intrinsic motivation. As these extrinsic elements draw on basic human needs like success or status, users are more likely to follow any instruction respectively to do any task just to satisfy these needs. However, elements promoting extrinsic motivation do not consider the actual quality, but rather only measure the quantity of the users’ actions. Consequently, users try to do as many tasks as possible at a great speed to reach a high quantitative measurement accompanied by success and thereby tend to disregard the quality of their contribution. Hence, hedonic motivation is essential to retain that quality by making users feel satisfied from their actions themselves. If they enjoy what they are doing, they will put more effort in it, which leads to a higher quality. To foster this
hedonic motivation, Meske et al. (2016) emphasize the necessity of interesting challenges for the user and invoke researchers to identify new appropriate strategies and gamification elements (Meske, 2016).

### 2.2 Theory: Multimotive Information Systems Continuance Model (MISC)

The Multimotive Information Systems Continuance Model (MISC) (see Figure 1) represents a modification or extension of the work and model of Bhattacharjee and Premkumar (2004) by Lowry et al. (2015). Considering the need of motivation in CW (Lowry, 2004) and the issue of “mixed-motive situations” (Forman, 1991), MISC relies on different individuals’ intentions, motives and expectations and their influence on individuals’ satisfaction when continuing to use information systems in a specific context. Individuals and their attitude towards the system, process and performance are in the focus of the MISC. One aspect is the influence of current underlying motivations such as hedonic, intrinsic or extrinsic on performance (Lowry, 2015) and thus on the outcome of the process when utilizing information systems to execute it. Gamification for instance covers several intrinsic and hedonic components, e.g. engagement, participation and motivation (Vanduhe, 2020). Therefore, hedonic components, which contain gamification elements can be impactful on individuals’ performance. In accordance to the MISC, we consider gamification elements in the designed and developed collaboration process to reach better outcome by triggering hedonic motivation of individuals for better performance.

![MISC according to Lowry et al. (2015)](image)

### 3 Research Method

The identification of collaborative writing process parts, which are amendable and suitable to be supplemented with gamification elements, is conducted by means of Action Design Research (ADR). ADR is applied in a common iterative structure (Löffler, 2009; Wilde and Hess, 2007). Moreover, the cooperation between action and research is emphasized with the ADR approach (Löffler, 2009; Sein et al., 2011; Wilde and Hess, 2007) by combining design science research and action research (Sein et al., 2011). We develop the structure of the paper aligned to the ADR method. Sein et al. (2011) define four stages: (1) Problem Formulation, (2) Building, Intervention and Evaluation (BIE), (3) Reflection and Learning, (4) Formalization of Learning. These phases are executed twice (see Figure 2). The problem is formulated in the introduction. An action plan is established in the following subchapters.
Wiethof et al. /Gamification in Digital Collaborative Writing

Figure 2. The Action Design Research Structure

The design of the collaboration process and the implementation of a platform to run the collaboration process on were conducted in an iterative manner and in accordance to ADR. The different components regarding the evaluation phase are displayed in Table 1. According to Table 1 four different methods (Simulation, Walkthrough, Expert Evaluation and Pilot Study) were utilized to evaluate the collaboration process and the implemented IT-artifact.

<table>
<thead>
<tr>
<th>Artifact</th>
<th>Preliminary Study</th>
<th>1. Cycle</th>
<th>2. Cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>Validate quality of the process</td>
<td>Identify parts of the CP that are suitable to be supplemented with gamification elements</td>
<td>Evaluate the design principles respectively the implementation of the interventions</td>
</tr>
<tr>
<td>Evaluation</td>
<td>For each: Simulation, Expert Evaluation, Walkthrough and Pilot Study</td>
<td>Two groups of five participants</td>
<td>Two groups of five participants</td>
</tr>
<tr>
<td>Participants</td>
<td>Five groups of three to five participants</td>
<td>Two groups of five participants</td>
<td>Two groups of five participants</td>
</tr>
</tbody>
</table>

Table 1. Research Object and Phases

The Simulation is a check for consistency and contains a step-by-step analysis conducted by the collaboration engineer to identify missing process steps. The expert evaluation refers to a collaboration process expert who is consulted to analyze the efficiency of each building block of the CP to detect deficits. In a walkthrough the process is executed with the problem owner and a practitioner (Kolfschoten and Vreede, 2009). The preliminary study was conducted with the implemented collaboration process with five groups of three to five participants to validate its quality. The feedback was utilized to improve and shape the collaboration process before the first cycle of the current research. The pilot study in the first cycle was conducted in an analog setting to capture important insights through observation to consider for the location-independent execution of the later implemented gamified IT-artifact in the second cycle (see Table 1). The pilot studies within both cycles consist of two groups of five participants. All participants of the second cycle were also part of the first cycle.

**BIE: Analog Collaboration Process:** As for the user survey and the users’ comments after the preliminary study (see Table 1), the process was incomprehensible and creativity as well as motivation encouragement were lacking. This may have negatively impacted the consistency, effectiveness and especially the reusability of the process regarding quality validation criteria. Hence, the current ADR begins with the observation of the problem in practice (Löffler, 2009; Sein et al., 2011) in the first cycle. Therefore, two groups of five practitioners each are formed to execute the process analogously.

**Reflection and Learning: Observations:** During the execution of each process the researcher observes the practitioners’ behaviors, the interaction as well as nonverbal communication. In this way, it is possible to detect parts of the process, which can be enriched by gamification elements (Briggs and Vreede, 2009). In addition, we use the qualitative think-aloud method by Charters (2009) to have greater access to the practitioners’ thoughts. Thereby it is possible to have direct and plain reactions to the process, which might not be reflected to this extent at a later point in time. Ultimately, Charters (2009) highlights...
the need for “triangulation” to validate the interpretation of think-aloud remarks. For the current research videotaping and notes are used (Charters, 2003).

**Formalization of Learning: Design Principles and Interventions:** Based on these reflected observations interventions for process improvement towards the research problem can be developed. These involve fundamental process fragments that can be supplemented with gamification elements as well as preliminary ideas of which elements to choose. Hence, interventions in ADR rather tend to represent various courses of action to reach the intended design goals (Löffler, 2009; Sein et al., 2011).

**BIE: Remodeled Computer Supported Collaboration Process:** Having identified and determined specific courses of action, the research object is redesigned. This enables the iterative nature of the ADR approach. It is then possible to observe the anticipated and unanticipated effects of the interventions in the second cycle considering the new collaboration process incorporating gamification elements (Löffler, 2009; Sein et al., 2011).

**Reflection and Learning: Expert Interviews:** Koch and Gross (2006) point out the relevance of users’ acceptance for the successful application of the process. Thus, they emphasize the involvement of the target group in the development process in an iterative manner. Accordingly, they propose not only the observation of the target group, but also the utilization of semi-structured interviews (Koch and Gross, 2006). As opposed to surveys, interviewers can amplify and elaborate on the experts’ replies as well as avoid and correct any misunderstandings. To ensure the conduction of qualitatively valuable interviews the preparation of the interviews is aligned to the work of Meuser and Nagel (1991). To admit a great ratio of the interview to the experts’ statements and remarks, the conducted interviews are guideline-oriented. The exact design of the interview guideline is dependent on the interventions of the previous phase (Meuser and Nagel, 1991). Additionally, referring to the MISC and the influence of the hedonic component on the users’ satisfaction, it is also relevant to measure the satisfaction with the process as well as the satisfaction with the outcome (Briggs, 2013; Lowry, 2015; Bhattacharjee and Premkumar, 2004). Eventually, the guideline supports a certain comparability. Meuser and Nagel (1991) call this approach a thematic comparison, which does not focus on the individuals, but on the extraction, merger and collocation of typical expressions throughout all interviews (Meuser and Nagel, 1991).

**Formalization of Learning: Results:** The analyzed empirical data of the interviews is reconstructed, interpreted, systematized, set into context and is finally linked to theories and consequences (Meuser and Nagel, 1991). In the context of the paper, the anticipated results are not formulated theories, but generated design principles for hedonic motivation and a high quality outcome of a collaborative writing process.

## 4 Action Design Research Implementation

In the following the ADR is performed as depicted in the research method and concept.

### 4.1 Building, Intervention and Evaluation (Cycle 1)

To represent a collaboration process, Kolfschoten and de Vreede (2009) introduce the Facilitation Process Model (FPM). Figure 3 (left) displays the Facilitation Process Model (Kolfschoten and Vreede, 2009) of the collaborative writing process in the first cycle.

The FPM clearly visualizes the activities and their logical flow by including directed arrows, decisions, activity names, step numbers, durations, patterns of collaboration and thinkLet names (Kolfschoten and Vreede 2009). The patterns of collaboration are activity patterns, which have been identified in the context of CE. Each activity of a collaboration process can be assigned to one of these patterns: Generate, Reduce, Clarify, Organize, Evaluate and Consensus-Building (Briggs and Vreede, 2009). From a more detailed perspective, thinkLets allow a certain specification of the patterns of collaboration. A “thinkLet describes an elementary group process from a facilitator’s point of view by making his or her prompts for the group explicit […]” (Briggs and Vreede, 2009).

So, the given and preexisting process is executed as follows: the preparation includes the gathering of the practitioners, the presentation of the process and in case of an execution not supported by a computer
the equipping with pens, paper and cards. Then, the process begins with a Brainstorming to collect words for the story. The practitioners write down their ideas and put them together in one stack. After that the stack of word cards is reduced by shuffling and dealing the cards. With each practitioner holding cards with predefined words, the iterative part of the process starts: the first practitioner needs to review his or her words and find a suitable one to include in a sentence, which extends the story. After the word card is played with a new sentence written and added to the story, there are two exclusive activities to follow: either claim or do not claim. In case one of their words appears in the present sentence they can claim, play the card and continue with the next iterative round. Otherwise, the next practitioner in line has a turn and continues.Whenever a practitioner plays a card, a new one must be drawn from the stack of word cards. As soon as a practitioner played all his or her cards and cannot draw a new card due to an empty stack, the process ends, and the story is complete.

To describe the process to the practitioners (first cycle according to Table 1), presentation slides were utilized for instructions. The executions of the process (see Figure 3, left) are captured on video. The observations are condensed in three categories according to Table 2. The categories have been chosen based on the similar comprehensive observations within both groups.

| Genre | The practitioners collect and use categories for their Brainstorming and give the story a specific direction. Though they sometimes struggle to use a word in a new sentence, they mostly have fun about the choice of words. The probability of a practitioner claiming is very low considering a diverse collection of only a few words. The practitioners are disappointed about not having matching words to claim. Nevertheless, they have fun writing new sentences and usually comment on them respectively laugh about them. While eventually reflecting on the story at the end of the process, although they are laughing, they feel more dissatisfied about a random ending and random sentences. The story should be a more meaningful and well-rounded one. |
| Winning | The practitioners disagree on the goal of the process. Some want to get rid of their cards as fast as possible and with that win the process as an individual. Others place most importance on the quality of the story, i.e. write a good, coherent and meaningful story with a good ending. Consequently, some practitioners help during the process by giving ideas on how to continue the story. Still no matter the goal, the practitioners work together in a dynamic and concentrated way. However, when they read and reflect on the story, they feel ashamed and consider their story futile. Thus, they ask for feedback and show strong interest in other groups and their stories. They want to be compared with them by time, properness and quality. |
| Deflections | When one practitioner needs more time to think about a new sentence and write it down, the others tend to get impatient and make him or her hurry or start a conversation about both process-related and independent topics. As soon as a new sentence is presented, they usually comment that sentence and sometimes get drifted away by talking about that sentence or the selected word. |

Table 2. Observations of the First Cycle involving the Analog Collaboration Process

### 4.2 Reflection and Learning (Cycle 1)

After having consolidated the observations by three categories, we develop interventions (I) from the Reflections (R) to improve the process regarding the research question Q1 (see Table 3). Therefore, the FPM (see Figure 3, left) is consulted. By utilizing the framework of Steffens et al. (2014) further interventions are considered to address research question Q2. Moreover, we derive meta-requirements (MR) from the observations for case specific interventions and generalized formalization in form of design principles (DP) (see Table 4).

| Genre | R1: The activity “Prepare” of the collaborative writing process is essential for the ongoing process including its consistency and recurrent theme (MR1). In the original process this activity is not well-elaborated. Consequently, the story is missing a golden thread and the practitioners consider it anything but meaningful (MR2). |

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I1: Steffens et al. (2014) suggest the Epic Meaning for processes with a lack of challenges or purposes as well as no clear goals. It creates a convenient environment by giving the process a special narrative (Steffens et al. 2014). In this way the Epic Meaning creates an introduction respectively a genre for the story.

R2: The variety of collected words makes it almost impossible to find matching words (MR3). However, the “Claim”-activity appears as a positive opportunity to keep up with the process while not writing a sentence (MR4).

I2: Despite an Epic Meaning, which might also increase the probability of claiming matching words, Steffens et al. (2014) describe the game element of “Virality and Community Collaboration”. This is used to help people cooperate in problem solving and thus find efficient ways to achieve the group goal.

R3: The original process ends with the completeness of the story. Mostly then the practitioners perceive a feeling of dissatisfaction (MR5). At the end of the collaborative writing process should be a remarkable activity with a corresponding goal, which the practitioners aim at during the process (MR6). Regarding the practitioners’ dynamic disagreements about the goals of the process, the ending is not well-defined enough respectively completing a story is not enough (MR7).

I3: Although the practitioners argued about the goal of the process, they had one thing in common: their interest in the other groups. Though they were mostly dissatisfied with their own stories, they wanted them to be at least better than the stories of the other groups. The idea is here to announce a competition of the groups beforehand. By doing this, the individual discordant goals ally to one group goal, which is winning against the other groups. In addition, it might guarantee a certain quality of the stories. Though the “Group Competition” element might be considered as extrinsic motivation, it would not have a negative impact on the quality of the process as only the most qualitative story wins (Steffens et al. 2014).

R4: The practitioners tend to reflect written sentences and eventually the complete story. Withal they do not hesitate to share their own opinion and end up in discussions about chosen words, desired story content, future sentences etc. It is important to appreciate the various ideas and perspectives of the participants (MR8), while still creating a group awareness towards a common goal (MR9).

I4: A lack of feedback among team members is an impeding issue in collaboration processes, which can be solved by integrating “Points”. In connection with the “no relationship between members” issue, a shared group score shall encourage the relationship between the members (Steffens et al. 2014).

R5: Although the team has a common shared group goal, each practitioner writes separate sentences (MR10) and strives to achieve individual goals. For the game this is to contribute valuable sentences to the story, that include one of the predefined words and that are recognized and appreciated by the other team members (MR11).

I5: Steffens et al. (2014) define an issue regarding a lack of perception of work in progress. Hence, they suggest a “Progression” game element to monitor the work achievements. By including colors in the story, it is possible to link each sentence to one of the practitioners and thus value their contribution.

R6: An amendment of the activity “Write Sentence” can prevent deflections. Coming up with a sentence and writing it down can take a lot of time (MR12), which either leads to or is caused by deflections (MR13). Consequently, the practitioners may lose focus of the process and the story’s quality decreases.

I6: Steffens et al. (2014) consider the “Countdown” in case of excessive workload. For the process at hand it may not be excessive workload, but an excessive use of time. After all, the process shall be dynamic and avoid any kind of impatience.

R7: Making use of all predefined words appears difficult for the practitioners (MR14). Consequently, they might lose their motivation towards the end of the game. Some practitioners are also very excited about formulating the end of the story (MR15), but therefore need to coordinate all left words in the team.

I7: Steffens et al. (2014) suggest the “Ownership” game element. Thus, the practitioners will bear responsibility, which fosters a qualitatively valuable outcome. By choosing the end of the story more freely and independently, the practitioners might feel more pressured to make the story a good one.

Table 3. Reflections and Interventions
### 4.3 Formalization of Learning (Cycle 1)

The developed interventions can now be utilized to remodel the collaboration process. The remodeled collaboration process is displayed in Figure 3 (right). The amendments are in bold and done as described per intervention. In a next step we generalize.

![Figure 3: FPMs of the Analog (left) and the Remodeled CP (right)](image)

Table 4 includes the collected meta-requirements and the corresponding design principles (DP) according to (Chandra, 2015) for platform designers and developers.

<table>
<thead>
<tr>
<th>Meta-Requirements</th>
<th>Design Principles</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MR1:</strong> Go through a profound preparation before process start.</td>
<td><strong>DP1:</strong> Include an Epic Meaning to highlight and set clear group goals to reach higher produced group outcomes.</td>
</tr>
<tr>
<td><strong>MR2:</strong> Follow a golden thread.</td>
<td>The Epic Meaning aims at giving a meaning to the process and outcome covering genre and goal. Therefore, it enables the practitioners to delve into the narrative triggering the hedonic motivation. This should further ensure a certain quality of the story aligning to the predefined genre.</td>
</tr>
<tr>
<td><strong>MR3:</strong> Use the collected words in a collaborative way.</td>
<td><strong>DP2:</strong> Make all initially collected possible includable content that needs to be considered for the outcome visible to everyone for better coordination.</td>
</tr>
</tbody>
</table>
Wiethof et al. /Gamification in Digital Collaborative Writing

| MR4: Keep up with the process while not writing a sentence. | This element serves as a complement to the Epic Meaning hedonically motivating the collaboration. Therefore, it fosters a common understanding of the genre among the group of practitioners. |
| MR5: Focus on the quality of the story. | DP3: Enhance the focus of the team towards producing quality outcome by including a Group Competition at a higher level and highlight the purpose of the group setting and its goal. |
| MR6: Aim at a meaningful goal. | The competition element is used to extrinsically motivate the practitioners based on the desire to win. As only the best story will be rewarded, the focus on quality is ensured. Additionally, having a competition between groups will strengthen the goal alignment within a group. |
| MR7: Perform as a team. | |
| MR8: Appreciate the various ideas and perspectives. | DP4: Include feedback, rating and veto mechanisms for the groups to change and adjust individually contributed content to be able to shape and improve the quality of the group outcome iteratively. |
| MR9: Foster group awareness. | This element extrinsically motivates practitioners by recognizing their individual contributions. Similar to the competition element, the focus is on the quality of the contributions as well as on the group awareness. |
| MR10: Perceive the work in progress. | |
| MR11: Recognize the individual contributions. | DP5: Include visual mechanisms to highlight any group members’ contribution to recognize individuals’ efforts and outline the progress of the group by appreciating any contribution. |
| MR12: Enable a dynamic process. | Highlighting the individual contributions aims at triggering the extrinsic as well as the hedonic motivation. For one thing, the practitioners can intrinsically identify with the story and its progress, for another thing, their contributions will be extrinsically recognized by the group. |
| MR13: Avoid impatience and deflections. | DP6: Include an appropriate time constraint to provide the practitioners with the right amount of time to produce quality content, which also is acceptable for others and prevents impatience for a goal-oriented group dynamic. |
| MR14: Coordinate and align all predefined words. | The element of a time constraint is used to address the extrinsic motivation. While writing, the practitioner needs to align to the time limit, which ensures a dynamic and active process working towards the goal. |
| MR15: Bear responsibility. | DP7: Provide the practitioners with Ownership of the produced outcome to raise the perceived level of responsibility to utilize the needed resources and collaborate and shape in the group towards better group outcome. |

By giving the practitioners ownership of the story, they can better identify with the story. What is more, they get responsibility. This aims at hedonically motivating them to ensure the quality of the outcome.

| Winning |
| MR11: Recognize the individual contributions. |

Table 4. Meta-Requirements (MR) and Design Principles (DP)

Before implementing and executing the remodeled process in a web-application, an evaluation was conducted with an expert, who eventually agreed to the developed interventions (expert evaluation (see Table 1) of the new CP displayed in Figure 3, right). After the implementation a walkthrough was conducted with practitioners over the web interface (see Figure 4, left) before the second cycle of the study.
4.4 Building, Intervention and Evaluation (Cycle 2)

After the formalization of the preliminary design principles and the consequent interventions, which aim at increasing the practitioners’ hedonic motivation and the quality of the story, these interventions were implemented in the web-application process. Figure 4 (left) shows the main page of the web-application, on which the core iterative part of the process takes place. Here three of the Design Principles are visibly implemented: a green Like-Button with the number of counts within the “Action Panel” (DP4), individually colored sentences in “The Story” (DP5) and a countdown of 30 seconds in the Wait-Button within the “Action Panel” (DP6).

![Figure 4. Screenshot of the Web Application - Main Page (left), Epic Meaning Pop-Up (right)](image)

The Epic Meaning (DP1) is implemented through a pop-up, which gives a short introduction of the topic as well as the laws of the process (see Figure 4, right).

Right before the iterative start of the process, the participants brainstorm and collect words to be included in the story. At this stage all initially collected words are visible to everyone (see Figure 5) (DP2).

![Figure 5. Screenshot of the Web-Application - Collected Words Brainstorming](image)

The two remaining Design Principles are not visible in their implementation, i.e. the Group Competition (DP3) is announced before the start of the process and by enabling the participants to end the process freely and independently, ownership is assigned to them (DP7).

This was then object of the final expert evaluation, walkthrough and pilot study. The remodelled process was executed on the implemented IT-platform in a pilot study with two groups of five participants using the web-application. It proceeded without any obstructive problems regarding technology and functional process elements. So, with the next phase the practitioners were prepared to reflect on the process and get involved in evaluating the effects of the developed interventions.

4.5 Reflection and Learning (Cycle 2)

For the evaluation, the practitioners were interviewed. By participating in both the cycles (see Table 1) they meet the requirements of a process expert within the scope of the current research. As the interview is guideline-oriented, the questions remain on a rather abstract level focusing the individual interventions. In doing so, the intended effects can be evaluated by comparing them to the perceived effects. Following the approach of thematic comparison (Meuser and Nagel, 1991) we utilized the transcription
of the interviews to consolidate and differentiate the experts’ (E) replies to the following categories covering the interview guideline questions.

**Epic Meaning:** Only one expert prefers not to have a predefined topic (E1). The others consider it quite helpful to write a story: it simplifies the start of the process (E3) and gives an approximate direction for a golden thread (E2, E4, E5, E6, E7, E8, E10). Thus, it is also easier to collect words and use these words in the same context (E8, E9, E10). Still, it could be problematic with different perspectives and ideas about one topic regarding the word collection (E4, E6, E7).

**Disclosure of Collected Words:** The disclosure of the collected words is quite useful to plan and establish the direction of the story beforehand (E1, E2, E3, E7, E8, E10) as well as support others during the process (E5, E10). Still one expert did not recognize any effect (E6). Another expert states that it could be used effectively, but the group did not do it (E9).

**Group Competition:** The sentiments about a group competition vary. It is probably dependent on the participants’ character and attitude. While some get really motivated by the competition and its perceived meaningfulness and severity (E2, E5, E7, E9), others are not stimulated at all (E1, E3, E4, E6, E8, E10). As these are already driven by intrinsic motivation, fun and creativity, the extrinsic motivation through competition does not have any effect (E1, E3, E4, E8, E10).

**Like-Button:** Only three experts consider this button a good and funny feature for both positive affirmation and staying concentrated while waiting (E4, E6, E9). However, most of the experts consider it not necessary (E1, E2, E3, E5, E7, E8, E10). It is rather pointless not having any consequences after liking a sentence (E3, E5, E8). Hence, some experts suggest alternatives, e. g. integrating a scoring system for the individuals (E5).

**Color Assignment:** Except for one expert, who did not recognize it (E1), the color assignment really appeals to all the other experts (E2, E5, E8, E9, E10). It helps to match the sentences to the practitioners (E2, E3, E4, E5, E7, E8, E9, E10) and is very useful to see who’s turn it is and to prepare one’s own next sentence (E4, E6, E7, E9). Besides, it gives a clear overview of the story (E5, E6, E7, E8, E10).

**Countdown:** Except for one expert, who states, that the countdown is too long (E1), the other experts request more time for the countdown. 30 seconds are too short, give too much time pressure (E2, E3, E5, E7, E8, E9, E10) and thus decrease the quality of the output (E4, E6, E8). Nevertheless, all experts agree that a countdown itself is a very good and meaningful idea, which is helpful to make the process more dynamic and to avoid impatience (E1, E2, E3, E4, E5, E6, E7, E8, E9, E10). Two experts also make suggestions on how to adjust the countdown, e. g. use different timeframes to promote concentration (E6) or include penalties for not sticking to the timeframe (E10).

**Free End of Process:** Most experts favor to choose the end of the process of one’s own accord (E1, E2, E3, E4, E5, E9, E10). This leads to a worthy and nice ending instead of an endless story with a sudden end (E2). Furthermore, it is easier (E5), more pleasant, not forced and thus results in a better quality (E8). Eventually they state that “it is our story” (E3) and “we know better when the story should find an end than an application” (E10). “I liked it because we could determine it” (E10).

**Satisfaction:** The experts are satisfied with the process, conduction and involvement (E1, E2, E3, E4, E5, E6, E7, E9, E10) and are very positive: it was “fun” (E1, E6, E7, E9), “cool” (E5, E6) and “very interesting” (E7, E9), which proves the intended encouragement of hedonic motivation. However, though some experts consider their produced story funny (E1, E7), most of them consider it meaningless (E2, E3, E6, E9). Nevertheless, they blame their teammates and the initial word collection for the resulting dissatisfaction rather than the actual process (E2, E5, E8, E9, E10).

In a final step, not only considering the Group Competition element, but more importantly the quality of the story, external unbiased judges were asked to assess the created stories. Therefore, criteria for qualitatively valuable stories were established. Following Rhodes (1961) the first measures are the level of creativity and novelty (Rhodes, 1961). In addition, Dean (2006) defines dimensions and sub-dimensions for the quality of ideas, which we use to assess the quality of the created stories: workability, relevance and specificity. We aligned the assessment questions to these dimensions and calculated the average result for each dimension (Dean, 2006). The rating can be scaled from 1 (Very Low / Bad) to 7.
(Very High / Good). This scale was chosen based on Johns (2005) to avoid the data becoming less accurate with fewer than five and higher than seven numbers of scale points (DeVellis, 2003). For a more detailed evaluation including several judges Likert scales of seven points (Johns, 2010; Likert, 1932) were chosen. A total of 29 judges participated. The results are demonstrated in Table 5.

<table>
<thead>
<tr>
<th></th>
<th>Cycle 1</th>
<th>Cycle 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Story 1</td>
<td>Story 2</td>
</tr>
<tr>
<td>Level of Novelty</td>
<td>3.62</td>
<td>4.34</td>
</tr>
<tr>
<td>Level of Creativity</td>
<td>3.76</td>
<td>4.86</td>
</tr>
<tr>
<td>Specificity</td>
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</tr>
<tr>
<td>Workability</td>
<td>4.29</td>
<td>3.55</td>
</tr>
<tr>
<td>Relevance</td>
<td>3.83</td>
<td>3.28</td>
</tr>
<tr>
<td>Sum</td>
<td>19.55</td>
<td>19.27</td>
</tr>
<tr>
<td>Overall Sum in each Cycle</td>
<td>38.82</td>
<td>39.57</td>
</tr>
</tbody>
</table>

Table 5. Results of the Quality Assessment of the Created Stories

4.6 Formalization of Learning (Cycle 2)

Examining the results of the story evaluation, it is apparent that the stories’ quality does not vary that much. Even though the best story was created during the second cycle, the same applies to the worst rated story. The maxima of the criteria measurements also vary from story to story. That may imply that the execution of the CP digitally via the IT-artifact with the interventions does not vary from the analog meeting setting in the same space. This is similarly reflected in the satisfaction measurement of the participants regarding the outcome. Nevertheless, they are positive with the process and the web-application itself and even show a higher hedonic motivation. Hence, in accordance to the MISC, by making use of several gamification elements, various intentions, motives as well as expectations were covered. Thus, these elements could trigger hedonic motivation of individuals to reach a higher satisfaction with the process. Still it did not succeed in reaching a better performance and thus concluded in dissatisfaction with the process outcome (Lowry, 2015; Bhattacherjee and Premkumar, 2004).

5 Discussion

Overall, seven formulated design principles rely on 15 meta-requirements, that were identified during the observation and reflection of the first cycle and fall into three categories: Genre, Winning and Deflections. It was revealed that the seven design principles could be successfully implemented within the instantiated digital collaborative writing process and thereby encourage higher hedonic motivation towards satisfaction (MISC). The evaluation indicated that an Epic Meaning (DP1) can be useful for the start of the process and consequently to stick to its topic. Still it may be difficult to clearly predefine the topic as various participants probably have different perspectives and interpretations of it, which could lead to discrepancies within the team. The disclosure of the collected includable content (in this case the collected words) (DP2) then was perceived as supportive for the collaboration within the team. However, just like the Epic Meaning, its usefulness depends on the individual participants. The evaluation shows that, while some are motivated to write a qualitatively valuable story, others see more fun in the process. Thus, some participants might not have taken the process seriously and this consequently caused dissatisfaction within the team. A difference of opinion was also recognized regarding the Group Competition (DP3). While some were not affected at all, others really felt more motivated. This emphasizes the importance to address all three hedonic, intrinsic and extrinsic motivation of participants. The Like-button (I4), which aims at appealing both by appreciation of the various ideas and fostering group awareness, leaves room for more suitable intervention design to meet DP4 better, since just three experts (E4, E6, E9) found that this was suitable. Others suggest the integration of a scoring system for the individuals. It could give the Like-button a better meaning and simultaneously increase the participants’
motivation differently. Nevertheless, the evaluation has indicated the successful implementation of highlighting the individuals’ contribution (DP5) and assignment of ownership (DP7) to nurture hedonic motivation. These DPs helped the participants to identify themselves with their own story. At last, the idea of including a countdown (DP6) was on the one hand well received. The evaluation proved its fulfillment of the meta-requirements, which were to enable a dynamic process and to avoid impatience and deflections. On the other hand, the evaluation revealed a possible lack of quality due to the time limit. Thus, it is important to give the participants enough time to come up with qualitatively valuable contributions. Further suggestions are the variation of timeframes for each new contribution as well as including penalties for not sticking to the timeframe.

All in all, the developed design principles can succeed in enabling hedonic motivation of all participants (MISC). The evaluation has shown their motivation and positive attitude towards the process. They had fun and took pleasure in the process which is indispensable, if one intends to trigger hedonic motivation (Lowry, 2015). The results show the potential to encourage satisfaction and creativity even within a virtual environment by designing and implementing systems that bind and motivate contributors to participate and produce promising outcomes that do not vary that much from outcomes in a classical co-located setting.

Besides, one may consider a few limitations. First, each story noticeably differs from the others in content, structure, writing style etc. Thus, for a better verification of the effect of the implementation of the design principles, more than two stories respectively more participants are required. Second, the type of story as well as the selection of participants should be considered carefully. For the instantiated process at hand, the practitioners were randomly selected, and they were asked to write a fairytale. This might have raised and encouraged a discrepancy in the group as each participant can have a different perspective and understanding of the predefined topic. In a narrow sense, the participants did not have any connection to either the other participants or the process and topic itself.

6 Conclusion and Contribution

The findings of this paper serve as a starting point for further research in the field of collaborative writing processes. For the research at hand the process test runs were performed via the implemented web-application. The evaluation revealed the success of the developed design principles to reach higher hedonic motivation. Overall, this paper aims to contribute to the research fields of both gamification and collaboration processes respectively collaborative writing. Moreover, this research aims to contribute with prescriptive knowledge (Gregor and Hevner, 2013) towards a “theory of design and action” (Gregor, 2006) with a CP, MRs and corresponding DPs. Following the generalized findings of Steffens et al. (2014), who declare the positive impact of gamification on collaborative software development processes, the research at hand connects to the established gamification elements with the current research object, which is the collaborative writing process. By doing that, elements were adjusted to suit the current process and evaluated regarding their effects on the process. Eventually seven design principles were established and evaluated to foster hedonic motivation and a qualitatively valuable outcome of a collaborative writing process. The DPs should be tested for their applicability to other collaborative writing practices, such as wikis, blogs or forums.
References


