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Article

# Digital Tools Disrupting Tertiary Students' Notions of Disciplinary Knowledge: Cases in History and Tourism

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**Abstract:** This paper reports on the findings from a two year research project that explored the potential of digital tools in support of teaching–learning across different disciplinary areas at a New Zealand university. Two courses (in History and Tourism) are case studied using data collected through interviews with lecturers, tutors and their students, and an online student survey. Findings from the research revealed that both lecturers and students were challenged in learning about the affordances and use of the lecturer selected digital tools as a mediational means. The tools were not initially transparent to them, nor were they able to be easily deployed to undertake their primary task—teaching for the lecturers, and, learning and demonstrating learning for the students completing assigned tasks. The process of learning and using the tools disrupted participants' prior thinking and led to new understandings of both disciplines and of effective pedagogies for the two disciplines. The findings increase our understanding of the ways digital tools can develop, challenge and expand tertiary students learning and have implications for practice.

**Keywords:** digital tools; university; pedagogy; student learning; disciplinary practice; sociocultural theory

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## 1. Introduction

Tertiary institutions are increasingly embracing digital and online tools as a productive way to support student learning, both as a primary means of communication as in online courses and as integrated with/integral to other aspects of courses. In this paper we report on two case study examples of how digital tools that were new to tertiary students, and their lecturers, supported and disrupted students' development of expertise and understanding of disciplinary practices, ideas and ways of expressing ideas. We begin the paper by expanding the three strands of thinking that dominated and shaped our analysis in relation to the study: potentials and challenges in digitally mediated tertiary teaching–learning practices, issues of access and transparency of tools appropriated within specific communities of practice (COP), and the nature of developing disciplinary knowledge/expertise. This is followed by a brief description of the research context. The study findings are reported next before a discussion of what the findings might mean for tertiary teaching and learning practice that incorporate digital tools to conclude the paper.

### *1.1. Digitally Mediated Teaching and Learning Practices in Universities*

Digital tools offer new and different means for representing and expressing ideas and for the co-construction of meaning [1]. In tertiary settings this can range from the use of clickers in lectures to provide lecturers with quick feedback on student understanding to the provision of courses that are fully online and allow for synchronous and asynchronous discussion forums and the posting of video and so on. Use of these tools often represent a pedagogical shift for the lecturer as someone who is the sole source of knowledge to situations in which understanding and authorship are collaboratively co-constructed through teacher-student or student-peer interactions [2]. New information and media literacies are often required in terms of the set “of cultural competencies and social skills” that young people need as part of their everyday interactions [3] (p. 4). The rhetoric around youth as digital natives can lead to the assumption that students already possess the necessary digital literacy skills and conceptual frameworks to become creators, rather than consumers of information [4] but current research indicates that many such assumptions about students' digital proficiencies are unfounded.

International studies have indicated that students cannot be viewed as a homogenous, computer literate group [5–8]. Digital inequalities and marginalisation persist around students' access to, and use of information and knowledge via digital means [9,10]. Furthermore, there are signs that although the digital generation may be technologically competent, many still lack the academic literacy skills essential for successful learning [11]. Use of social networking software for recreational or entertainment purposes does not necessarily prepare students for academic study [12]. Learners are frequently unaware of how to apply technology effectively to enhance their learning [13], or they are under prepared and/or disinterested in learning online [14].

For educators, the transformative potential of technology in tertiary teaching is not without its challenges. They need opportunities and incentives to understand the affordances of different technologies. They also need experience with how to activate them in practice [15]. There exists the potential that teachers will simply use new technologies to undertake old tasks, albeit more efficiently [16]. [17] caution that access to digital tools alone is not enough to achieve some of the aspirational goals

we have for the role these tools might play in enhancing student learning outcomes. Layering digital tools over outdated pedagogy does not necessarily enhance teaching or learning [18,19]. There needs to be pedagogical alignment and integration of the teaching, learning and digital tools used for productive teaching and learning processes and outcomes to occur. Another inherent challenge lies in the need to consider disciplinary differences in digitally mediated tertiary pedagogies. Educators are reminded that different disciplines make use of digital technologies in different ways for teaching and learning and advocate the examination of these practices across a variety of learning events [20]. This then raises questions of how lecturers/teachers might use digital tools in an integrated and transparent manner to develop students' understanding of, and willingness to learn about and with the digital tools. There exists a need to examine how educators might better support students to develop the skills to function within digitally mediated learning environments in a way that also promotes curriculum-based learning outcomes.

### *1.2. Action and Interaction as Mediated*

The notion of “mediated action” is helpful in elaborating this challenge/conundrum [21]. It is a sociocultural approach in which human action is considered “inherently linked to the cultural, historical, and institutional settings in which it occurs” [21] (p. 203). It has been proposed that there is an “irreducible tension” between a cultural tool and the individual's active use of it—that is, the two cannot be studied in isolation from each other [21]. Also within a sociocultural frame, in any COP, new-comers or novices, over time, come to know and understand more about what it means to contribute to the valued activities of that community [22]. That movement towards full membership in a community is dependent on access; access to peers, masters, resources, information, activities, and opportunities for participation [22]. This movement involves the use of artifacts and technology that is connected with the historical and cultural activities and priorities relevant to the community.

Digital tools, like other artifacts, “carry intentions and norms of cognition and form part of the agency of the activity, expressing their agency also as resistance” [23] (p. 301). They have the potential to both afford and constrain the forms of action that are likely to emerge and be deemed acceptable and legitimate within their context of use. Hence, students and their lecturers need to deeply consider their teaching–learning practice as well as the social and cultural implications for digital use for different disciplines. They also need to consider that different student groups/individuals may be more or less able to exploit and critique the affordances software and hardware. The notion of “transparency” is used to discuss this development in expertise in the use of artifacts and tools:

Transparency...refers to the way in which using artifacts and understanding their significance interact to become one learning process. Mirroring the intricate relation between using and understanding artifacts, there is an interesting duality inherent in the concept of transparency. It combines the two characteristics of invisibility and visibility: invisibility in the form of unproblematic interpretation and integration into activity, and visibility in the form of extended access to information...these two crucial characteristics are in a complex interplay, their relation being one of both conflict and synergy ... invisibility of mediating technologies is necessary of allowing focus on, and thus supporting visibility of, the subject matter. Conversely; visibility of the significance

of the technology is necessary for allowing its unproblematic—invisible—use [22] (pp. 102–103).

The use of Twitter and Facebook illustrate this dynamic. For dedicated users the computer/iPhone fades into the background as they interact with others: their focus on communication and relationships. This example highlights how the technology can become invisible to the user to make obvious the key functionality of communicating (the visible). However, for those who have little experience with this social media the technology can seem more opaque—their focus is more towards the technology than the interaction it affords. We use the notion of transparency in our case study of two lecturers who had just introduced new digital tools in their course.

### 1.3. The Nature of Disciplinary Knowledge

All communities, including those associated with academic disciplinary communities, have particular ways of thinking, acting and valuing. This point is summed up thus:

Any actual domain of knowledge, academic or not, is first and foremost a set of activities (special ways of acting and interacting so as to produce and use knowledge) and experiences (special ways of seeing, valuing, and being in the world). Physicists *do* physics. They *talk* physics. And when they are being physicists, they *see* and *value* the world in a different way than do non-physicists [24] (p. 200, italics in the original).

Novice movement to be more expert in their understanding of a discipline therefore involves them developing an appreciation of how the community of interest sees, values and acts to generate, authenticate and use knowledge. Accomplished and innovative learners not only know the ‘what’ (concepts) of a knowledge domain they also know “how to do the learning in that subject—how to think, question, search for evidence, accept evidence, and put evidence together to make an argument that is acceptable in that discipline” [25] (p. 532). Invariably this involves the use of both general and discipline specific tools and artifactual practices. Multimodal affordances of new technologies can however reshape knowledge production, representation and dissemination practices [26,27]. Using the example of digitally available poetry, [26] points out that the use of these technologies,

... remakes the authority of texts, unsettles the boundaries and forms of knowledge, and creates connections across previously distinct boundaries. It repositions the learner in relation to knowledge, making different demands on them, concerning how to authenticate and evaluate, how to select, and reduce and foregrounds the active and ideological work of making meaning (as opposed to ‘receiving’ it) (p. 34).

She challenges us to think how physical and digital materials and actions can best be connected in contemporary and future learning environments to support learning and participation. As an extension of this idea, [28] note that a complex relationship exists between knowledge representation and digital technologies in higher education. They highlight the potential for the disruption of conventional (writing) academic practices towards more collaborative ways of working that are grounded in the digitally-mediated practices of the professional communities associated with the discipline students are studying [29]. In this paper we consider this challenge in the context of tertiary teaching and learning in history and tourism.

## 2. The Research Context

The data reported in this paper was generated as part of a two-year Teaching and Learning Research Initiative Ministry of Education funded project aimed at exploring and understanding the ways lecturers were exploiting the potential of digital tools to support university-level student learning across diverse disciplinary areas at the University of Waikato, Hamilton, New Zealand [5]. Eight lecturers from seven different disciplines participated in the study, which involved them in a collaborative interrogation of the ways of knowing of their discipline and the nature of effective pedagogy. That is the project was set up as having a dual disciplinary focus. The general research question that guided the project was: “How are different lecturers/groups exploiting the potential of information and communication technologies (ICT)/eLearning to support tertiary-level student learning?” A key goal of the project was to document, develop and disseminate effective and innovative digital tool supported practice. It is the interplay of the disciplinary and pedagogical implications of our findings that are discussed in this paper rather than students’ academic achievement. The project received official Human Research Ethics approval from the University and all participants participated on a voluntary basis.

A qualitative interpretive methodology framed the conduct and collection of data consistent with the intention of uncovering the significance of events as experienced by research participants [30,31]. Data was collected through lecturer and tutor reflections and interviews, student focus group interviews and an online student survey as well as an end of the course evaluation (for the History case study). Analysis of the data was underpinned by sociocultural theory, which directed attention to the interaction between people, the tools they use to achieve particular purposes and the settings in which the interactions occur [21]. The data analysis process involved careful reading, coding and categorising of key ideas to identify significant emerging themes through a process of inductive reasoning [32,33]. For the purposes of this paper, two case studies in History and Tourism with a focus on the ways digital tool mediated and disrupted, challenged, supported and expanded students’ notion of what it means “to do” History or Tourism are reported. Specific details of the cases with regards to the educational affordances of the tools used have been reported elsewhere [34,35].

### 2.1. Overview of the Case Studies

#### 2.1.1. History and Digital Storytelling

The history case study concerns a third year undergraduate course focusing on a range of digital practices for making history by examining public history and collective memory on the Web (including genealogical research, virtual museums and digital archives). The course lecturer, (Lecturer 1, L1), had three aims for the course: an intent to challenge students’ current relatively narrow conception of ‘digital history’ in the discipline, to help students to make connections between theories of digital media and history with and through digital tools, and to engage students in practical work involving peer-to-peer learning. L1 was aware that History as a discipline tends to be a very text-based field. She commented that a majority of academics have very little experience with and regard for digital technologies in their teaching of the subject. In the first year of the study (2009), she explored the notion of storytelling as a way for her students to think differently and creatively about new modes of

presenting history that is visual rather than merely text-based using the Photostory software. She adopted a blended learning approach where in addition to face-to-face lectures; she provided support for students through a Moodle discussion forum. By doing this, she hoped her students would gain a better understanding of the implications of new media and digital practices within history, and gain a broader view of issues related to sources and representation of knowledge as history in the field. L1 was also alert to the potential of this initiative to inform her own practice. She explained,

“There is also the layer where History is not just about stories of the well-known or famous. [It is also about] How the personal is historical.... [it is important] for student to see they are a contributor to understanding of history. Their experiences of people, memories and events, personal histories are all part of a collective history.”

In the second year she refined the coursework and assessment activities to culminate in students developing knowledge of digital formats for and within history education through experiential learning. The assignments included a reading report submitted online, an analysis of a historical website, a group project in digital history, and a digital storytelling workshop leading to the submission of a three-minute digital story created using Windows Movie Maker (WMM). WMM allows users to put together a digital story that can incorporate multimodal resources (images, audio, videoclips, sound/video effects, text). It is easily accessible (it comes as part of the standard Windows software package) and quite easy to use. WMM was selected as the most appropriate tool to facilitate student digital storytelling, which is a short form of digital media production that allows people to share facets of their life story and/or a specific personal experience. It is commonly used in education, social services and health settings [33].

The findings report on lecturer, tutor and student perception/evaluation of the digital storytelling assignment, which the class worked on over three weeks with the support of two tutors who were experienced digital storytelling practitioners. As part of the digital storytelling creative process, students attended a lecture about related key concepts, followed by a workshop where they shared their initial ideas about stories they could tell. They then attended lab sessions (twice a week, three hours each session) where they could get support and assistance from the tutors to put together their stories in WMM. For the digital storytelling assignment, students were given the option either to tell a personal story, especially one focused on an aspect of family experience and history or to conduct a small historical research project to inform the production of a short history. Through this process, L1 hoped that her students might come to appreciate the value of new modes in conducting and presenting historical knowledge by using new technologies, as well as adapting ‘traditional’ modes of historical research and writing for the new format.

There were 19 students enrolled in the course in the second year.

### 2.1.2. Tourism and the Use of Wikis and Online Forums

The tourism case study focuses on a postgraduate level course providing students with an overview of different issues such as sustainable management, planning, and the development of tourism as an industry. It is offered concurrently in face-to-face and online modes as part of a departmental strategy to increase postgraduate student enrolments. Consequently, there can be pressure on staff who may

have little experience and/or inclination to make better and more innovative use of online and Web 2.0 teaching tools.

The case study lecturer, (Lecturer 2, L2), was an experienced teacher in face-to-face settings, but a novice in the online teaching environment. L2 believed that social networking software (such as online discussion forums and chats in Moodle, and wikis in Google Sites) could encourage meaningful, critical, collaborative inquiry amongst course participants. She had found that paper based essays and exam assessments were not engaging her students to the level she intended. In a further challenge for her, the study class comprised predominantly international students (mostly from India and China). These students had differing levels of English language proficiency and academic and digital literacy skills and confidence when they enrolled in the course.

In 2009, L2 trialed the use of a variety of digital tools to ascertain the extent to which adopting the tools could enhance student engagement and deeper learning. Feedback from the students' and her own reflections were then integrated to refine the course for 2010. The course was designed so that any student group, whether studying in a face-to-face, or fully online mode could collaborate and interact as a unified cohort. However, in 2010 no online students enrolled in the course and so L2 used a combination of face-to-face lectures and online coursework in Moodle. Students were assigned weekly readings (academic research papers) and took turns summarising, critiquing, and developing a question for others to answer in Moodle. In addition, they had to take turns defining key terms in their field and post these to a Moodle Glossary discussion area. These Moodle activities were graded and provided students with structures for reading academic research texts, and then writing, sharing, and collaboratively discussing their understanding so as to scaffold each other's learning. L2 thought these activities were fundamental in supporting international students less familiar with more collaborative forms of academic engagement.

L2 also incorporated the use of the wiki tool within Google Sites to promote collaborative inquiry amongst her students. This required students to relate theory to practice and then summarise, organise, and present information in meaningful ways. The main wiki assessment task for the course had four foci, each representing aspects of a potential real-life \$35 million tourism development project. They were: Community consultation, Maori consultation and involvement, Marketing, and Sustainability issues. Students were provided background information about the tourism project and also went on a class field trip to the potential site. They worked in one of the four groups to develop a wiki based on one of the project foci and then present their insights to classmates and a representative from the (real) project's key stakeholders at the end of the course. L2 intended to share her students' completed wikis online and link them to other tourism education websites to showcase a demonstration of a real application (for example, how community consultation can be undertaken in a real context). It was expected that the academic reading and writing skills students had developed in the Moodle exercises in the earlier part of the course could be adapted to the wiki project. A Moodle forum was also used to facilitate group discussion about the wiki projects and Moodle chat was available for students to coordinate their group work.

L2 who was herself new to using digital tools received Moodle support from the department's technical team and curriculum design support (particularly for the wiki project) from university-level eLearning staff. eLearning staff also provided support for students in the wiki project in the form of a one-off face-to-face two hour workshop on how to create and use wikis. Ongoing technical support

for Moodle use was available throughout the semester for students and staff. There were 10 students enrolled in the course in the second year.

### 3. Findings

A close examination of the data highlighted three main themes. Digital tool use: (1) impacted on the learning and assessment process; (2) was influenced by issues of access and transparency; and (3) disrupted students' notion of what it means to learn in their discipline. These are expanded next and exemplified through representative quotes.

#### 3.1. Theme 1—Digital Tools in the Learning and Assessment Process

Both lecturers and students commented that the use of digital tools had changed the way they went about teaching and learning. Lecturers and students generally enjoyed and considered there was value in the new ways of learning that were mediated through the new digital tools in their courses. Student survey response was largely positive toward the use of new technologies for learning with just over half (53%) of the History and just under half (44%) of the Tourism students agreeing to the statement, "I usually use new technologies when most people I know do".

The following three factors related to the use of digital tools which students were largely unfamiliar with recurred throughout their commentary: digital tools provided support and incentives for collaboration, lecturers and peers had greater access to student ideas through the use of digital tools, and students engaged in tasks that were relevant and had meaning beyond the classroom.

*Support and incentive for collaboration.* L1 noted that the digital storytelling process allowed for both experiential and collaborative student learning:

"Digital history allows for experiential learning- experiencing technology and in peer-to-peer environment. They discuss what does/doesn't work, rather than doing essay by themselves, and never discussing with peers, which is common in history at undergrad level."

The History tutors also highlighted the collaborative value of the digital storytelling process as part of students developing understanding of their discipline:

"So it's kind of a two pronged—it's that process for the person within the workshop environment and that collaborative process with everybody else in the room and the bonds that are formed but also the significance for the person telling the story... The workshop process, the actual process of creating the story is most important. So the key process is that sharing, that listening, that trust within the group that is the emphasis in digital storytelling and distinctive from making any story to upload onto Youtube or broadcast content."

L2, the tourism lecturer, asserted that use of the wikis promoted more collaboration and interaction in the class than she had experienced before:



“[I have] observed how more engaged the students are this time round, how they come together as a group, how the tool has facilitated group work, how the group has interacted with another. It’s all brilliant!”

*Greater access to student ideas:* There were three aspects in teacher and student commentary relating to greater access to student ideas. Firstly, as explained by a student from the Tourism class, students realized that Moodle gave them greater access to their peers’ ideas. They saw this as a benefit because this provided them with an increased range of ideas to consider in their own learning:

“I liked Moodle as I can see everyone’s work; I can know what everyone is thinking compared to traditional coursework which you can’t. I like to see others’ opinion, [those] who may have more advanced opinions so I can learn and study more from them.”  
(Tourism student focus group interview)

Digital tool use had the added benefit that these ideas accumulated and were available over time and so they could be referred back to as needed. Tourism students appreciated the fact that individual work and thinking was documented, made public, and could be accessed at a later date for a variety of purposes:

“The data and postings are permanently there [online]. We can access our peers’ postings, revisit them (all the topics posted in the summaries) and use them in their essay. We can take examples from different postings, including references, otherwise it would be too time consuming for us to search for and read through whole journal article on our own. We can use our peers’ summaries in our own essay. This saves time in doing research and compiling our own assignment.” (Tourism student focus group interview)

However, the public persistence of student postings/ideas was not endorsed by all the tourism students. Some were concerned about their privacy, specifically who had access to their online postings. They also expressed concern that copying and pasting text (plagiarism) was a frequent problem in online environments:

“I liked the public *versus* private options in Moodle discussions but am concerned with to know who can read the discussions. I am uncertain how private my discussions with [the teacher] were, I am unsure who can read it even in the private portfolio.” (Tourism student focus group interview)

Another Tourism student commented:

“My concern is that my peers can take my writing/information posted in Moodle (example from the Glossary) for their own assignment and then we’ll get charged with plagiarism. What about our intellectual property? That is, our juniors taking our ideas posted online and incorporate them in their own work?” (Tourism student focus group interview)

This matter was also a concern for students in the History case. Here the social and cultural issues pervaded the telling and making public their private stories as part of a formal course process even when students appreciated the importance of this aspect of history as a discipline. As illustrated by the quote below, some of these stories being told belonged to other family members:

“At the very start, you sort of expected that you could just go and do the project. You were told it has to be personal so you could put a bit of emotion in it and that would be done. It was more complicated than that. I had ethical issues with trying to balance these things because it was a digital story and a personal story for me to take it back to my family because it was about my heritage.” (History student focus group interview)

The value for lecturers of the ongoing posting of student ideas through the discussion forum and chat features in Moodle was that this provided the lecturers with access to student thinking as it emerged and they were able to provide formative feedback and not just summative grades. L2 explained:

“By using Moodle and eLearning tools we could generate good discussions and encourage students to take ownership. Otherwise, I’d be far away and only get to mark their essay at the end [of the course].”

*Tools and tasks had meaning beyond the classroom:* In both cases the tasks the lecturers designed around the digital tools they had introduced to their course had relevance outside the course. The history lecturer saw her students’ appreciation that the course had practical outcomes beyond the course as a ‘real bonus’. For her these outcomes included being able to share the digital story that had been developed and also the potential for digital storytelling to be used in the community:

“Some students have feedback that there is a practical outcomes—that there are world outcomes, for the real world. This is a real bonus for this paper. For instance, some students could use this in the community setting, taking it and melding it for other cultural purposes. It brings history into the living, breathing world. ... That story [the digital story students produced] then goes on and has resonance for that person long term for their family, their community and other people who connect and watch it.”

The history tutors who were experts in digital storytelling considered that the digital skills students learned through the digital storytelling task would be of use to them across their university programme:

“[we] hoped students also develop more confidence with learning a new tool that can cross over to learning other programmes, e.g., save files, how to get files from USB onto the computer *etc...*”

And even beyond this:

“[we] hoped that students might see that] digital storytelling is not professionalised into a slick media genre but used by people and for people who normally don’t have much access to technology....When people leave they will access to these tools to continue on with them.”

Wider relevance was an aim and outcome identified by L2, the tourism lecturer:

“This is a group work- student work in pairs or threes and take on actual real case that is happening in [our region]... This is real life as the people promoting this [tourism] development can make use of this information. It has real-life use.”

Students from both classes indicated they found the tasks involving digital tool use interesting and relevant. The tourism students highlighted how the wiki project, in particular, promoted new ways of learning that were more interesting:

“...this [using wikis] made the learning process more interesting and fun rather than normal essay type submission which is so boring. Using technology promoted the learning. It made the study more interesting, although it was a new learning experience for most of us.” (Tourism student focus group interview)

In the next two quotes students identify value in the greater demands on their thinking and creativity, respectively.

“It wasn’t just the standard lit review or essay, you had to think a lot differently. Even though it was harder, although it was a little bit harder, I thought I learnt a whole lot more doing this type of assignment than churning out an essay submitting it and forgetting about it 2 weeks later” (Tourism student focus group interview)

“We can use our creativity, deal with more content and it was a group assessment as well. This mode of learning is more interesting, enjoyable.” (Tourism student focus group interview)

The tourism students believed that the diverse forms of coursework and the wikis had authentic (real-world) application and relevance to their future careers:

“In the course, we got to go on a fieldtrip, do the research and create the website [wiki]. I feel it’s related to the present, [I get to] communicate with actual people in the field and then share with my classmates. [Its] really world related.” (Tourism student focus group interview)

### 3.2. Theme 2—Issues of Access and Transparency in Digitally Mediated Practice

Both lecturers were new to the digital tools they had adopted in their teaching context. At the beginning of their courses it was clear that they faced challenges in accessing the affordances of the tools they had selected; the tools were not immediately transparent to them although overtime they became more so. In this theme, rather than identify factors, we trace lecturer perceptions of development over time. We also include commentary from students that signaled they were alert to the need for technical skills in the use of the designated software and were sometimes concerned about the interaction/intersection between their skills and the quality of the work they were able to produce.

Commenting early in her use of the tools the tourism lecturer admitted the need to invest time and effort as well as her own dependence on external technical support:

“It’s a lot of work. You really need to change your mindset. The biggest struggle is not having the time to devote to it because of other pressures. I don’t have the experience, nor skill, nor time to teach myself [how to use the technology]. I think this is a big challenge for the other staff in my department as well. I’m grateful to have [the technical team]’s help to support me. I still rely on others to hold my hand, to walk me through the technology. However this kind of knowledge accumulates over time. At least I have the

curiosity and keep questioning my practice. I would like to become an expert to pass on the knowledge to my colleagues in the future.”

We can see here that L2 is aware that her expertise will develop over time and also that she has as a goal to become an expert and help others. Later she noted the benefits that were realized through the use of digital tools, emphasizing they were ‘delivering’ the learning goals she had for her students and had led her to question her usual assessment practices:

“The current tools are delivering the learning objectives I hope to achieve. I felt the journal summaries and glossary are helping students to clearly articulate their arguments/definitions, and putting a case forward through the case study (wiki). So there is no need for an essay [format for assessment]. I have begun to question traditional forms of assessment, whether they are effective in the light of these eLearning tools. ... Although I have to invest the time to set it up and to mark, I am reaching my objectives more efficiently and more effectively. Seeing the benefits has motivated me to continue to want to know more about eLearning.”

As the tools became transparent she noted that her focus had shifted from the tool to her pedagogy and student learning:

“All of the sudden the penny has dropped for me in terms of the role of pedagogy when using eLearning tools. My focus is not on the tool but on the pedagogy and learning now. From regular reflections of my practice and being involved in the research, I am now thinking more about pedagogy and learning... It’s that finding a balance between teacher and student talk in class. The tools have given me the breadth but I need to balance this with the depth and breadth of students’ learning.”

The history lecturer’s development followed a similar pathway. Some of her initial reservations with the notion of digital storytelling and using WMM were related to the kinds of tasks digital storytelling is typically used for. She explained how she initially depended on the tutors (experts in digital storytelling and in using the digital tool) to help students bridge the technical and conceptual aspects of the course. Over two years she came to consider more deeply ways to refine her pedagogy:

“I was new to digital storytelling [in the first year]. As with many students in that paper I felt uncomfortable with the part that involved telling a personal story. The idea of digital storytelling is that you have a journey [using a] liberating technology...It’s an activist tool in community, that engages people in difficult stories. I felt uncomfortable that largely students wouldn’t have a story of pain to tell. I wanted to temper this for the next time the course was taught [in the second year], so students are now encouraged to explore historical story in their family history. For example, a grandparents story, a life history, where they came from, *etc.*... I had to work with [tutor names] to explain this type of history might not come easy to students from History who used to looking at evidenced history in objective fashion. So its been about trying to introduce a new technology into the classroom [and]...there is also the layer where History is not just about stories of the well-known or famous. Its also about how the personal is historical.”

Through her use of digital storytelling, considerations of pedagogy and how to better align the different components of her course especially, the assessment tasks became more important. In the following quote, L1 notes that for the first time she feels there is a fit between learning and assessment:

“The course [now] involves theory (article appraisal), practical (digital storytelling, 25% of the final mark), then planning for an exhibition (how to apply knowledge). It makes sense to build these components in ... I felt for the first time in my academic career that there is a perfect fit between assessment and learning. They are the right assessments, compared to other history I’ve taught.”

The History case study tutors noted the need to balance students’ learning about the tool with their history curriculum outcomes thereby signaling an appreciation of the issue of transparency:

“It was a balancing act between learning the value of the digital storytelling process in History and the learning of the tools using WMM. Some students tend to focus on the technical aspects to finish their story and hand in their assignment on time rather than appreciating their storytelling process. ... Students do get frustrated over little things when learning [to use] WMM, some get so focused on their story and so tunnel vision, but feel that the technical drama that comes is part of the process.”

Turning to student perceptions and commentary, students in both cases discussed the technical demands associated with them undertaking and completing the assigned tasks. Some of the tourism students indicated they valued the wiki project as it offered them opportunities to learn about the course content as well technical skills applicable in their future professions:

“... [the] Google Sites assignment was good as I learned both the content of the course and technical skills on developing websites and website design which I can make use in real work life.” (Tourism student focus group interview)

Other tourism students expressed concern that their final assessment would be affected by their [lack of] technical skills rather than their understanding of course content, although this was not the case nor was this stated in the assessment criteria:

“Students who are good at using the technology can get better grades when they might not be good with the content but the students who are good at content and not skillful technological wise are penalised and get lower grades.” (Tourism student focus group interview)

A history student provided a critical analysis of the challenge between grappling with the technicalities of using WMM and using it to convey the emotional/cultural/personal nature of her digital storytelling content. This comment made clear that at this point in time the technology was not yet transparent as a means for achieving his/her goals:

“A lot of what people were talking about, the content of them was quite emotive. Everyone chose something that was about emotions in one way or the other. So it was that mirroring...matching up of the emotional aspect to the technological. It was quite hard in a

way coz you've got to be quite detached but at the same time be fairly close to what you're talking about." (History student focus group interview)

At the end of the course some history students were unsure about the main focus of the task highlighting the role of the transparency of tools:

"Was the focus on digital story or technology (WMM) side of things? ... That connection between story and technology needed to be greater in the course." (History student focus group interview)

Some students saw the digital story or wiki presentation on their own as the goal and failed to see the process involved as part of that learning goal:

"More time should be allocated to the actual physical use of software. Length of time for story sharing circle could be reduced or don't have the story circle altogether. Or students could be divided into smaller groups so we don't need to share/hear everyone's story, we can use the time more productively for hands-on practice with WMM." (History student focus group interview)

Students across both case studies reported a mismatch between the time demands to fulfill the need to upskill in the use of the technology and to understand and present the required curriculum/discipline knowledge assignment requirements:

"There was inadequate time to learn and use the technology. Three weeks to get the assignment ready. We coped well with a high degree of inter-work between ourselves. It was very quick learning, very fast, extremely fast... I'm not sure if we came out well as a result. The course was trying to achieve too much too soon as some students' learning style can't cope with it." (History student focus group interview)

"There were only 2 tutors for the class of 18 students and they were going everywhere. We were learning the new technology without 'any one sitting on your shoulder' ... You also had to work to a script and you had to read off a script and keep time with what was happening. We are learning about how to make everything and to tape as well." (History student focus group interview)

"I would appreciate [technical support person] coming in earlier in the course to help students. The timing was essential as I don't think I could cope with learning different sets of new skills and coping with course at the same time." (Tourism student focus group interview)

"[It is best if we] be given 5–7 days of training (a proper hands-on technical workshop built into the course in the middle of the course) on how to use technology... This is so we are not rushed into using the technology as well as trying to cover course content. As it was, the technical support person came and talked about what to do but we forget after that as there was no hands-on practice." (Tourism student focus group interview)

In considering the challenges for students, L2 confirmed that International students in the tourism course faced multiple challenges due to their diverse educational and cultural backgrounds and because

many of them lacked the digital skills required for academic work despite their familiarity with social media. She reported:

“International students have a far higher uptake, need to cope with a lot more things [in the course]. They need to cope with the academic side (journal summaries, researching databases, all of them need to learn to use APA referencing) - new skills they have not experienced before. Besides moving away from traditional forms of learning and then there's eLearning. Even though students make use of social networking, so they are quite computer literate with email and social networking but some have never had to do word processing as their previous universities in their countries did not expect them to submit typed assignments.”

### 3.3. Theme 3—Digital Tools Disrupting Student Notions of Disciplinary Practice

Student responses to the tasks that the lecturers had designed to take advantage of the affordances of the digital tools they had selected were largely positive and came with strong indications that the tasks had disrupted students' prior conceptions of what it meant to do History and Tourism. Firstly, as noted as part of Theme I, the tasks were more collaborative and more strongly linked to the world outside the classroom. For the history students, the history they were engaged in was more personal than they had expected or experienced before. One student in history reported:

“When I first saw the assignment, I was skeptical about how this fit into my perception of ‘what is history’. I was not sure of its relevance. This was on the basis that we were able to choose whatever topic we liked to narrate and record on and also that it kind of needed to be a topic that was quite personal. History I have come across so far in tertiary studies has on the whole been impersonal. I was unsure how the whole experience related to history as a whole and how it would actually be relevant to my history degree.” (History student end of course evaluation)

Another student explained how the digital storytelling project had shifted their view of history as dry to a view linked with history as a public and personnel endeavour:

“I have learned that History need not be wholly academic and dry but can be more in the public history arena when digitized in the manner we experimented with in class. The digital story is a good way for regular people to create a personal history and to preserve individuals and place that might otherwise evade historical documentation.” (History student end of course evaluation)

L1 commented that students had adapted well to lab and collaborative work implying both were outside student expectations and experiences. She argued for the importance of these activities in terms of students' future careers:

“Students have adapted to having a lab [to prepare their digital story] in a History paper. ... Students also get nervous about peer-to-peer learning, which doesn't happen much in history. I have been stressing that this is what they will be doing in the workforce as grads, and they can in fact now put this experience on their CVs.”

The history tutors, while noting student frustration with the technological challenges identified the interdisciplinary nature of the task requirements as a further challenge to student thinking about what was involved in history/learning history:

“Students are not used to learning this way, they are not used to doing an assignment like this nor creative writing, It [digital storytelling] combines a lot of interdisciplinary components.”

The tourism lecturer and students each identified the authenticity of the online design tasks as both new. The students commented on the need for group and collective effort to complete the task (Theme 1) while the lecturer saw the value of the wiki project in informing real life tourism development agencies (Theme 1). However, the tourism students did not initially see digital literacy as an aspect of becoming engaged in the learning of tourism:

“When [we] enrolled in the course, [we] were not told we needed to be ICT proficient. This is a problem....” (Tourism student focus group interview)

These challenges underscore the need for explicit lecturer clarification of course expectations and assessment guidelines to address students’ prior conceptions about likely course requirements and what is currently involved in the practice of disciplines such as history and tourism.

#### 4. Discussion

We began the chapter by exploring the ways and to what extent digital tools can mediate, develop, challenge and expand disciplinary knowledge and understandings including teaching and learning practice. Our findings reiterate those from elsewhere that highlight that students are not necessarily comfortable with the use of technologies for academic purposes. Concerns range from their capacity to use a new technology to the public nature of digital representation of their ideas in progress, and matters of plagiarism. Nevertheless, the findings also highlight the advantages and educational affordances that can follow from the use of tools such as WMM (in the case of History) and online tools such as wikis (in the case of Tourism) as mediational means to facilitate learning. The tools were effective means for supporting the teaching and learning processes of diverse tertiary students through the provision of multiple modes and media for students to express and negotiate their ideas. The tools were also useful for expanding and transforming students’ preconceived notions of legitimate disciplinary area content and representation. Some students initially resisted the introduction of digital tools for representing their discipline specific ideas as it conflicted with their preconceived ideas of what it meant to be knowledgeable or accomplished in the field.

Lecturers’ strategic pedagogical use of the digital tools, including new forms of both formative and summative assessment, provided them with enhanced opportunities to access, challenge and extend students’ understandings. Digital tools provided students access to and legitimised some the wide variety of means for knowledge construction, presentation and outcomes that are now valued in the contemporary practice of the disciplines of interest in this study. Students in both cases were brought closer personally to the subject matter as in the history case study and to professional practice as in the tourism case study. They began to value interactions and collaboration with one another. Through the use of digital media, history as a discipline was transformed for students and they became public and



digital historians. In the Tourism case, students became tourism development ambassadors/advocates as they created a product (wiki) that needed to be concise and visual for an authentic community. This process was however not without challenges.

For both lecturers, the digital tools adopted in their course were new to them, that is, their affordances were not transparent at the onset. Lecturers had to spend time familiarising themselves with their functions and depended on external technical support (for their own and their students' technical needs). As a starting point however, they had heard about the tools and their potential to facilitate student learning as part of their participation in a multi-disciplinary and collaborative research project. They became convinced that they would be able to afford and facilitate the kinds of teaching–learning process and outcomes they hoped to achieve. This also involved a level of risk and experimentation with new ways of constructing and representing disciplinary knowledge in their respective disciplines. Like the lecturers, students initially grappled with issues of transparency and access to the tool. Although they may belong to the digital generation, students' familiarity with digital tools and being able to wield them for formal learning contexts cannot be assumed.

The students in the cases questioned the legitimacy of the tools adopted in the course based on their prior assumptions of how their discipline (and its related community of practice) operated. For example, the study and practice of history does not involve computer labs. As others have found, disrupting and challenging pre-conceived ideas concerning the norms, shape and form of disciplinary knowledge through digital tool use posed a key challenge for students [36]. Over time as the functionalities and features of the tools became transparent and normalised as part of their coursework, students began to value the new, diverse and creative ways of constructing, representing and communicating their disciplinary knowledge (beyond the stereotypical notion of traditional coursework) including the real world value and relevance of the tools (and the skills they had developed) in their future profession.

As the tools became more transparent to the case study lecturers, they began to see beyond the technical challenges to consider how they could adapt their pedagogy to take advantage of the tools' affordances. The suggestion here is that questions regarding ways to make their pedagogy more effective come to the fore as and when lecturers learn to balance the content with assessment and technical components of the course. In the design of their courses, both case study lecturers planned opportunities to help students bridge the technical and conceptual aspects of their course and/or connect with the relevancy of the tool to their coursework. Examples include the crafting of personal stories within the WMM environment and a field trip to help students appreciate the issues faced by a local community prior to students researching and presenting a solution via a wiki. These activities helped students see the relevancy of the tools and the real world application of the concepts they were learning to their future professions.

Three implications can be noted from the case studies.

Firstly, digital tools have the potential to disrupt, challenge, develop and expand students' construction, representation and communication of disciplinary knowledge. For this to happen however, lecturers need to consider the affordances of the tools they adopt and how these can best serve knowledge construction, representation and communication relevant to current forms of a discipline. These expanded goals for student learning need to be made explicit to students to help them

perceive the relevancy of tool use as a transparent process. Lecturers may need to model, even directly teach these norms with students to support their students attaining successful learning outcomes.

Secondly, lecturers and students need time to become familiar with digital tools they need to use. The time needed cannot be underestimated [37]. It is essential students and lecturers develop the confidence and capability they need to use a tool to support the achievement of curriculum teaching-learning goals. Issues of access to and the transparency of tools need to be considered. Adequate and multiple forms of support need to be in place to foster the transparency of tools and their functionalities. As seen in our study, both lecturers (and their students) depended on a high degree of technical support initially. This then raises the question as to the extent and availability of resourcing for digitally mediated teaching-learning practice in tertiary institutions. A way forward is for educators and students to tap into a variety of informal Web 2.0 resources such as online help guides and/or even their own personal (social) learning networks to inform their practice. In our study, lecturer development of the knowledge, skills and confidence to engage with digital tools in their respective disciplines was made possible through their participation in the research project. Without such commitment or any impetus or encouragement to do so, most educators face time and work load pressures and are hard pressed to spend the time needed to engage meaningfully with digitally mediated pedagogical approaches congruent with their disciplinary discourse.

Thirdly, course designs that incorporate elements to help students bridge technical and conceptual ideas are vital. Lecturer consideration of pedagogical issues (aligning their pedagogy with the tools adopted) in the context of digitally mediated practice is important [38,39]. Clarification of course expectations and clear assessment guidelines are needed to ensure students understand the role of the selected digital tools and how their use relates to the course learning outcomes. Our findings also highlight that digital tool can support student engagement in tasks that are of relevance to their future careers to facilitate their participation in future disciplinary based professional communities. Without this relevancy component, students can fail to see the need for digital tool use and/or the need to engage with new ways of knowledge construction and representation in a discipline.

In concluding, we take [18]'s point, on the need for lecturers to move beyond the mere layering of digital tools on to their current practice, to consider the potentials a digital tool might offer for enriching the teaching-learning goals they have in mind. Lecturer(s) recognition that physical access to the tool on its own is inadequate is essential if they are to begin engaging with the complex issues related to transparency and access in tool use for and within academic and disciplinary practice. We hope this overview of the two case studies has provided insights into some of the ways digital tools can disrupt, challenge, support and expand student notions and experience of disciplinary knowledge and the ways lecturers can make more transparent, and leverage the use of, digital tools in support of their teaching and their students learning.

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## Conflicts of Interest

The authors declare no conflict of interest.

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