Increasing Motivation to Learn through Group Work in a Competitive Environment

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Abstract—In today's digital era, learning apps have become increasingly important as they can change access to education and optimize learning processes. When developing a product for Mittweida University of Applied Sciences, the intention was to design an app that can be used in a supportive way in the university teaching of the Faculty of Social Work to improve the understanding of the learning material. This paper aims to find out whether learning motivation can be increased when a digital learning app is used in group work within a competitive environment. The digital learning app developed serves to create a space in which several students work together on the topic complexes through exchange or answer questions and motivate each other. To validate the increase in motivation, an evaluation was conducted with a group of students (n = 17) in which group work was simulated with the app. To create the competitive environment, the scores of the groups were openly compared. In addition, the best group received a prize. To determine motivation, questionnaires were used before and after the simulation. The questionnaires consist of a combination of the existing questionnaires on motivation FAM, MSLQ, and CMELAC. They are rated on a five- or seven-point Likert scale. The evaluation of the questionnaires shows that motivation cannot be increased in the simulation. Overall, no major change in motivation can be detected through the evaluation. In addition, the reward was not perceived as necessary. Thus, the question arose why no changes in motivation could be recorded via the snapshot. This may be due to various factors, such as the size of the period under consideration or the number of respondents. The evaluation also makes it clear that the main aspect of the app is not necessarily the motivation of the students.

Keywords—motivation, digital learning app, competitive, group

I. INTRODUCTION

The social work profession is very practice-oriented. Therefore, education is of enormous importance. This is partly based on a lot of theory. Established teaching concepts include internships in a social work degree programme where theory is to be put into practice. Within these internships, lecturers often notice a gap between the theory taught and the application of this theory in practice by the students [1].

The Faculty of Social Work at Mittweida University of Applied Sciences has also recognized this problem among its students. To close this gap, a digital learning app was developed for the faculty. With this, the lecturers should be able to specifically check the knowledge of the students. This should make it easier to identify existing gaps in the material so that teaching can be adapted if necessary or the existing knowledge gaps can be closed. The existing gaps in knowledge could lead to failure when the feeling arises that certain tasks cannot be mastered. In addition, despite great effort in learning, success might not occur, which could increase frustration and decrease motivation. To counteract this, students should not learn alone but rather in groups and thus motivate each other. The gaps in knowledge can be closed directly in the group work by the students themselves through the exchange or by the lecturer. Through the active exchange of knowledge and the resulting closing of knowledge gaps at best, this could lead to an increase in motivation.

The question this paper aims to answer now is whether group work with a digital learning app in a competitive environment can increase motivation to learn. With the potential success of combining group work and competitive environment, such an approach could help to design effective teaching and learning methods to impart knowledge and, most importantly, improve motivation to learn. Improving motivation to learn is important because it is crucial to how actively students engage with the material. Therefore, the paper only analyses motivation and not other aspects of the learning process, such as the students' level of knowledge or competence.

The combination of group work and competitive environment should be used in a way that influences and increases motivation. Motivation has been an issue to this day as well as back then, as a 1993 study by Deci and Ryan shows, and emphasizing the importance of motivation. Specifically, intrinsic motivation, which is driven by personal interest and enjoyment in an activity.

When people are intrinsically motivated, they tend to be more committed and productive. Extrinsic motivation is also mentioned. This works externally or only arises through a request and is linked to reward. The type of reward can be varied, such as praise, good grades or similar [2]. This means that the creation of incentives could increase motivation. These findings have not changed over the years, but rather expanded. This means that today it is known that several parts of motivation exist. In a source by Spinath from 2022, which already describes the importance of Deci and Ryan's findings, it is also explained that motivation consists of various components. It becomes clear that motivation still depends on several components, such as interest and goal orientation, or are intertwined with each other. The source thus states that "intrinsic motivation is an essential component of interest" [3]. While intrinsic motivation comes from interest in a subject, extrinsic motivation is generated by incentives. However, by removing these incentives, extrinsic motivation for an activity also decreases [3]. People who knew that their performance would be rewarded would generally be more motivated to complete their tasks probably efficiently and perform well. In order to create the best possible motivation for learning, research in this area is always a topic to be optimized.

In the Journal of Pedagogy, the thesis is put forward that the use of digital media that is applied for cognitive learning, such as a quiz app instead of an oral question, increases learning success and has a positive effect [4]. Under certain framework conditions, which will not be discussed in detail here, the thesis was tested. It was found that "the use of digital media has positive effects under almost all conditions" [4]. "However, it is also shown that not every use of media automatically has positive effects" [4]. Therefore, a meaningful use of media as a digital learning tool should always be aimed for.

One question that is still open is whether the use of digital media increases motivation. Jeno, Grytnes, and Vandvik [5] were able to answer this in their study. For this purpose, two groups were formed in the study, with one group using a textbook and the other group using a mobile application. Motivation was then measured. It was found that the group using the mobile application had a higher motivation than the group using a textbook [5]. The study shows a resulting benefit for the use of a mobile application to increase motivation. This clearly shows the positive influence of digital media on motivation.

In addition, the type of media and how it conveys the learning material also plays an important role that should be taken into account. In addition to the use of media, it is also beneficial to design the application accordingly and to include gamified elements. This can motivate the user or increase the user's motivation [6].

Motivation can be promoted individually, but also within a group, as digital media in the classroom offer various opportunities for collaboration. This can take

place between students as well as between teachers. Collaboration can also extend beyond the classroom [7].

That a collaborative learning environment is beneficial was already shown in a study by Lakkala, Lallimo, and Hakkarainen [8]. Their focus was on the mobile use of digital media in the classroom. They combined this with the approach of forming groups in the classroom. They found that this promoted collaboration in the classroom and was a good approach to 'learning activity' and was included in their research [8].

In summary, it can be said that the increase in motivation can depend on several factors.

The app combines two approaches, such as the group aspect and a competitive environment, which is created by comparing the points scored. The group aspect, which is also the focus of the paper, is the most important aspect of motivation. The lively exchange in the groups could lead to motivating individuals or the group.

II. APP "SOCIAL EXPERIENCE"

A digital learning app was developed as part of the underlying research project. This contains questions created by the lecturers for various subject areas (Fig. 1). The subject areas are further subdivided into different topic complexes (Fig. 2). The app is structured in such a way that the subject areas as well as the subject complexes can be worked on separately from each other. The questions are divided into single-choice questions (Fig. 3) and sequence questions (Fig. 4). In the case of single-choice questions, the correct answer must be selected from the wrong ones. In the case of sequential questions, different answers are given, which must be clicked on in the correct order. The given order can be reset by pressing a button. As soon as a question has been answered, the student immediately receives feedback on his/her given answer. Points set by the lecturers are awarded for correct answers to the questions. However, points for a sequence are only awarded if all answers have been given the correct position. If help is needed to answer the questions, a hint can be 'bought' in exchange for deduction of points for selected questions. Students can continue with the questions independently by pressing a button, which should give them the opportunity to discuss the correctness of their answers in their group or the course. Once all questions have been answered, students are taken to the results screen. Here they are told how many points they have scored, how many hints have been used, and an overview of the questions, highlighting correctness and the use of hints. Students can then finish the set of topics and work on another one or finish learning.

In the background of the app is a Google Drive. This enables the lecturer to edit the contents of the app (subject areas, topic complexes, questions and answers, points and tips). Google Drive was chosen as the backend for the app because it offers easy handling of various tools and files. The app content is stored in a separate Google Sheets table for each subject area. These are loaded when the app is started. In addition, student

results are processed via Google Apps Scripts and entered into another Google Sheets table. The results are uploaded to Drive each time in the results screen of the app. The results of the different groups are differentiated in Drive by the name that the groups give themselves during the topic selection. The results are then summarised in an overview in the table. The lecturer can see from these which questions were answered correctly or incorrectly and by how many percentages. Accordingly, possible gaps can be identified.

Fig. 1. With the help of the app, different subject areas can be covered. Thus, lecturers from different subject groups can use the app in their teaching. Each subject area is stored in its own Google Sheets table.

Fig. 2. Each subject area is divided into different topic complexes. The subject complexes can be worked on separately from each other. During the topic selection, the groups can give themselves a name.
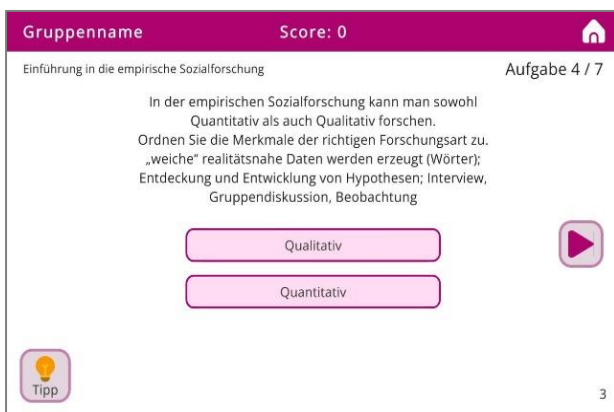

Fig. 3. The app has single-choice questions. For these, the correct answer must be selected. The group name given is displayed at the top left.
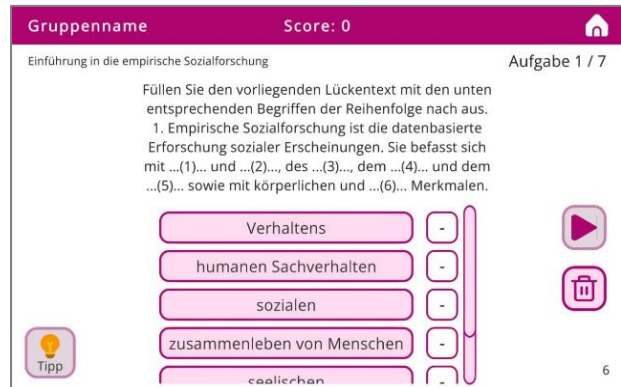

Fig. 4. The app has sequence questions. For these, the answers must be pressed in the correct order. The selected order can also be reset by pressing a button. The group name given is displayed at the top left.

III. EVALUATION

To investigate motivation, a group work was simulated with the app. The simulation was carried out with a small group of social work students (n = 17). For the group work, the students were divided into four groups of equal size. The students were free to choose which group they belonged to. During the simulation, the groups had to answer two sets of questions on the field of empirical social science. The competitive environment was generated by openly comparing the scores of the groups. The scores of the groups were read out to the students and the current ranking of the groups was stated. The comparison was made each time a topic complex was completed. As an additional incentive for the students, the best performing group received a small prize in the form of sweets. Questionnaires were used before and after the simulation to record motivation and a possible increase.

The pre-test questionnaire was composed of the FAM [9] and MSLQ [10]. The FAM questionnaire was used to determine the students' current motivation to learn, challenge, success and interest. The questionnaire used a seven-point Likert scale, with a 1 being 'disagree' and a 7 being 'agree' [9]. The MSLQ questionnaire is a questionnaire designed to assess students' motivation, attitudes and learning strategies [10]. For the evaluation, 16 items were taken from the questionnaire, which were from the areas of intrinsic learning. This was used to create a prior picture of motivation, which was compared with the results of the post-test questionnaire. Similar to the FAM questionnaire, the MSLQ questionnaire also uses a seven-point Likert scale. Here too, a 1 corresponds to 'disagree' and a 7 to 'agree' [10].

Before answering the two questionnaires, some personal data was collected from the students. These were age, biological sex, degree programme, and current semester. In addition, the students' group affiliation was determined. In order to be able to assign the pre-test and post-test questionnaire to the correct person afterwards, a recognition code was used in both. This code consisted of the first letter of the first name, the second letter of the last name, the first letter of the place of birth, and the number of the month of birth (01–12).

The post-test questionnaire consisted of the MSLQ, with the same questions as in the pre-test, and the CMELAC [11]. The CMELAC is a questionnaire to assess the motivation of playful and cooperative learning strategies. This 16 item questionnaire was used to obtain the students' assessment of this group work. The questionnaire asked questions about motivation for the task, learning, teamwork, and flow. The CMELAC used a five-point Likert scale, where 1 corresponded to 'disagree' and 5 to 'agree' [11]. In addition to the motivation questionnaires, respondents were also able to provide feedback on the app.

All questionnaires that were not available in German were translated into appropriate German.

IV. RESULTS

Seventeen students from the Faculty of Social Work took part in the evaluation. The students were between 20 and 55 years old. The median age was 32. Of the students, 4 were in their 3rd semester and 13 in their 5th semester of their Bachelor of Arts degree in Social Work. The evaluation was conducted with 15 women and 2 men.

The FAM questionnaire was used to classify the students' motivation. The evaluation of the questionnaire showed that the participants felt able to work on a group task with a digital learning app. The students were partly opposed to the competitive aspect, i.e., the comparison of points. The reward, which the best group should receive, was not felt to be necessary in such group work. This did not affect the motivation to work on such a task. The motivation was given by most of the participants. When comparing the groups, it was noticeable that the groups only differed in a few points. Based on the results of the FAM questionnaire, the following can be taken away: The students have a positive attitude towards group work with a digital learning app and are also motivated to work on it as a group. What is rather disadvantageous for the evaluation is the attitude towards the competitive and the receiving of rewards. Since these points are partly main aspects for increasing motivation, the attitude of the students could only slightly influence their motivation.
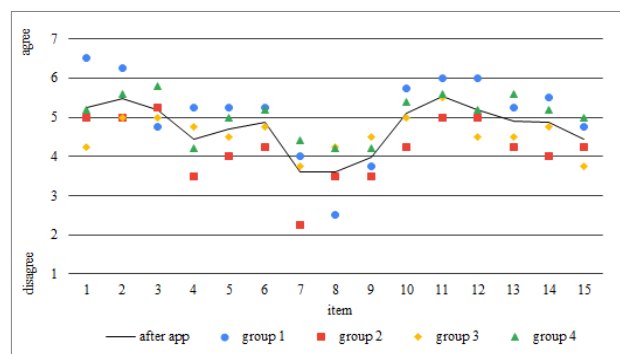
Important for the evaluation was the 'before and after' comparison of the MSLQ questionnaire. The MSLQ questionnaire was used for current motivation before and after the simulation. Fig. 5 shows the comparison of the pre-test and post-test responses. In the comparison of diagrams 5(a) and 5(b), the groups do not differ much from each other in this questionnaire either. If we look at the mean values for group one before and after the simulation, we see that the mean values differ by a maximum of one point on the scale. A similar picture can be seen for the other groups. This indicates no measurable increase in motivation. This is particularly evident in the direct comparison of the general averages, see Fig. 5(c). Since the two graphs describe a strongly similar course, motivation could apparently not be increased. As mentioned before, the MSLQ questionnaire contains different topics. In the area of intrinsic motivation, there was predominantly an increase. Intrinsic motivation is not particularly in focus in the context of the competitive. Extrinsic motivation is more important. This showed a predominant deterioration. The evaluation of the statements on the topic of seeking help remained relatively constant. In the aspect of group learning, there was again a deterioration. If we look at the average, see Fig. 5(c), the results described are also evident. Nevertheless, there were no major changes in motivation. These results suggest that motivation could not be increased either by group work with the learning app or by the competitive environment.

In the post-test questionnaire, the CMELAC was used in addition to the MSLQ questionnaire. The CMELAC questionnaire was used to evaluate the group work by the students. The questionnaire revealed a positive attitude towards group work and learning together. None of the participants felt annoyed by the group work. The motivation remained positive according to the questionnaire. Furthermore, the participants would welcome a repetition of such an activity. Through the questionnaire and the feedback from some students, it could be determined that the groups should influence each other less in a further use of the app than during the evaluation. While the groups sat close to each other, they should sit further apart or in different rooms. In summary, the following results can be noted. Learning motivation was not influenced by group work with the app. Nevertheless, the students were positive about using the app for group work. The participants also felt that learning and testing the material as a group was appropriate. Through the individual feedback, a quite positive attitude towards such an activity and learning app could be established.
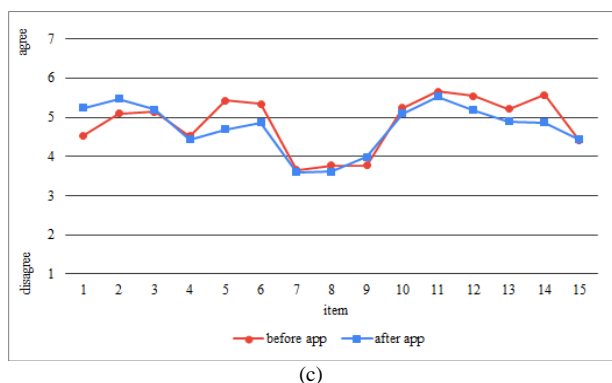

(a)

(b)

(c)
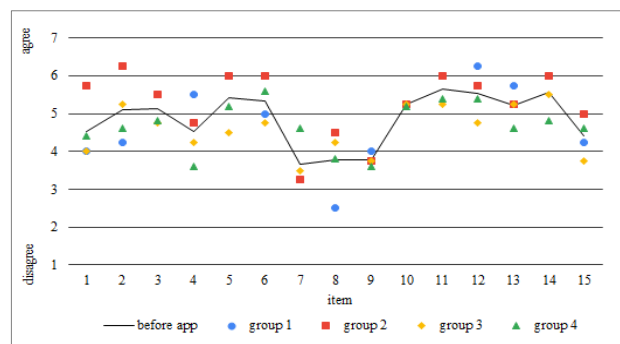
Fig. 5. The graphs show the averages of the individual groups as well as the overall average for the items of the MSLQ questionnaire. The y-axis represents the seven-point Likert scale. A one on the y-axis stands for disagree and a seven for agree. The items of the questionnaire are listed on the x-axis. Items 1–4 belong to the area of intrinsic motivation and items 5–8 to extrinsic motivation. Numbers 9–12 describe the items on help seeking and 13–15 the items on peer learning. (a) shows the before picture and (b) the after picture, (c) shows a comparison of the general averages. The comparison of the diagrams shows a very similar picture of motivation before and after the simulation.

V. DISCUSSION

This study aimed to investigate whether the learning motivation of students can be increased through group work with a digital learning app. As can be seen from the results, this could not be confirmed. This may have been due to various factors.

On the one hand, it may be due to the test persons and their composition. Only 17 students took part in the evaluation. This is a small group where each statement carries weight. However, since many more people can participate in courses, it would be interesting to see if the results change with more test persons. With a larger group, it should be possible to get more results from different people. The group of students for the evaluation, as described, consisted of 15 women and 2 men. Let's look at the composition of the subjects in the context of gender. With only 2 men, the male gender is only very slightly represented. Due to the small number of male test persons, no generally valid statements can be made regarding the learning motivation of men. This point would be a possible approach for a later evaluation of learning motivation. The gender distribution, however, is typical for the target group. Thus, predominantly women study the professional field of social work [12]. This is also clearly recognizable in the group of students surveyed. This means that in the context of the target group, the results are representative. Therefore, if an attempt is made to form a group of test persons with equally distributed genders, the results could be distorted. Therefore, the genders should be distributed on the basis of the target group. Another factor that can come from the subjects is the basic motivation. If there is a high level of basic motivation among the students, then this cannot be greatly increased. If it is, then it can at most decrease. From the results of the questionnaires, it can be seen that there is a high level of basic motivation among the students. Therefore, it is not unreasonable to assume that this could not be greatly increased.

In addition to the general composition of the subjects, the group aspect can also have an influence on the change in motivation. For the evaluation, the groups were formed primarily according to the will of the students. This presumably brought together people with a similar motivational attitude. Due to the similar persons in the groups, the motivation could not change, as it was at a similar level in the groups. This is also evident in the results. For future studies, it would be interesting to investigate whether a change in motivation can be achieved through specific group constellations. A possible example would be the following: Before the group work with the app, the motivation of all participants is measured. Based on the determined motivation, the test persons are divided into groups. People with a high level of motivation are put together with people who have a low level of motivation. During and after the group work, the motivation of these groups should be observed. It should be of interest to see whether the motivation of the group members is equalized, increased, or decreased. Figuratively speaking, it could be that the motivation of the people with lower basic motivation increases or the motivation of the people with higher basic motivation decreases. This experimental design should make the influence of the group aspect clearer.

Motivation was determined in the evaluation by means of a snapshot, i.e. an attempt was made to record it at a specific point in time. This period of time, in which the increase in motivation should be achieved, was relatively small. This probably meant that no great change in motivation was evident. Therefore, a longer period should be chosen for a later study. For example, the determination of motivation could be divided into three points in time. The current basic motivation is measured one week before the simulation. Then the current motivation is measured during the simulation. Finally, the motivation is measured one week after the simulation. Through these three points in time, it could be seen whether the motivation has changed during the time under consideration.

One of the main aspects of the evaluation, besides the group work, was the competitive environment. This was created by openly comparing the scores of the groups. However, the environment did not seem to have any influence on the increase in motivation to learn. This could be due to the fact that the competitive environment was too low for the students due to the prize and the comparison of the scores. Alternatively, if there are several groups, a ranking system could be considered. This should create more competition between the groups [4]. The questionnaires also showed that the students felt that the reward, i.e., the prize, was not necessary. The fact that the students felt this way may be due to a high self-confidence in knowing the material. In addition, the low impact may also stem from the students' personal attitudes in social work. In this case, the competitive idea was perceived, but does not influence motivation.

Within the competitive environment, the group with the highest score should also receive a reward. This was

realized in the form of sweets. Now, the motivation that comes from sweets is probably no longer appealing enough for the age group surveyed, as it is for children, for example. Therefore, the influence of the price will have been minimal or not very decisive. In order to increase the influence of the price on the competitive environment as well as motivation, rewards should be chosen for later evaluations that are more in line with the target group. For example, the best performing group could receive extra or bonus points for the final exam in the corresponding module. Thus, the prize could cause an increase in motivation.

The basic component of the app are questions which the students have to answer with given answers. Thereby, the knowledge of the student is tested. Therefore, it would be important for a future study to see how the respondent's knowledge or level of knowledge would change as a result of the group work. For example, it could be seen whether the respondent feels more confident or insecure in his or her level of knowledge after using the app. In this way, different teaching concepts could also be tested with the app. For example, it could be tested whether the app is a possible alternative to the classic lecture, in which the material is taught in a more interactive way. The app could be integrated into a station project. In this case, the students walk through the stations in groups. First, the group goes through the prepared subject matter and then they test their knowledge with the app. This also allows the lecturer to see how well the students have understood and internalized the individual topics or stations. In addition to improving the transfer of knowledge, such a teaching concept could perhaps also change the motivation to learn.

As can be seen, the lack of the hoped-for results may have been due to various factors. For future research, it would be important to check the examples and considerations. Furthermore, the app could be extended with more features and question types. For example, multiple choice questions could be introduced. The new question types and features, such as further gamification elements like achievements or high score lists, could stimulate the students' motivation to learn.

VI. CONCLUSION

This paper aims to find out whether group work with a digital learning app in a competitive environment increases learning motivation. Thus, new possibilities for teaching and learning concepts with a digital learning app should be developed.

For this purpose, an evaluation was conducted with students of the Faculty of Social Work. In this evaluation, group work was simulated with the developed learning app. During the simulation, an additional competitive environment was created through the open comparison of points. Using pre- and post-test questionnaires, learning motivation was measured before and after the simulation.

The evaluation showed that group work did not increase motivation to learn. The fact that the motivation

could not be increased could be due to various factors, such as the small number of test persons or the time period under consideration. It should be noted, however, that motivation depends on various factors. For example, basic psychological needs must be fulfilled for intrinsic motivation [13]. This dependency probably influences the measurement of motivation.

The questionnaires also showed that the competitive environment had no real influence on motivation during group work.

The evaluation shows that a new evaluation would have to be carried out by taking into account the possible factors mentioned or by redirecting the evaluation. The new evaluation could provide information on whether a change in the evaluation would occur due to the new measures and whether an increase in motivation would still take place.

Although no clear increase in motivation could be determined in our evaluation, it became clear that the students had a positive attitude towards the group work and learning app. The use of the app was positively received and will be taken up and applied in the learning context in the future.

The fact that the app was nevertheless positively received could be explained by the fact that it is a different way of imparting knowledge. Compared to a normal lecture, in which the lecturer simply teaches the material, the use of the app offers the opportunity for students to exchange ideas and actively engage with the material. This can promote understanding of the material, as students are given the option to consult with their classmates and/or lecturers and clarify any questions that arise. Furthermore, lecturers receive feedback on whether they need to change their lecture.

When using the app on a regular basis, it would be interesting to investigate the motivation again to see if there have been any changes. Likewise, there is the possibility to continue working on the app and expand it with more question types and features.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Andre Spittel and Dean Müller were responsible for programming the app. Mr. Müller was in charge of the general programming of the app, while Mr. Spittel took care of the development of the backend with Google Drive and its integration into the app. Constantin Kühn and Devdana Husejnspahic carried out the data acquisition and analysis for the evaluation. They also wrote the paper. The authors Dominik Breck and Christian Roschke supervised the pedagogical and didactical aspects of the app during development. Susan Labude devised the didactic concept on which the use of the app is based. Marc Ritter and Matthias Vodel conducted iterative review and revision of the paper. All Authors had approved the final version.

REFERENCES

[1] A. Matthies, "Theory-Practice transfer through the back door? Application orientation through digitization in social work," *Die Hochschule: Journal for Science and Education*, vol. 29, pp. 55–70, 2020. doi: 10.25656/01:24460

[2] E. L. Deci and R. M. Ryan, "Self-Determination theory of motivation and its significance for pedagogy," *Journal of Education (in German)*, no. 39, pp. 223–238, 1993. doi: 10.25656/01:11173

[3] B. Spinath, "Learning motivation," in *Textbook, Empirical Educational Research: An Elementary Introduction*, H. Reinders, D. Bergs-Winkels, A. Prochnow, and I. Post, Eds., Wiesbaden, Heidelberg: Springer VS, 2022, pp. 739–752. doi: 10.1007/978-3-658-27277-7_40

[4] K. Stegmann, "Effects of digital learning on knowledge and competence acquisition in school: An integration of meta-analytical findings," *Journal of Education (in German)*, no. 66, pp. 174–190, 2020. doi: 10.25656/01:25790

[5] L. M. Jeno, J.-A. Grytnes, and V. Vandvik, "The effect of a mobile-application tool on biology students' motivation and achievement in species identification: A self-determination theory perspective," *Computers & Education*, vol. 107, pp. 1–12, 2017. doi: 10.1016/j.compedu.2016.12.011

[6] O. Korn, A. S. Schulz, and B. J. Hagley. (2022). Gamification: Fundamentals, methods, and application examples. *Digital Learning Environments – Serious Games and Gamification*. Wiesbaden: Springer VS. [Online]. pp. 43–63. Available: https://link.springer.com/chapter/10.1007/978-3-658-35059-8_4

[7] C. Albers, J. Magenheim, and D. M. Meister. (2011). School in the digital world: Media educational approaches and school research perspectives. Wiesbaden: VS Verlag. [Online]. Available: https://ebookcentral.proquest.com/lib/kxp/detail.action?docID=747431

[8] M. Lakkala, J. Lallimo, and K. Hakkarainen, "Teachers' pedagogical designs for technology-supported collective inquiry: A national case study," *Computers & Education*, vol. 45, no. 3, pp. 337–356, 2005. doi: 10.1016/j.compedu.2005.04.010

[9] F. Rheinberg, R. Vollmeyer, and B. D. Burns. (2021). FAM – Questionnaire on Current Motivation: ZPID (Leibniz Institute for Psychology) – Open Test Archive. [Online]. Available: https://www.psycharchives.org/index.php/en/item/b4ebe366-f9ee-4284-9888-c76a31d7fc7c

[10] P. R. Pintrich and E. V. D. Groot, "Motivational and self-regulated learning components of classroom academic performance," *Journal of Educational Psychology*, vol. 82, no. 1, pp. 33–40, 1990. doi: 10.1037/0022-0663.82.1.33

[11] A. Manzano-León, *et al.*, "Development and validation of a questionnaire on motivation for cooperative playful learning strategies," *International Journal of Environmental Research and Public Health*, vol. 18, no. 3, p. 960, 2021. doi: 10.3390/ijerph18030960

[12] A. Brenssell. Gender and social work: Texts for an introduction to the discussion by social work students. [Online]. Available: https://www.hwg-lu.de/fileadmin/user_upload/service/studium-und-lehre/diversity/Diversity-Projekte/GenderundSozialeArbeit.pdf

[13] 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. doi: 10.1016/j.chb.2016.12.033