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Blended support for students' reading in teacher education using PeerWise and Padlet.

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Abstract: This study started from the problem that many master students in a Dutch Master of Educational Needs program had trouble reading and studying course materials on a regular basis. This often led to less than desirable results, especially when it came to theoretic understanding and the integration of theory and practice. A need was felt for more interactivity throughout the courses in order to foster more regular reading processes and to be able to scaffold the assigned reading. In two consecutive courses two different tools were used for interactivity and support: PeerWise, and Padlet. The study takes a mixed method case study approach. This paper reports the intervention design, student use of the tools for blended learning, usability and effects of the design. The two tools differed in their ability to elicit intrinsic motivation in students.

Introduction

In the Master of Educational Needs program of a Dutch university for applied sciences, suboptimal student reading in preparation for lessons was identified in many different courses. In higher education, reading compliance of students often proves problematic while reading literature is deemed important for the development of knowledge and thinking (e.g. Cunningham & Stanovich, 2001; Wolf, 2018). From the point of view of student learning, many suboptimal responses to this problem are commonly observed within higher education. A frequently observed 'solution' is that the teacher provides short summaries of the material during class when it appears that too many students are not adequately prepared. This does not motivate students to read, as they start to rely on the material being discussed in class (Brost & Bradley, 2006). Another 'solution' is that of a university ICT study program in the Netherlands who are hardly prescribing any books anymore, because students 'don't read them anyway'. Quotes from students concerning reading do not give rise to optimism either: 'Before this examination I did not read at all, I just used my notes' (see also Brost & Bradley, 2006) and 'I never buy the books they prescribe, I can do without them'. Given the importance of reading for the development of professional knowledge and for lifelong learning, it is important to establish the extent of the problem and the causes and to try out solutions. In this study a blended pedagogical design was used to foster student reading. Research questions concern student use, usability and effects of the blended intervention.

Reading compliance in higher education

For almost twenty years, researchers have been reporting on students' low reading compliance in higher education. As early as 2000, Burchfield and Sappington reported that only one third of students read the assigned texts prior to class. The work of Connor-Greene (2000) showed a similar percentage: 72% of students did not do the reading homework prior to class. Comparable numbers are reported in more recent literature (Isakson et al., 2016; Baier, Hendricks, Warren-Gorden, Hendricks, & Cochran, 2011). The problem of not reading is not a problem of specific disciplines, but it occurs in all disciplines. And not only at the bachelor level but also at the level of the professional master's programs (Starcher & Proffitt, 2011).

In the literature, a number of reasons are identified for the current lack of reading compliance. Several authors (e.g. Brost et al., 2006; Sappington, Kinsey and Munsayac, 2002) indicate that students do not feel responsible for their reading behavior because evaluation is lacking as to whether the reading assignments are met. Students themselves often do not perceive reading as important for their learning and performance (Sappington et al., 2002). Other causes for the lack of reading compliance are reading comprehension problems, text comprehensibility (due to writing style), lack of motivation for reading, and the appeal of the multimedia entertainment culture (e.g. Brost et al. 2006; Hoef, 2012; Moravcsik & Kintsch 1993; Ryan, 2006). In addition, students often indicate a lack of time that may in part stem from very full curricula (Nathan, 2005, Rijckaert,

2014). It is striking that a number of factors are not or hardly mentioned in the literature, that are often mentioned in reading motivation research about children and adolescents: free choice, relevance, social interaction around books and texts and good (free) accessibility of books (Gambrell, 2011). It is plausible that these factors, in part related to self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2000) would influence whether or not students will read prior to class.

Intervention design

As the problem of low reading compliance has many causes, a pedagogy that may lead to a (partial) solution, is necessarily multi-faceted (Starcher & Proffitt, 2011). The pedagogy that was implemented, has eight characteristics that are briefly explained below.

Quality and relevance of the text

The students are only assigned literature that is relevant and interesting to them (Derryberry & Wininger, 2008; Hoefl, 2012), with a clear relation to professional practice and a clear and substantive function within the lesson. In addition, care is taken to ensure that the text is well written (narrative structure, paragraph structure, alternating sentence length and rich use of words, see Kintsch, 1998; Newkirk, 2014). This criterion excludes many of the available textbooks for Higher Education in the Netherlands.

Planning reading: building a reading habit

The teacher aims for a regular reading habit among students (Gambrell, 2011) by limiting the amount of material to be read (chapters and articles) to what is feasible and by spreading the literature clearly and regularly over time. The teacher also emails a weekly reminder for the literature to be read and for the expectations regarding the weekly use of the platform. For PeerWise the expectation was to produce six questions and to answer 60 multiple choice questions evenly spread over the course of six weeks. For Padlet the expectation was to write at least one contribution per week during seven weeks. During the face-to-face lessons the importance of a daily reading habit at a more or less fixed time is discussed (see also Miller, 2010).

Embedding in the lesson

No lectures are given in the session and the content of the literature is not repeated by the teacher (see also Brost et al., 2006). During the lesson, the literature that is read by the students, is used functionally within (discussion) assignments and reference is made to the literature in all discussions and dialogue. The content of the literature forms the core of the lesson, without the content being repeated.

Slow reading

Following Newkirk's (2012) concept of 'Slow reading', the teacher will encourage students to read slowly and with pleasure and to experience reading as a conversation with the author. Also rereading and pondering the content are encouraged. Students do not need to feel frustrated when they experience themselves as a slow reader as slow reading is exactly what is asked for. Slow reading facilitates the process of active meaning making.

Online interaction with teachers and fellow students

The interaction takes place during face-to-face lessons, as described above, but also outside the lessons through an internet platform; PeerWise or Padlet. In PeerWise students make their own multiple choice questions about the text and answer the questions of others. PeerWise is gamified through the use of badges and leaderboards. In Padlet, the teacher creates columns in advance that steer the interaction. The teacher questions in Padlet are open and low threshold. Padlet is set up to allow comments and ratings (likes). The teacher writes the introduction, but most of the columns are filled by the students. Padlet can be used on the computer and on the phone and sends messages as soon as there is activity on the platform. The use of PeerWise is suitable for large groups of students. The use of Padlet as described here is limited to groups of up to 8-10 students. It is possible to make several Padlets for a larger group, but then the teacher cannot easily keep track of student contributions.

Intrinsic motivation (Padlet)

The questions in Padlet are geared towards scaffolding and aesthetic/personal response (Rosenblatt, 1978; Beers & Probst, 2017) in order to foster reading comprehension and intrinsic motivation (i.e. inherent personal interest and enjoyment of reading, Klauda & Guthrie, 2014). The following columns were used: Introduction to the chapter/article, difficult words/phrases, beautiful ideas and sentences, questions (where students can ask questions about the chapter) and extra information.

Active reading and writing

Both PeerWise and Padlet are used to facilitate active reading and writing about the assigned literature; in one case multiple choice questions and in the case of Padlet an authentic personal response to the literature.

Scaffolding: arousing curiosity, supporting understanding, supporting technology use

In teaching practice it is often not clear to students why they should read certain articles/chapters. In the teacher- made summaries on Padlet, we clearly show which questions underlie the material to be read and what the importance of reading it is. The aim is to support reading (scaffolding) but also to arouse curiosity which makes it easier to read the material. In Padlet there is also a column in which questions about difficult aspects of the text can be asked. The teacher and/or fellow students give answers, making the article/chapter easier to read. This can also be considered as a form of scaffolding. The teachers also took care to scaffold the use of PeerWise and Padlet, by making their own authentic contributions (questions in PeerWise and comments in Padlet) before students started to use the platform, so students did not come to an empty platform and could use the teachers' examples in order to write their own. The teachers also modelled regular weekly contributions the platforms.

Methodology

Participants of the study were first year students of the Master of Educational Needs program. All were practicing teachers. In the first course, where PeerWise was used, ten students participated. Seven students participated in the second course where Padlet was used. Four of these students had also participated in the first course. The tools were used according to the pedagogical design described above.

The study followed a mixed method case study design. The courses were followed with research in order to determine usability and effectiveness of the pedagogical design. In order to quantitatively analyse the student contributions the PeerWise dashboard was used, as well as the number of questions that were contributed and the number of answers given. The PeerWise dashboard shows a number of different scores per student that are explained in table 1. The students' contributions in the different Padlets were counted with the help of the search function.

Table 1: Different types of scores in the PeerWise dashboard (based on PeerWise definitions)

Types of PeerWise scores	Definitions
Total reputation score	The Reputation score is calculated on the basis of three components: question authoring, answering questions and rating questions that were written by others. Component scores increase whenever the actions of other students generally agree with that students earlier decisions.
Question authoring component	Is related to the number of questions that were authored and to the agreement about the chosen answer with other students and the question's rating by other students.
Question answering component	Is related to the number of questions answered as well as the correctness of the answer (in relation to the prescribed answer or the most frequently given answer by other students)

Question rating component

Is related to how often students rate questions that were made by others, and how much their ratings agree with the ratings of others.

The final assignments of the students consisted of written reports about the application of the course content in their teaching practice. The reports are graded on several competencies; one of which is used in this study: 'knowledge use'. Knowledge use was marked as insufficient, sufficient, good or excellent, coded as 1 for insufficient, 2 for sufficient and 3 for good and excellent. Participation in the platforms played no role in marking the assignments. Non-parametric correlations were calculated in order to assess relations between student use of Padlet/Peerwise and the outcomes for 'knowledge use'.

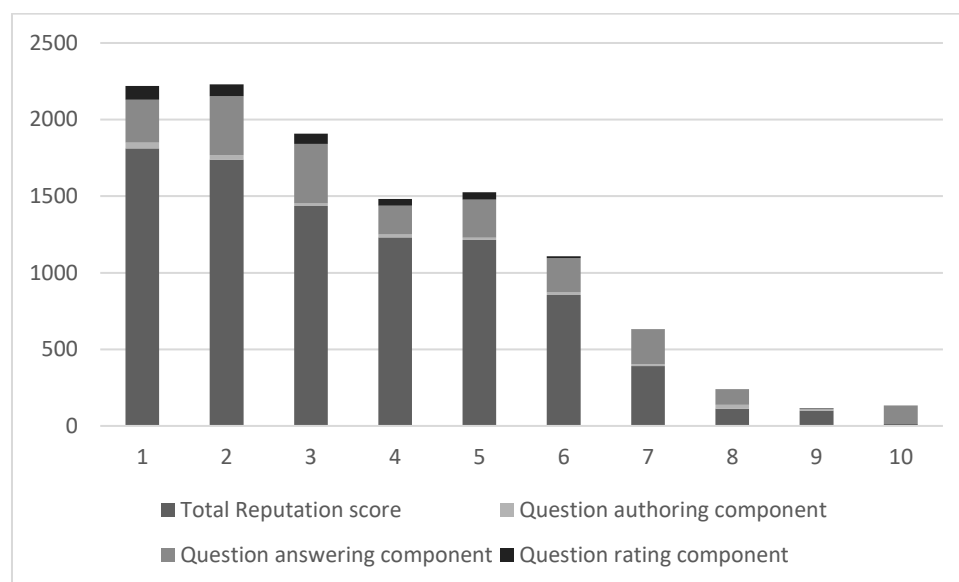
Qualitative analyses took place of the student's reflections on the use of the platforms. Also, their teachers kept notes and emails related to their pedagogical actions towards the use of the platforms and the students' reactions to these actions. The notes and emails were also analysed in order to determine the usability and effectiveness of the interventions. Qualitative analysis consisted of a summary of key themes in the sources of qualitative data.

Results

Student usage

For PeerWise, six of the ten students needed extra email reminders in order to start participating and to keep up regular work. They made a slow start in the platform. At the end of the course, five students did not meet the minimum requirement of producing 6 questions. Only one student did not meet the requirement of answering 60 questions. Figure 1 provides an overview of the PeerWise scores of the participating students in the first course.

Figure 1: PeerWise scores per student (Course 1, N=10)

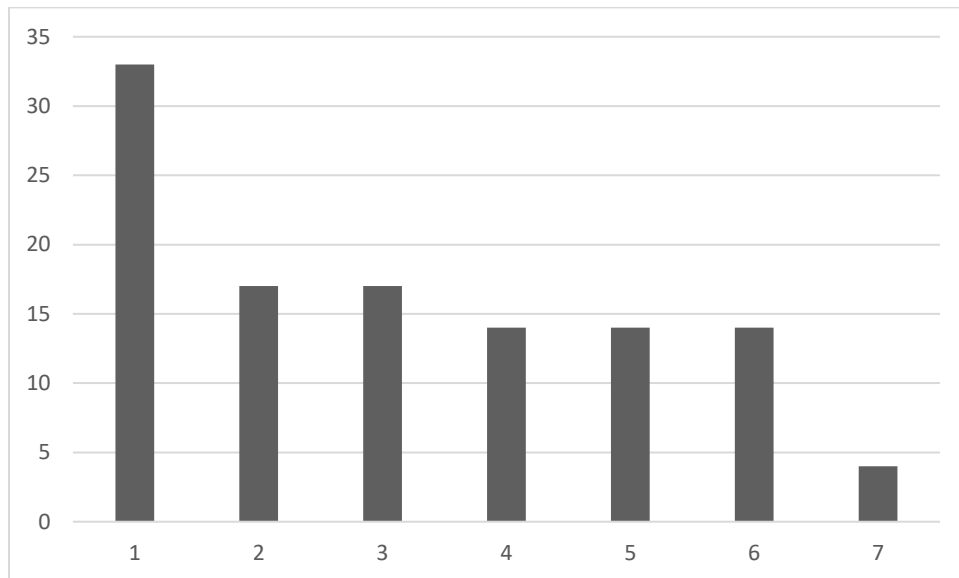


The graph shows large differences between students, primarily in their reputation scores but also in their question answering component. Despite the regular reminders, four students (7-10) had a very low or no reputation score. Student number nine does not show any question authoring component, whereas student number eight does not show the question rating component. Other students show their participation in PeerWise with relatively large reputation scores (e.g. students 1-5) and all but two students show all components (albeit with very low scores in some cases).

In the second course seven Padlets were used; one for each book chapter. For each week a new Padlet was made for a new book chapter. Once the Padlets were launched, students were encouraged to participate

within a week in order to maintain a steady study rhythm. Two students needed email reminders in order to participate. Figure 2 shows the total number of contributions per student in Padlet in the second course.

Figure 2: Contributions to Padlet per student (Course 2, N=7)



Participation in Padlet, in terms of the number of contributions, was relatively homogeneous except for student number 1 (very high) and student number 7 (very low). The high score of one of the students was mainly caused by the student's high participation in one of the Padlets (15 contributions in 1 Padlet). For all students except student number 7, participation was satisfactory as it turned out to be relatively evenly spread over the 7 different weeks and consisted of 14 or more total contributions.

Usability

In order to appreciate the usability of the two platforms and the associated pedagogical design, key themes in student reflections, and teacher notes and emails related to the course were summarised. Success factors for the use of PeerWise were enrolment and practice during the first face-to-face session of the course, teacher-made examples of higher order questions, regular reminders by email, student anonymity in the platform, and for some students the gamification aspects of the tool: badges and leaderboards.

I find collecting those badges extremely rewarding

However, challenging factors were also identified in the use of PeerWise. Several students suffered from procrastination concerning the use of PeerWise. They found it difficult to produce questions. It took a lot of encouragement (in emails) from the teacher educator to get them started and several students experienced technical problems. Once started, some students persisted in lower order questions and had difficulty answering the questions of others (also visible as a relatively low question answering component in figure 1). Students proved diverse in their reaction to the gamification aspects: some found it very motivational and others expressed their dislike. In the second course, the students that had worked with PeerWise in the first course hoped that they would not have to work with PeerWise again. They clearly perceived PeerWise as 'work'.

Badges are irritating, I don't like them.

I hope we don't have to do PeerWise again, it's a lot of work.

The way Padlet was used, proved to be intrinsically motivating for students. Padlet resembled social media use more than PeerWise as push messages were automatically issued to the students' mobile phones and were not anonymous. Students appreciated the fact that they could use their phones to work with Padlet. Students liked to react and often reacted with interesting literal quotes of the chapter that they read. They also commented

on relations between the literature and their own teaching practice. The diverse reactions on the Padlet made them reread parts of the chapters and appreciate the literature from different perspectives. Relatively little teacher encouragement was needed for students to participate regularly in the Padlets and no technological problems arose. The students valued the structure of slowly reading one chapter per week and all participating students appreciated the book that was used for the course.

Nice, because you could slowly read a chapter every week. This provided me with a clear structure.

The Padlet encouraged me to think more about the chapters. It is interesting to see how fellow students think about literature. Because everyone gets different sentences/ideas from the chapters. Sometimes I had already read the chapter, but when I looked at the Padlet it made me think again about the chapter.

Effect

The use of both tools led for most students to visible regularity of their reading and learning processes and provided the teachers with insight in the student's learning process and occasional misconceptions. The teacher educators actively integrated the literature in the lessons and used these insights to adapt the face-to-face lessons to the actual state of the students' learning. Padlet also provided insight in the students' practice and interests related to the chapters. Most students commented on the helpfulness of the interaction in Padlet and slow reading for their learning process. According to them, slow reading and the interaction in Padlet led to rereading, deeper learning, multiple perspectives and better retention. Two students commented that using PeerWise led to better retention of the knowledge in the literature.

In the end, working in PeerWise was a positive experience because my retention of the knowledge in the literature was better

The use of the Padlet has led me to deep learning/thinking. Talking to each other about literature, makes you think more and thus remember more. This way you are challenged to think more about what you stand for.

(Padlet) It is as if I learned to read again during this course. I start a conversation with the book and continue this conversation at later moments.

Slow-reading led to much more depth. You talk to the book and to each other.

Table 2 shows the percentages of the student results for the courses, regarding 'knowledge use' in their final assignments. In these assignments they are expected to use the knowledge they have gained from their reading assignments and to relate this knowledge to aspects of their teaching practice. The outcomes of the courses are not easily comparable due to the differences in students, course content and final assignments as well as the small numbers of students in both courses.

Table 2: Percentages of the students' results regarding 'knowledge use'

Course	Insufficient (1)	Sufficient (2)	Good – Excellent (3)
Course 1 (PeerWise) N=10	30%	30%	40%
Course 2 (Padlet) N=7	14.3%	14.3%	71.4%

The outcomes for course one are considered as positive for course one, in comparison to other courses in the program, and even more positive for course 2. For both courses the outcomes were positively related (non-parametric correlations) to participation in the tool, albeit non-significant for course 2 and Padlet ($\tau=0.7$, $p=0.06$). Most PeerWise scores proved significantly correlated to the outcomes of course 1; number of questions answered ($\tau=0.7$, $p=0.01$), Total reputation score ($\tau=0.6$, $p=0.03$), Question Answering Component ($\tau=0.7$, $p=0.005$), Question Rating Component ($\tau=0.7$, $p=0.01$).

Conclusions and discussion

Conclusions

The research questions concerned student use, usability and effects of the blended intervention. Student use of PeerWise did not meet requirements for half of the students (5/10), due to the question production aspect of PeerWise that students found challenging. In Padlet one student (1/7) did not meet the requirements. Student contributions were relatively homogeneous for Padlet, and differed quite a lot per student for PeerWise.

Both interventions (as described in the intervention design) were usable. Padlet (with questions geared towards scaffolding and aesthetic/personal response) proved simpler to use within the context of the two courses than PeerWise. For some students PeerWise was challenging on a technological level, and producing questions was perceived as difficult and 'work'. This was not the case for Padlet as the students showed intrinsic motivation to use the Padlets. For both platforms teacher reminders were necessary in order to secure regular contributions from (almost) all students. However, for the Padlet intervention less teacher encouragement was necessary as a result of the intrinsic motivation that it induced.

The effect of the intervention was that most students read regularly in the courses. By following and contributing to the platforms teachers gained insight into student learning from the literature, which they used to align their face-to-face classes with the students' needs. Students perceived learning from their activity in both online platforms. Related to the PeerWise intervention they expressed this as better retention of knowledge. The Padlet intervention (with slow reading) not only led to better retention, but also to deeper learning, knowledge – practice integration and multi-perspectivity. The perceived advantages for learning of both interventions were somewhat corroborated by the positive assessment outcomes for knowledge use.

Discussion

Probably the most important finding was the fact that the Padlet intervention led to increased intrinsic motivation for reading the course literature. It is important to appreciate that this was the result of the complex intervention with all of its components. The choice of the books, the weekly reading rhythm, the integration of the literature in the lessons, the concept of slow reading and the online interactions around open aesthetic questions and the fast social media-like interaction on the smartphone are all key components. The finding is important, because a lack of intrinsic motivation is seen as an important cause for a lack of reading compliance (Lei et al. 2010; Ryan 2006), and also because it shows a way to foster reading motivation in higher education that differs from other current approaches. Most of these approaches address extrinsic motivation (e.g. Hoefl, 2012) and oppose academic reading to leisure reading (Isakson et al., 2016), whereas in the approach under study a successful attempt is made to foster aesthetic personal response and social media interaction around authentically interesting books.

A second interesting finding concerns the types of learning that students reported. For the intervention with PeerWise they reported better retention of knowledge, whereas the Padlet intervention allegedly led to better retention as well as deeper learning and multi-perspectivity. This seems in line with the different paradigms behind both interventions. PeerWise, with its multiple choice questions, seems primarily aligned with a knowledge transfer paradigm, where the intervention with Padlet that was tested aligns better with a constructivist paradigm. In hindsight this meant that the Padlet intervention showed better alignment with the educational paradigm of the courses, which was primarily constructivist, and therefore also with the learning activities in the course and the way the course was assessed. Biggs and Tang (2007) defend the importance of these alignments that they see as 'constructive alignment' and as a necessity for learning. The intervention with PeerWise may prove to be a better fit in courses that are more aligned with the knowledge transmission paradigm.

A number of moderating remarks about this study are necessary. It is difficult to identify the actual learning that took place on the basis of the interventions. Self-reported learning does not always mean that real learning took place. Also it remains difficult to interpret the meaning of the relation between PeerWise outcome measures and outcome measures of the course. There may be a common underlying factor, and students who started out with more knowledge may do better in the platform(s) and ultimately show better results in the course. Also, the groups that we worked with, were small and the possibility of teacher effects cannot be eliminated.

However, even when no claims about learning are made, this type of approach towards intrinsic motivation for student reading warrants further attention in research. Another positive effect of the project was a spin off that was seen in our institution, in which other teacher educators also started to use the two tools, driven by the same questions and problems that were identified at the start of the project. Overall, the fact that these two tools can have a rather essential role (and good fit depending on constructive alignment with the course) in (partly) solving the problems that we experience furthers the uptake of the tools in the master program.

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