Learning from Wikipedia: Using digital social production as an assessment tool in higher education

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Abstract

Wikipedia has been viewed as a dubious resource within higher education, and students are often encouraged to avoid its use due to the questionable rigour of its entries. In this study the tables were turned when Wikipedia became the central element in an assessment task. The task experimented with a new approach to summative assessment within a university-taught pre-service teacher education programme. This paper describes an authentic task that allowed students to demonstrate their learning by editing Wikipedia entries and providing justifications for their edits. Findings showed that this assessment task was enjoyed and valued by the students as they saw they could make a positive contribution to the socially produced Wikipedia resource. Additionally, they described the development of their own digital literacy skills gained through engaging with the task.

Keywords

Learning-oriented assessment; authentic assessment; Wikipedia; higher education; pre-service teacher; social production.

Introduction

This article describes a project that was designed to explore the potential benefits and challenges of using Wikipedia as a teaching and learning resource within higher education, and in particular its use as an authentic assessment tool. It describes an assessment task used within the final year of a three-year pre-service teacher education programme in which students had to edit Wikipedia entries to improve the content. The project involved an investigation of the effectiveness of the task and invited responses from students within this programme.

Use of Wikipedia in higher education

Socially generated information is widely available and a source of information accepted by the general public. Wikipedia is one such source of socially generated information. It is a free, multilingual online encyclopaedia which has been generated by a wide range of volunteer contributors (experts and generalists) through a model of open collaboration that is updated in real time (Williams, 2008). This publicly edited, open educational resource is available worldwide, and has been ranked as the 9th most popular website globally by Similarweb, an American web traffic analysis company (Similarweb, 2022). Because Wikipedia entries consist of collaboratively produced knowledge that can be generated and edited by anyone, these entries run the risk of inaccuracy, misrepresentation of facts, and lack of rigour, and can be used for spreading misinformation (Carberry, 2009). As observed by Leuf and Cunningham (2001) "a wiki is not a carefully crafted site created by experts and professional writers and designed for casual visitors. Instead, it seeks to involve the typical visitor/user in an ongoing process of creation and collaboration that constantly changes the website landscape." (p. 16).

As a consequence of the risk of low quality entries (McDowell and Vetter, 2020), students in higher education are inevitably warned not to rely on Wikipedia content, but rather to focus their energies on high quality peer-reviewed literature (Di Lauro and Johinke, 2017). Despite this, research shows that students and indeed academics regularly use it in their everyday lives for matters that range from trivial knowledge checking to important information about their health (Di Lauro and Shetler, 2013; Menchen-Trevino and Hargittai, 2011; Olutola et al., 2016; Selwyn and Gorard, 2016). Wikipedia entries have the potential to be improved in quality as people edit the information on the website,

Citation

and numerous practices and policies have been put into place to encourage this (McDowell and Vetter, 2020). However, university students are not necessarily good at critiquing Wikipedia, with many students unaware of how Wikipedia entries are generated. Research has shown that some students have a level of concern about the credibility of information they read in Wikipedia, but many do not (Menchen-Trevino and Hargittai, 2011).

Nevertheless, Wikipedia has also been used successfully for teaching and learning in tertiary education. For example. Di Lauro (2020) illustrates the positive contribution of Wikipedia editing in her tertiary writing class, and describes this as "an open and sustainable platform for formative and summative assessment" (p. 1). Moreover, Di Lauro's paper emphasises the benefits of texts created by collaboration. Zou et al (2020) develop these ideas when investigating the benefits of flipped learning with Wikipedia, as flipped learning was found to lead to more time and space for collaboration, interaction and active learning. As described below, Wikipedia has also been used as a context for student assessment in recent studies.

Assessment in higher education

Assessment in the tertiary sector is moving from the use of traditional testing, examinations and essays towards utilising more innovative tasks that allow the assessors to make judgements about students' work, based on more "real world" tasks. This means that students are now being given opportunities to demonstrate their learning in a larger variety of ways (Hay and Mathers, 2012; Holgate and Sambell, 2020; Katz and Gorin, 2016; Struyven and Devesa, 2016). Given the time pressure and workload issues within higher education, it makes sense that students are able to learn through the assessment tasks they engage in. This has been discussed as sustainable assessment (Boud, 2000; Boud and Soler, 2016), as learning oriented assessment (Carless, 2015) and as authentic assessment (Sokhanvar et al., 2021; Villarroel et al, 2018). Sustainable assessment means that students will learn things through the assessment process that will inform their thinking after the assessment is complete, that is, assessment "that meets the needs of the present and [also] prepares students to meet their own future learning needs" (Boud 2000, p. 151). By doing this assessment serves "double duty" (Boud, 2000). Authentic assessment is assessment that "focuses on students using and applying knowledge and skills attained in their course to real-life settings" as opposed to assessing their theoretical knowledge without an application component (Miles and Foggett, 2019). It is comprised of three components: realism, cognitive challenge and feedback (Villarroel et al, 2018). The design of such assessment tasks can be intimidating for some tertiary teachers, and to this end Villarroel et al. (2018) have proposed a four-step model to build authentic assessment that they hope will guide those reluctant to adopt authentic assessment. The merits of authentic and learning-oriented assessment through the use of cases, portfolios, action research and the generation of Wikipedia entries have been highlighted as they include providing value for graduates by enriching their skills that may contribute to their employability (Darling-Hammond and Snyder, 2000; Johinke, 2020; Sotiriadou et al., 2019). These researchers position workplaces as places in which creativity, credibility and agility are all expected, and argue that authentic assessment should mirror the use of problem solving strategies that are needed in the workplace. In this way graduate students have experience "using and applying knowledge and skills in real-life settings" (Sotiriadou et al., 2019, p. 3).

Wikipedia editing has been trialled within assessment tasks in some disciplines. Fraser (2020) describes its use by students' editing gene stubs within the context of improving the representation of biomedical scientific information on Wikipedia. This task was found to both improve students' digital literacy skills, and also to contribute to improving the quality of scientific representation in Wikipedia, hence contributing to wider society. Participants in Fraser's (2020) study did encounter challenges, namely choice paralysis when trying to choose a gene stub to work on, the writing style required for Wikipedia, and editor wars with others who would potentially majorly edit student work.

However student feedback indicates that they enjoyed and engaged with the task well. In their study with undergraduate information technology students in Hong Kong, Zou et al. (2020) found that using a flipped classroom approach facilitated student learning, allowing for more interaction between students and in-class collaboration on Wikipedia entries. At postgraduate level Vetter (2020) described the use of a Wikipedia Edit assignment by doctoral students, and again findings highlighted participant learning about collaboration, writing and digital awareness, as well as the challenges of identifying a gap, which Vetter (2020) described as an exceptionally complex task.

Digital literacy
Digital literacy is a skill required by all people engaging with digital material, and particularly important for teachers, given that they will need to employ it themselves in their work, and work with pupils to develop their skill and knowledge. Digital literacy includes:

- critical thinking — questioning how authentic, valid and useful digital information is
- communicating and collaborating with others in the digital space
- using digital tools to design and create compelling original content
- using digital tools to access, use and share information. (National Library of New Zealand, 2020)

To develop these skills it makes sense that students work in contexts where they need to critically evaluate the digital information they access (Patch, 2010). Patch suggested using focus questions to help students critique the information they are accessing, in order to be more critical and ascertain whether the entry they are reading is reliable or unreliable. This sort of activity allows students to be "smarter consumers of online information and more responsible researchers" (Patch, 2010, p. 281). Research has found that students working with Wikipedia can demonstrate increased development of digital awareness and literacy, and levels of criticality (Di Lauro and Johinke, 2017; McDowell and Vetter, 2020). Additionally, Soler-Adillon et al (2018) found that by working on Wikipedia entries, students within two universities changed their perceptions of this platform with respect to reliability, trustworthiness and robustness of the process of posting information.

There has been an acknowledgement in recent literature that platforms such as Wikipedia can be used constructively in higher education, although there is still reticence to do so. Student assignments that include the generation and communication of knowledge using such platforms have been shown to help with learning and the development of critical thinking, as well as contribute to the social production of a resource available freely to society. Research to this point has not encompassed the possible use of Wikipedia edits for students in pre-service teacher education programmes. This study contributes to the literature by focussing on ways that the production of annotated edits of Wikipedia can be used for assessment for students, and as a learning process.

Specifically the research aims to answer two questions:
- Is the use of digital social production as an assessment tool an effective strategy?
- What factors contribute to the effectiveness of using social production as an assessment tool?

Research methods
Participants in this study were members of a third year university course which contributed to a Bachelor of Teaching degree designed for primary/elementary school teachers, and the lecturer who convened the course (the author). The course focussed on educational assessment. Ethical approval and clearance for the reporting of these findings was sought for this study and granted through a formal university ethics committee. All student participants enrolled in the course were provided with an invitation to participate and thirty students agreed to participate in this study.

The first assessment task in the course is the focus of this study. This task was designed to assess the students' knowledge of formative assessment. During the preceding learning period, the students were given the opportunity to explore educational research and teaching practice related to formative assessment, such as peer- and self- assessment, questioning, use of learning objectives and so on. For the assessment task they were asked to choose one of these elements as their focus.

The research was designed to involve the student participants in five stages: familiarisation with Wikipedia, choice and approval of topic, editing media and submission, marking and feedback, post-assessment interview. Firstly participants were provided with information about Wikipedia and how it was constructed and edited. To ensure students understood this process a short video clip was recorded in Zoom, in which the process was demonstrated using the Shared Screen function. Then an assessment task was presented to the students as follows:

Steps involved by students were:
1. Identify a Wikipedia entry that described one aspect of formative assessment.
2. Gain approval by a lecturer who checked to ensure there was enough scope in their choice to allow them to meet the criteria of the assessment task.
3. Cut and paste the selected Wikipedia entry into a Microsoft Word document and turn on track changes
4. Improve the entry by editing the text. Use the comments function to provide rationale for the edits and provide links to literature and commentary from practicum experiences that support the changes.
5. Upload the Word document to an online platform for marking and feedback.

The marking of this assessment was carried out by the lecturer, and focussed on the corrections and additions that students made to their selected entry as well as the reasoning provided in the comments. The marker could see the original Wikipedia entry in black font and all of the edits made in blue font, alongside the justification for these changes. This colour coding made their changes obvious and the comments section made their understanding of formative assessment visible. The completed assignments were collected as data (see Figures 1 and 2 for examples of the edited entries with tracked changes and comments).
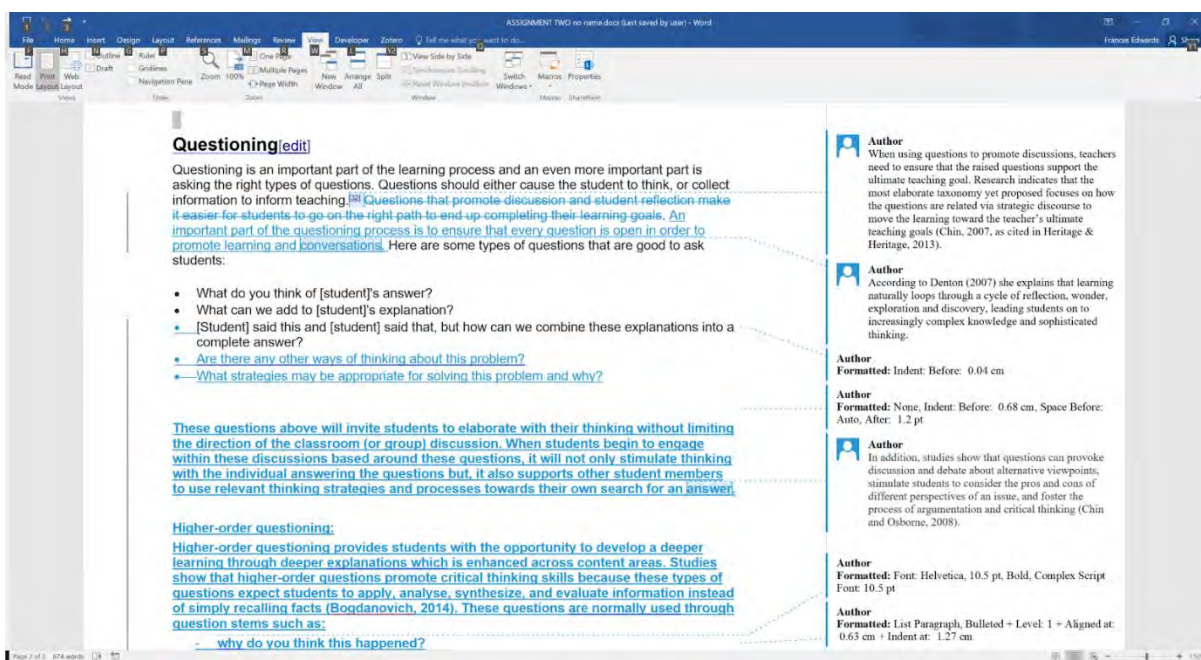

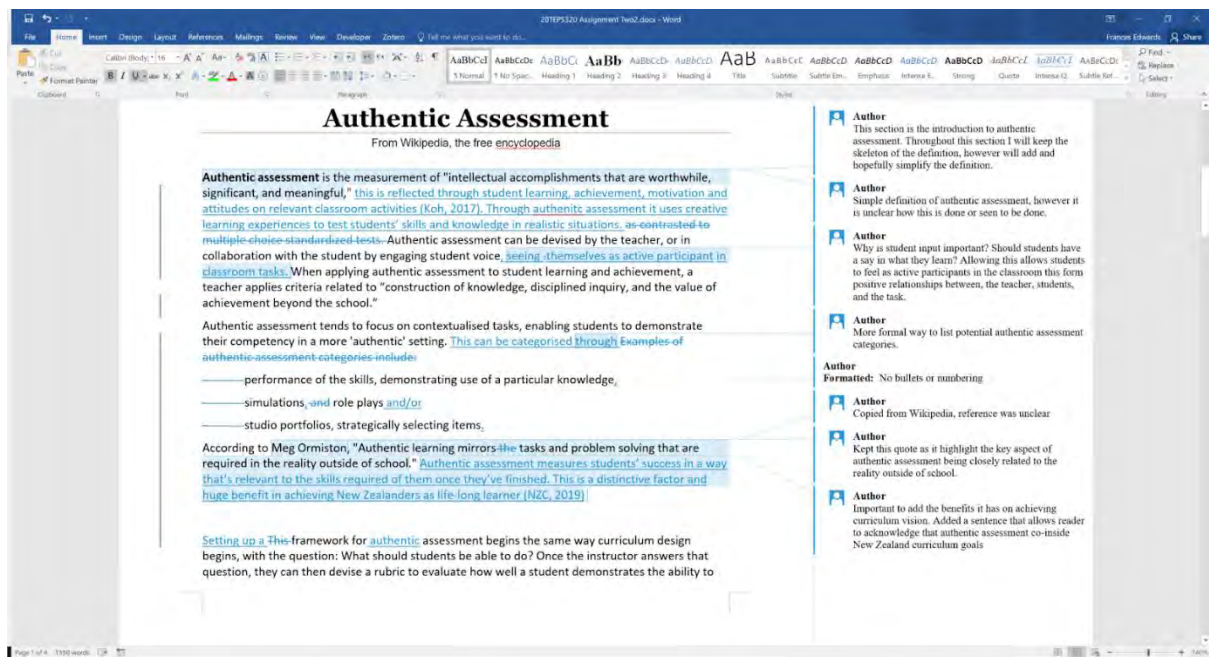**Figure 1.** An example of an edited entry with a significant re-write.

Figure 2. An example of an edited Wikipedia entry with less new text.

After the assignments had been marked and final grades uploaded to the university database, participants were interviewed using a semi-structured interview format (see Appendix for interview prompts). The students were encouraged to talk freely about their experience of the assignment and to comment on its effectiveness or otherwise. Interviews were conducted and recorded using Zoom. Files were then transcribed and the transcriptions returned to student participants to check. All student participants agreed that the transcripts were accurate and represented their ideas. The lecturer involved in the marking of the assignment wrote journal entries to record reflections on the format and content of the work that was submitted by students, and practical elements of using the task. Lecturer reflections included views on the clarity of information, ease of marking, and whether the tasks reflected principles of good assessment.

Data gathered in this study consisted of artefacts of student work i.e. their completed assignments, interview transcripts and lecturer reflections. Thematic analysis was used for identifying, analysing and interpreting patterns that emerged within the data (Clarke and Braun, 2017). This included reading and rereading the data and generating initial codes, then looking for themes across those codes. After this the themes were reviewed and condensed when they were very similar. Then themes were named and checked.

Findings

Findings are presented in two sections: firstly, findings that relate to student experience, and secondly those that relate to the implementation of the task.

Student experience

Importantly and overwhelmingly all students involved in this study spoke very positively about this assessment-type and were able to identify what they learnt through the experience of editing and providing annotations on their edits on Wikipedia entries. The first and most obvious finding is that all students in this study without exception said that they enjoyed the assignment and found it interesting. They talked positively about the assessment structure and the freedom that was afforded:

> I actually really liked it because it was different…it wasn't just an essay or something that … it was assessed in a different way which was nice, refreshing… Like the freedom of what you did it on in the first place… the topic… and then also how you rewrote it – there was a lot of freedom with that.   (Student A).

They described that they found it easier to improve a piece of writing (the Wikipedia entry), than to start writing something from scratch. For those who did not like writing essays and other long forms of writing, this task proved to be more accessible, and they enjoyed the process more. Some comments in this regard were:

> One aspect we found positive was that we did not have to start with a blank page, but instead were able to work to improve something that someone else had written.   (Student B).

> Enough scope – yes, it is much easier improving something than writing something from scratch.   (Student C).

> I like that it gave us a different opportunity to present our knowledge… I feel that that is important for people that aren't fans of essays.   (Student D).

These quotes illustrate that the assessment structure was helpful for the students. Although a few students chose the same excerpts to edit, they each followed their own lines of interest so the completed entries were quite different from each other.

Most participants in this study commented on their perception that they learned about their topic of focus as they completed the assessment task. They were able to identify specific learning that occurred for them. Many explained that they chose a topic they were particularly interested in and that they wanted to learn more about, so the task was seen as a learning opportunity as well as an assessment task.

> I feel it was good for us to learn as well, like I learnt so much about the topic that I chose and I feel that a lot of people did as well.   (Student A).

> … so although it was a wordy assignment it was really well done in that it wasn't overwhelming but I still learnt so much about summative and formative forms of assessment because of the research aspects of it.   (Student E).

They explained that as they edited the Wikipedia entry they engaged with literature and other scholarly writing, and also considered links between what they read and what they experienced on practicum. The prospect of their entry potentially being loaded on Wikipedia made the task seem more real and urgent for them.

Participants felt they were able to provide genuine evidence of deep learning through the completion of the Wikipedia editing task. They valued the opportunity to critique the writing of others, both through their use of reference to the academic literature and through their own experiences and observations while on practicum.

> I found it was a really good way of going about something instead of just writing what we know…critiquing what someone else has written... which I thought was quite valuable. You know when you are taking something quite inaccurate there are a lot of opportunities to show what you know… it takes it a bit deeper. I did like it.   (Student F).

Students felt that being able to explain their reasoning for the edits confirmed and validated their learning. In their attached comments the students added detail from literature they had read, personal reflections from practicum experiences, and even recent media articles, and acknowledged these sources. At times they also added comments to sections that they did not edit, and explained why these sections were strong and accurate and could be left unchanged.

Students' understanding of how Wikipedia actually works was limited, so they appreciated learning about the way the general public were able to contribute to this website. This knowledge was "eye opening", as they explained how they became more aware of how to critically analyse the online material they read. A number commented on the range and quality of literature used to substantiate Wikipedia entry claims; something they had not considered before. For example one student explained:

> It was a really practical way of realising that what you are reading online may not be right, and I think being here at University we get that, but I think it is a really good reminder that what I'm reading on Wikipedia, even though it is referenced, is actually super outdated and missing a whole lot… I often go to Wikipedia for information, for quick information knowing it's not a super-reliable source but … oh they're using this meta study that sounds super-really-great but actually it has been updated and improved massively about 10 years later… and it doesn't mean that the study was wrong but like we've moved on from 1996, that was before I was even born… but we don't always check the references that we read.
> (Student F).

Through the editing of Wikipedia entries, students had the opportunity to carefully check on the references that were used in their chosen entry, and the information it conveyed. At times they found irrelevant or outdated references being used to back up content. For example, in the following quote the student alluded to the potential that existed.

> It was good to see some of the gaps between Wikipedia and what *could* be there.
> (Student C).

All participants explained how they gained an increased sense of understanding of how the Wikipedia resource could be improved for the benefit of all readers, and the importance of adding recent research and literature to entries. A number found the possibility of being able to do this as they contribute to a "live" online website exciting.

Students in this study described things they had learned that would inform their future teaching. For example they spoke about how the task helped them develop better digital literacy and critical thinking skills. This was identified as something they would need to be teaching students in their future classes. A number built on this idea by explaining that they could use a modified version of this class with their own classes next year, as a way of developing their students' digital literacy. As one participant commented:

> I did like it. It's something I would do in my own class, I think it is a good idea…. It did help a lot… starting with a set piece of writing it definitely helped a lot.
> (Student A).

The transferability of this task to teachers' further work was seen as a positive outcome from the course.

Implementation of the task
From the lecturer's perspective this assignment was easy to set up and the expectations were

effectively communicated to the students by two means: written description of the assignment and a recorded video clip which briefly described the assignment and provided a shared-screen demonstration of how to access Wikipedia, select a topic, set up their Word document, use track changes and so on. A few questions were fielded from the students before they began but they all seemed to find the instructions clear. As one student commented:

> I thought the instructions on how to change it on Word were also really straight forward, so I had no problems with the assignment.   (Student E).

There was value in the students being offered the opportunity to have their entry selection checked by the lecturer. This approval step was included to ensure that their choice provided them with enough scope to demonstrate their understanding of an aspect of formative assessment in some detail. The lecturer found that most students chose appropriate entries or sections of entries to work on. One student chose a very long entry, and she was advised to work on just one section. The lecturer found that interaction with the students about their choice during tutorial times was productive as some discussion ensued about what they planned to do, enabling some formative feedback at this stage.

The lecturer found this assignment to be a particularly interesting one to mark, given that students chose a wide range of topics within the broad field of formative assessment. There was obvious deep engagement in the activity of editing. It was easy to see what changes had been made (they were highlighted in blue in the document). The comments that students added to justify their edits were easy to follow and many were quite sophisticated, revealing their depth of understanding and the literature that informed their edits. The content that the students added and in the comments used to justify these changes were "to the point" with no fillers. As one student commented:

> You have to think about and write in not so many words, so you have to be really specific and know what you are talking about. You don't have to fill it with garbage.
> (Student G).

In further commentary he admitted that he would often be very verbose in essays just to get to the word limit, whereas in this assignment he was encouraged to be concise with his language. When comparing this assignment to previous assignments this one was quicker to mark and there appeared to be a deeper engagement from the students.

A challenge in the assessment task design was the "length" of the entry. Usually, university assignments provide guidelines for length. Although 800-1000 words in length was stipulated, it soon became obvious that this was not a useful limit to put on the assignment, as some entries needed to be completely rewritten, given the inaccurate or out of date material they presented, whereas others were improved through more judicious edits. The participants did comment on this as a difficulty, as mentioned here:

> You can't really put a word count on it… With the people I talked to anyway, most people figured it out on their own. They may be some people that would struggle with that.   (Student A).

The students also suggested that the provision of exemplars would have been helpful, and this is an additional resource that could easily be added to the assessment in the future.

Discussion
This study demonstrates that the editing of Wikipedia can be used effectively within a pre-service teacher education programme as a means to assess learning and as a means to develop students' critical thinking and digital awareness and literacy. Wikipedia has been found to be useful in tertiary

education in other contexts (Di Lauro, 2020; Fraser, 2020; Vetter, 2020; Zou et al., 2020) but no literature has been located regarding its use in assessment within teacher education.

Through the editing of a Wikipedia entry, students provided evidence of their knowledge and understanding of an aspect of formative assessment, which is one of the key learning outcomes in a university course. For all participants this was their first involvement in digital social production, and they all spoke very positively about the experience. Johinke (2017) describes digital social production as authentic assessment, and, although the task used in this study did not require the students to demonstrate their understanding of formative assessment in a practical sense (i.e. actually using it in a classroom), the task can be considered authentic given that the work potentially contributed to a resource accessible world-wide. This purpose provided the students a heightened sense of the value of their contribution, and in this sense they saw their work as a contribution to the real world.

The task design aligned with Villarroel et al.'s (2018) model to build authentic assessment in that it provided a rich and worthwhile task requiring higher order skills, and it engaged students in judgement and layers of feedback, while reflecting the skills required in the graduate profile of teachers. This type of assessment task can also be described as sustainable learning-oriented assessment as its contribution to learning is evident and extends beyond the timeframe of the course (Boud and Soler, 2015). Sustainable assessment has been defined as assessment "that meets the needs of the present and [also] prepares students to meet their own future learning needs" (Boud, 2000, p. 151). Students commented that their active engagement in the assessment task caused them to consider their future use of formative assessment as well as their ongoing developing digital awareness, so it served "double duty" described by Boud (2000). For example some students spoke of using the same sort of tasks with their future classes. So although the assessment task was not positioned as part of the learning activities, it was found to fill that role.

The development of critical thinking skills and upskilling in digital literacy were two outcomes from the use of Wikipedia for assessment that were a surprise to the students themselves. These findings are similar to those found by Di Lauro and Johinke (2017) and McDowell and Vetter (2020), where both teams found that criticality and digital awareness were outcomes in other contexts. Knowing about these outcomes is particularly useful when considering the participants in this study. Students are charged with development of critical thinking skills and digital literacy in their future students. Their awareness of this development in themselves through their completion of the Wikipedia editing task has the potential to effectively equip them for their work in future years. When comparing what the students learnt to the four aspects of digital literacy (National Library of NZ, 2020) it was evident that this assessment task lead to development in each of these skills: critical thinking, communicating and collaborating, using digital tools to design and create compelling content, and using digital tools to access, use and share information. The activity allowed students to ascertain more readily the reliability of online content and challenged their perceptions about the trustworthiness on online information. This is testament to the power of a single assessment task.

At an affective level, students in this study were overwhelmingly positive about the Wikipedia assessment task and the process of contributing to something bigger than an assessment which would generate a grade. Numerous studies have shown links between students own emotional experiences and how this shapes their views of teaching practice (e.g. Antilla, Pyhältö, Soini and Pietarinen, 2017; Brown, Gebril, Michaelides and Remesal, 2018; Edwards, 2020; Stuart and Thurlow, 2000). This bodes well for the Wikipedia task's potential to engender effective and longer lasting learning for the students.

From this study a number of factors were seen to contribute to the effectiveness of using social production as an assessment tool in education. Firstly the task provided the students with a new,

interesting and different way to present their learning. Being offered opportunities to demonstrate their learning in a larger variety of ways is an increasingly common feature of assessment in higher education (Holgate and Sambell, 2020; Katz and Gorin, 2016; Struyven and Devesa, 2016), and can be motivating for students. This task provided the students with a real purpose (beyond the need to generate a grade) and allowed them choice and a level of freedom they had not often experienced, which added to their positive experience. Secondly the assessment strategy allowed students to clearly demonstrate their learning in ways that they felt were easier and more accessible. This benefit of accessibility to those who, for example, did not enjoy essay writing or found it difficult to get started on writing, was obvious in the student commentary. A third factor that contributed to the overall effectiveness of this assessment task was the spin-off learning that happened for the students. They identified that both their digital literacy and critical thinking skills developed as a result of engaging with the assignment, highlighting the move in purpose of assessment from assessment of learning to "future practice for which courses are a precursor" (Boud and Soler, 2016, p. 401). Given that they were pre-service teachers, this assessment task was particularly authentic for the students. Not only will they be using their professional judgement to decide what and how to teach in the post truth world (Boyd, 2022), but they will also be teaching their future pupils to be critical consumers of media and information.

From the course lecturer's perspective the work proved easy and interesting to mark. An added bonus were tangible learning benefits of students acquiring digital literacy, and potentially teaching strategies for their future classes which can only be of benefit to the students. These factors are likely pragmatic push factors affecting academic staff future decisions around the design of assessment tasks, and in particular using a framework of digital social production as both assessment and learning purposes. The main challenge of the task from an implementation perspective was the difficulty in quantifying how much content was required from the students. As their chosen topics varied considerably so did the editing required. Additionally some students did find it hard to choose a focus topic for the task. These sorts of challenges are difficult to mitigate if the task to remain authentic, using actual online sources. However students could receive individual feedback on their chosen material, including advice about the scope of editing required.

Conclusion

The process of utilising Wikipedia as a resource within an assessment task provides insight into the possible range of benefits as experienced by students. The assessment experience was found to be positive, interesting and useful by the participants. Additionally they identified the benefits of a deeper understanding of socially produced online resources and their growth in digital literacy. Through a fairly simple process of preparing and annotating edits in Wikipedia, these positive contributions will have ongoing impact on the pre-service teachers as they commence working with their own students in schools. The sustained outcome from a learning-oriented assessment as its contribution to learning is evident and extends beyond the timeframe of the course.

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Appendix

Interview prompts for semi-structured interview with student participants:

1. Tell me about your experiences in completing Assignment 2?

2. What in particular do you see as the strengths of the assignment? Why?

3. What in particular do you see as the weaknesses of the assignment? Why?

4. How well did the assignment give you opportunity to provide evidence of what you knew and could do with respect to Formative assessment?

5. If you were asked to improve the assignment task what would you suggest?