



Students' perceptions and use of a new digital tool in teacher education

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Abstract

This article investigates how student teachers of English at two different teacher education institutions perceive and use a new digital tool, OneNote Class Notebook. The intervention study explores student responses to and use of a specific digital tool implemented for a specific pedagogical purpose, namely to enhance formative assessment. The data consist of 128 reflection notes written by 40 student teachers during a semester and a focus group interview with three of the students. The results show that the students' attitudes towards the new tool varied considerably. Both the attitudes and the reported use were overwhelmingly related to the perceived ease of use, rather than the learning-related potential of digital technology. On the other hand, the interview data show that at least some students are aware of the affordances provided by the digital tool for enhancing formative assessment. The article highlights that the transformational potential of digital artifacts rests on teachers and learners alike. The students need to be made aware of the pedagogical, and not just the practical, aspects of digital technology, and be willing to exploit it. The article concludes that more fundamental changes in students' working habits and their expectations of higher education may be required to truly harness the transformational power of digital technology.

Keywords

student perceptions, digital tools, teacher education, higher education

Introduction

Digital technologies have become an integral part of everyday life and also of teaching and learning in higher education. Students today, often referred to as “digital natives” (Prensky, 2001), have grown up in the digital era, and as such commonly assumed to be expert users of digital technology. However, previous studies on students' digital competence have challenged this assumption (Selwyn, 2016; Ståhl, 2017; Sørensen, 2018). For instance, in a recent study, Sørensen (2018) found that students are conservative in their choices of digital tools, with a preference for mainstream commercial tools that they are already familiar with. Sørensen (2018) describes the students' approach to digital tools as “non-explorative”, and “pragmatic and outcome-focused”, a far cry from the idea of the creative and technologically adroit digital native (cf. Drange & Birkeland, 2016).

In order to gain a more nuanced understanding of students' digital competence, it is important to explore students' attitudes to and actual use of digital technology. This will enable higher education institutions to make informed decisions about how to best implement pedagogical technology (Waycott et al., 2010). To address this issue, a number of studies across different countries and educational programs have attempted to map the students' choice of digital tools and/or the development of their digital competence, using predominantly survey data (e.g. Henderson et al., 2015; Røkenes & Krumsvik, 2016; Ståhl, 2017; Bond et al., 2018; Sørensen, 2018). Rather than investigating the students' overall preferences regarding the choice of digital technology, the current study aims to add to this body of research by exploring students' encounters with a specific digital tool introduced to enhance formative assessment in the context of teacher education.

Teacher education is particularly significant for developing students' professional digital competence (PDC). As underscored by Lund et al. (2014), PDC involves teachers not only appropriating technologies, but also making their learners appropriate them and put them to productive use. A review study (Røkenes & Krumsvik, 2014), published in the current journal, mapped the research field on approaches used to develop student teachers' PDC. The review focuses particularly on student teachers educated to teach in the secondary school grade level and analyzes online peer-reviewed empirical studies from 2000 to 2013. The findings revealed that most studies used multiple approaches, the most common being metacognition (i.e. reflection on the use of digital technology). An assessment approach was used in 33 studies. The authors note that there were few studies from Scandinavian countries, calling for more research in this particular context. Some examples of more recent studies will be given in the following.

Røkenes and Krumsvik (2016) investigated how student teachers' PDC develops over the course of four academic semesters. The survey data in this study showed that the student teachers' self-perceived digital competence was rated relatively high, whereas observations and interviews revealed that basic digital skills seemed to dominate their teaching practices. Drange and Birkeland (2016) conducted focus group interviews to map out how student teachers use digital tools in their courses and at home. They found that student teachers generally used digital tools in a passive way, as consumers of information rather than as active producers of content (cf. Sørensen, 2018). In contrast to these studies, Brox (2016, 2017), Kongsgården and Krumsvik (2016) and Røkenes (2016) have investigated student teachers' responses to and use of specific digital technology, wiki spaces, tablets and digital storytelling, respectively. The aim of these studies was to introduce students to innovative ways of integrating digital technology into teaching, in which students were required to take on the role of active producers of content.

The current study also explores student teachers' encounters with and reactions to a specific digital tool, in this case OneNote Class Notebook. However, the primary aim of the current project was not to showcase innovative pedagogical practices. The digital tool was introduced as an integral part of the course to enhance formative assessment practices (Bader et al., 2019; Black & Wiliam 2009). Though the students were encouraged to reflect on the potential of OneNote Class Notebook in their future careers, the main aim was to harness the power of digital technology to better support learning through formative assessment and then explore student reactions to and engagement with the digital tool. With this backdrop, the study aimed to address the following research questions:

- How do student teachers perceive a new digital tool introduced to enhance formative assessment practices?
- To what extent and in what ways do student teachers make use of a new digital tool introduced to enhance formative assessment practices?

A cultural-historical research approach informs the study (Aagaard & Lund, 2020). As pointed out by Lund and Aagaard (2020), digitalization requires student teachers to cope with and develop transformative digital agency. Aagaard and Lund (2020) call for the development of PDC as an agentic, quality and context sensitive as well as transformative capacity. A cultural-historical research approach to the data highlights any qualitative transformative processes (Wertsch, 2007), meaning any activities mediated by cultural artifacts, such as a digital tool (Aagaard & Lund, 2020). Tools, or cultural artifacts, mediate higher mental functions and human actions (Vygotsky, 1986). In the present study, we were interested in any type of mastery and appropriation of the new digital tool with respect to formative assessment practices (Black & Wiliam, 2009). Mastery refers to knowing how to use an artifact, while appropriation implies “taking something that belongs to others and making it one’s own” (Wertsch, 1998, p.53), and as such involves transformation of tools. Students’ attitudes and uses were scrutinized in order to track any transformative processes and possible resistance (Aagaard & Lund, 2020). In the case of this study, the intervention of an artifact occurred with the new digital tool that was introduced as an integrated part of the two courses at the two teacher education institutions.

A digital tool to enhance formative assessment practices

Formative assessment can be defined as “the process of seeking and interpreting evidence for use by learners and their teachers, to identify where the learners are in their learning, where they need to go and how best to get there” (Assessment Reform Group, 2002). Following Wiliam & Thompson (2007) (see also Black & Wiliam, 2009), formative assessment can be conceptualized as involving five key strategies and one “big idea”. The “big idea” concerns the fact that formative assessment involves eliciting evidence about student learning that is used to adapt instruction to better meet the students’ needs. The five strategies are:

1. Clarifying and sharing learning intentions and criteria for success;
2. Engineering effective classroom discussions, questions, and learning tasks;
3. Providing feedback that moves learners forward;
4. Activating students as instructional resources for one another; and
5. Activating students as the owners of their own learning.

The principles outlined above served as a basis for operationalizing the construct of formative assessment in the context of the present study. The attempts to promote formative assessment focused first and foremost on the work related to the three obligatory assignments the students had to complete in the course of the term. After completing the assignments, the students received teacher and/or peer feedback and were given the opportunity to revise before including two of the assignments in the exam portfolio. The key aspects of the course interventions are illustrated in Figure 1.

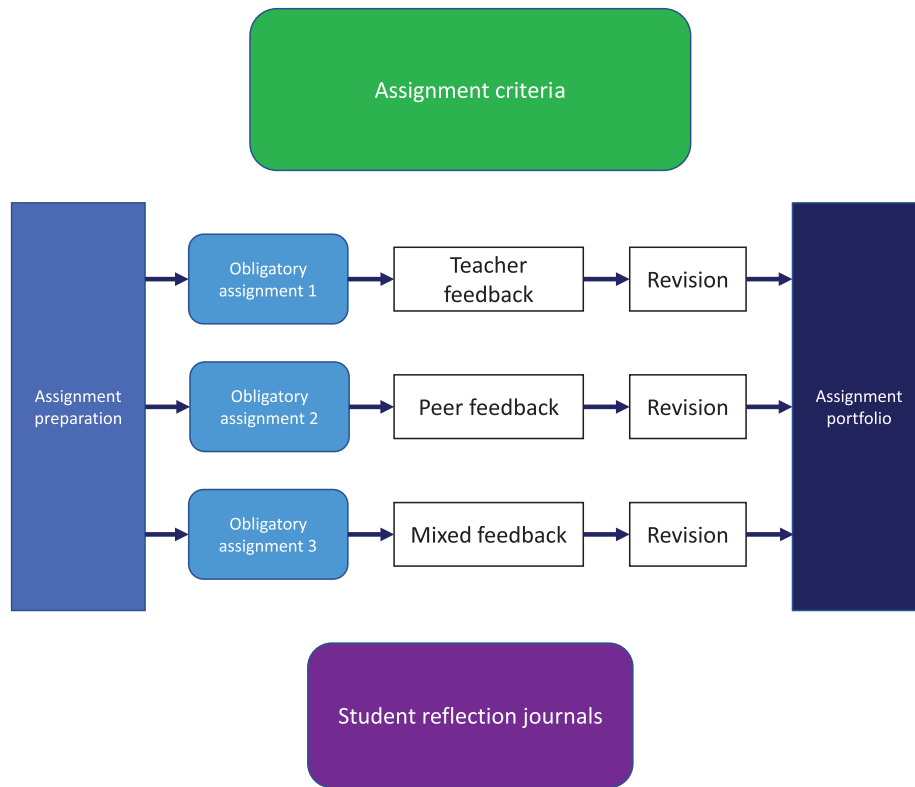


Figure 1 The course design

OneNote Class Notebook was chosen as a digital tool to facilitate formative assessment practices. OneNote Class Notebook is a version of Microsoft's OneNote application specifically designed for use in an educational setting. The application has different areas: the Collaboration Area, in which everyone in the class can contribute and collaborate, the Content Library, which is read-only for students, and Individual Student Notebooks, which are areas shared only between an individual student and the teachers. This was a new digital tool for all of the participating students.

Several features of OneNote Class Notebook were deemed particularly suitable for supporting formative assessment and student-active learning. The Collaboration Area was used both in class and out of class, not only to manage various collaborative activities more efficiently, but also to encourage a shared responsibility for producing, editing and structuring content. This opened up the possibility of activating students as resources for one another through collaborative learning. The students could also gain insight into the work of others, as well as both teacher and peer feedback posted in this area, which served the purpose of further clarifying the expected standards. The students were encouraged to use Individual Notebooks to compose and submit their obligatory assignments, take notes, share low-stakes tasks such as home preparation activities, and ask questions related to the posted work. The aim was to create more opportunities for the provision of feedback with more work being shared. The students were advised to draft their assignments directly in OneNote and in that way open up the possibility for the provision of feedback during the process of composing. The course instructors expected that the use of Individual Notebooks would promote dialogue around the assignments and feedback, leading to a better understanding

of both the feedback and success criteria. Finally, the increased insight into student progress and understanding, through both the Individual Notebooks and the Collaboration Area, would allow the course instructors to adjust the teaching to better meet the students' needs.

Data collection and analysis

The data set consisted of 128 reflection notes written by 40 students at two teacher education institutions in Norway: 24 at institution one, and 16 at institution two. The participants were specializing in teaching English as a foreign language in secondary schools (grades 5-10). The instruction was conducted in English and all student submissions, including their reflection notes, were thus written in English.

As the attempts to promote formative assessment focused predominantly on the work related to obligatory assignments, the students were asked to submit reflection notes after receiving feedback on their assignments. The following prompt was used: "How did the use of digital tools affect the process of planning, drafting and revising the assignment?". In the final reflection notes submitted with the exam portfolios, the students were asked to respond to the question: "To what extent has the use of digital tools been helpful/disadvantageous to your learning during this course?" In this case, the prompt was purposefully left more open to allow for the possibility of bringing in other relevant aspects of digital tools. In addition to written commentaries, the data set includes the transcription of a focus group interview conducted with three students, without the course teachers present. Students had been asked to discuss the use of the new digital tool at the end of the course. The open and flexible nature of the interview prompted the students to go beyond simply reporting their experiences to discussing various issues related to digital tools. In addition, the researchers, who were also the course instructors in this case, were able to observe in what ways the students took advantage of the different possibilities in OneNote.

The reflection notes and the interview transcript were read in their entirety, and the research team met to discuss initial observations. The framework involving two broad categories was then established on the basis of our research questions: 1) Students' attitudes to the new digital tool and 2) Students' use of the new digital tool. The relevant content from the reflection notes was identified and coded through close reading of the data and placed into these categories. Subsequently, a more inductive analysis was conducted, allowing relevant concepts to emerge from student responses. The final stage involved comparing the established categories against the features of the digital tool thought to promote formative assessment. This was done in order to identify the relevant uses not mentioned in student responses. The process of analysis involved repeated cycles where team members worked individually to code the data and collaboratively to review the individual analyses.

Findings

Students' attitudes to the new digital tool

The students seemed mostly preoccupied with the user-friendliness of the digital tool. The words "easy" or "easier" are extremely frequent in student reflection notes. Ease of use here can relate to how easy or intuitive the tool is, how easy it is to navigate, and how easy it is to locate information. The students mentioned "ease of access over different devices" (S25), that it was "easy to switch between different folders" (S1), and that it was "easy to find information" (S10). The following quote is illustrative:

S10: I find OneNote useful because it is easy to find information ... It is also easy to upload documents, and I really like that we do not have to download copies to be able to read the documents.

Similarly, when referring to collaboration and feedback, it was the managing of these features that students generally focused on, as the following quote illustrates:

S8: One note made it easy to share our work with the other group, also receiving and giving feedback was easier.

The comments of students expressing negative attitudes again predominantly relate to the perceived difficulties, rather than ease, in managing the tool, such as accessing information, receiving notifications, or navigating the application.

S23: In the beginning I felt like OneNote and It's Learning was of good help. As the course went on and OneNote filled up with information, it became hard and almost time consuming to find the information you were looking for.

Another factor that seems to have had an effect on student perceptions is the familiarity with the digital tool. OneNote Class Notebook shares many features with the OneNote application and those students who already had some experience using OneNote before the course were more positive.

S4: OneNote is a fantastic tool, and it is something I have been using since 2nd year in high school. It is a great way to write notes as opposed to a separate word document for each lesson, collaborate with others, and organize your notes to be gathered in one place, and to be easily accessible for when the exam shows up, or whenever you need them.

The reflection notes reveal that the purpose of using the different digital tools was not always clear to the students, leading to frustration because two digital tools with seemingly similar functions were used in a course.

S19: To be honest I have not used ItsLearning for much, other than finding information about what classrooms we are supposed to be in. I am used to using ItsLearning as I have been using OneNote (submitting texts, receiving feedback, finding power points etc.) Since It's learning is used differently here, I have not understood why we are using ItsLearning as well as OneNote.

Finally, the following quote highlights the fact that some students remain unenthusiastic about the use of digital learning tools in general:

S13: On the matter of digital tools, I am of mixed opinions. While I see their usefulness, I do not like working with them. I find them cumbersome, time-consuming, and often confusing to work with... Both of these tools have largely been discouraging factors in my work, because I am a person who prefers to work on paper, with a pen in hand, and staring at a computer screen is both distracting and tiring after a while.

Students' use of the new digital tool

Overall, the students are most concerned with the digital tools' capacity for organizing and managing the coursework. In order of frequency, the following uses of the new digital tool were noted by the students: accessing information/content, managing peer and teacher feedback, and collaborating with peers. Many students mentioned that they used OneNote mostly as a space for retrieving information, where "information" typically refers to the content posted by the teacher. The following quote is illustrative:

12: OneNote and ItsLearning are great places to find information, but I haven't really used them for anything other than getting information.

Uses related to feedback and student collaboration were mentioned relatively frequently in the students' reflections. These comments again by and large focused on the way digital tools make it easier and more efficient to collaborate and manage feedback.

S17: The one thing that was quite practical was the fact that the feedback was located in the same place as the assignment itself, which meant that there was no hassle having to go back and forth between applications trying to read two documents at once when revising.

The possibilities that the digital tool offers for enhancing formative assessment, and thereby student learning, were rarely mentioned in the reflection notes. One student noted the possibility of learning from peers by being able to "share ideas through the collaboration space" (S25), while another appreciated that (s)he could "see what questions peers have" (S1).

The students did not take advantage of the drafting aspect of OneNote during formative assessment practices. Rather than composing their responses to course tasks and assignments directly in OneNote, most students simply pasted in a finished text. Many noted using the programs they were already familiar with to handle tasks that could have been done using the new digital tool.

S27: I did not use OneNote in my planning, or drafting process, and I do not plan on using it in my revision either. I prefer to work in a Word document and then upload it when it is done.

S22: I do imagine that I might in the future post questions to my peers on there [OneNote] if needed, but for now we have Facebook-groups that work as both social channels and for issues related to the studies.

Individual Student Notebooks, which provide a more personal and informal channel of communication with the teacher, were rarely used by the students and hardly mentioned in their reflection notes. Only two students made explicit reference to this aspect of OneNote. One of these references again relates to management of work, as the student found it beneficial "that you can save all your files for class on your own private section." (S19). The second reference, however, does highlight one important aspect related to formative assessment, namely the possibility to track student progress and provide feedback in the course of learning:

S8: It [OneNote] also allows the teachers to look at our work, something that ItsLearning does not. I think it's great so the teacher get to see what we do in the course, and might be able to help us along.

In contrast to the data from student notes, the comments of students taking part in the interview show deeper reflection on the uses of digital tools to promote formative assessment. The students highlighted the importance of insight into the work of others:

S2 interview: *We got ideas from different examples on how a lesson plan should look like [in reference to the assignment requiring students to design a lesson plan].*

S3 interview: *You can also look at other people's assignment and how they wrote... what kind of writing style they have and what kind of feedback they get on their writing style.*

The students also stressed the potential for learning in having access to the feedback that the other students received:

S2 interview: I particularly enjoyed the lesson where we used the collaboration space for peer assessment and assessment in class as well, because you not only could see the feedback you received but also the feedback others received... and how we learnt from that.

S1 interview: yes, you get access to more feedback in a way, it's accessible to everyone, so you can use other people's feedback as feedback on your paper as well.

S1 also mentioned the possibility of tracking one's own progress, and the fact that the informal nature of OneNote motivated further engagement with submitted texts:

... what I liked most is that you have access to all your assignments in chronological order, so you can see your own development in a way, read the feedback from paper to paper...

... when I delivered stuff in Fronter, which we used to earlier, it felt more final, you sort of clicked on the official "deliver now" thing... whereas here you can sort of copy or draft... it feels more like a draft and you feel you want to change it after.

The students also reflected on the benefits associated with the possibility of having a dialogue around feedback in OneNote:

S2 interview: ... I particularly enjoyed the lesson where we actually received feedback while we were sitting in the lecture cause then you can read the feedback straight after you get it and ask questions if there was something you didn't understand... you can't do that if you receive everything on email or on a different learning platform.

S1 interview: but if you did have access to this back and forth inside like the actual OneNote program, it would be even better, then you could see what different stages of the text received different kinds of feedback, that would help you with writing a new paper in a way and look at your process in a way.

In another discussion, the students sketch the possibility that the digital application opens up for providing feedback not only on products, but on the process itself:

S1 interview: I also think we could use the concept of co-writing more, and giving feedback as well... like set a time for writing the assignment – like from 8 to 4 you are supposed to write this assignment this Thursday – and the lecturer could comment...

S2 interview: ...can give formative feedback in the process – that’s excellent!

S1 interview: yeah... not only on the paper but also on the process

They went on to note that this way of working would give teachers insight into the way the students structure their texts, the way they use notes and would inspire the students “to do more stuff in OneNote as well ... like post all our sources beforehand” (S1 interview).

All in all, the analysis of written reflections reveals that students’ attitudes towards the new digital tool varied considerably, depending on their familiarity with the tool and the extent to which they perceived it as helpful in managing their studies. As for their use of the new digital tool, the students used the tool first and foremost to retrieve information and manage the practical aspects of studying. The aspects of the digital tool more directly related to learning and promoting formative assessment are rarely mentioned in students’ written reflections. The interview data, on the other hand, reveals that some students are aware of the potential for enhancing formative assessment practices, most notably associated with increased insight into one’s work and the work of others, as well as the quantity and quality of feedback.

Discussion and implications

The written reflections in the current study revealed that the students were not always enthusiastic about adopting new digital tools or aware of the benefits they provide in supporting learning (Drange & Birkeland, 2016; Sørensen, 2018), which hampered their effective use in the course. Familiarity with the digital tool and the extent to which it was perceived as useful and user friendly emerged as significant factors in influencing the reported attitudes (cf. Sørensen, 2018). The results highlight the significance of clearly articulating the role that the digital artifacts will play in the course and how these relate to other digital technology that students are already familiar with (Brox, 2016, Lund & Hauge, 2011).

The ways in which the students reported making use of the new digital tool showed that they were singularly preoccupied with the aspects of technology related to course management (cf. Sørensen, 2018). The new digital tool was viewed as another teacher-controlled “base of information”. The findings suggest that students see the teachers as the ones responsible for updating this bank and making the information easily accessible, whereas the students’ job is to access the information. The affordances that the digital tool offered for promoting formative assessment were not truly exploited by the students. Specifically, most students did not take advantage of the drafting aspect of OneNote and reported simply pasting in a finished text, missing thereby the opportunity for receiving feedback on work in progress (Bader et al., 2019). The new tool therefore ended up being used in an “old” way, as a tool for submission of finished products. Individual Notebooks, which offer a possibility for dialogic feedback and a better insight into the individual progress of each student, were only occasionally used by a handful of students and hardly ever mentioned in their reflection notes. This limited the possibilities the course instructors had for providing formative feedback and for gaining insight into student learning (Carless, 2013).

There may be a number of potential reasons for students’ reluctance to engage in these types of activities. Bennett and Maton (2010) point out that students’ everyday digital activities may not prepare them well for academic practices. Although students use digital tools frequently in their everyday life, they are typically consumers rather than active producers of content (Drange & Birkeland, 2016, Sørensen, 2018). In higher education, where focus is

still predominantly on summative assessment, students might be unaccustomed to sharing work which is not “finished” or graded (Lee, 2011). Issues of trust regarding the provision of feedback may also play a role, as students need to show willingness to share their partial understandings (Carless, 2009, 2013). Building a relationship of trust is perhaps not easily achieved in the course of a semester.

The missed opportunities noted here for harnessing the potential of the digital artifact point to the complexities of teaching and learning in technology-rich environments. Using the concept of “design” in teaching and learning (Lund & Hauge, 2011; Lund et al., 2014), we can observe that the intentions embedded in the design for teaching were only partially enacted by the learners, and the transformational potential of the digital artifact remained therefore unexploited. Lund et al. (2014) highlight that teaching and learning in technology-rich environments is a co-constructed effort. Therefore, the role of both teachers and learners is crucial for advancement of knowledge. Nevertheless, tensions may arise between the established practices that the students are accustomed to in higher education, in this case the focus on products and summative assessment, and the new practices that the use of the cultural tools make possible.

In contrast to written reflections, the transcript of the focus group interview reveals potential transformative digital agency in relation to using the digital tool as an artifact enhancing formative assessment practices (Assessment Reform Group, 2002; Black & Wiliam, 2009). Specifically, the students mentioned the possibility for dialogic feedback, the advantages of which are highlighted in the more recent literature (cf. Carless, 2013; López-Pastor & Sicilia-Camacho 2017; Nicol & Macfarlane-Dick, 2006) by appropriating the new digital tool for that purpose. In addition, the students also pointed out the benefits associated with the provision of feedback on process, and the opportunity for learning that arises from increased insight into one’s own progress and the work of others, all key features of formative assessment (Bader et al., 2019; Black & Wiliam, 2009; Carless, 2013). Interestingly, neither in the reflection notes, nor in the interview transcripts do students mention the possibility that the tool offers for teachers to gain insight into student learning and adapt the teaching accordingly (cf. Wiliam & Thompson’s (2007) “big idea”). The significance of this may be less obvious to the students as it concerns the actions of teachers and may thus need to be underscored in class.

The contrast between the student reflections and interviews in this respect need not necessarily indicate differences in the level of awareness regarding the potential of the digital tool, but might also suggest that using written reflections is not an ideal way of eliciting this kind of data. The need for training in reflective skills to help students move beyond shallow and descriptive reflective writing is noted in the literature (e.g. Hume, 2009). These observations are tentative as they are based on only one focus group interview but seem to suggest that focus group interviews might be a more suitable tool for exploring student perceptions as they may encourage reflection through group discussions. The interview findings further suggest that course instructors should ask students to discuss the possible ways in which particular digital tools could be used to support learning, and thereby appropriate them as cultural artifacts, rather than outlining the affordances of particular tools to the students. This may encourage transformative digital agency and engagement with the new digital tools (Aagaard & Lund, 2020; Lund & Aagaard, 2020).

Conclusion

By definition, all students are “digital natives” in the sense that they have grown up in the digital era. However, students today are a heterogeneous group as regards their attitudes to and use of digital tools in education. Whether or not students welcome particular digital tools in their studies may depend on their current working habits, their level of engagement, and their motivation for using them. The students also need to be aware of the pedagogical benefits of digital tools and be willing to appropriate them, as the transformational potential of digital artifacts rests on teachers and learners alike.

To truly harness the pedagogical advantages that the digital tools provide, it is not enough to present the possibilities and encourage the students to make use of them. More fundamental changes in students’ working habits and their expectations of higher education may be required. The pedagogical use of new digital tools may require the students to develop skills beyond PDC, in our case strategies related to process writing and peer assessment. The focus needs to be taken away from grading and summative assessment and directed more to practices which encourage student engagement. If we are to support the students in this transition to appropriating new digital artifacts and obtaining transformative digital agency, it is paramount that we take into consideration student perceptions and experiences. The current study is a small contribution in that direction.

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