In the knowledge-based digital economy, the ability to harness digital technologies to capture and manage information is a critical skill for tourism professionals. This article examines the use of wikis as a teaching and learning tool to help students develop a range of knowledge management skills, including creative collaboration, consensus-building, and technical literacy. The purpose of the study is to provide an exploratory analysis of student attitudes toward the use of wikis as a collaborative assessment task. The results indicate that wikis are perceived to be a flexible, convenient, and fair pedagogical technique for collaborative learning. Many students readily understood and exploited the collaborative and reflective nature of wikis. However, some students did not spend enough time on the task and did not appear to gain as much from the learning experience. This impacted on the extent and quality of collaboration in some groups. It is suggested that a staged wiki assessment might overcome some of the perceived shortcomings reported by students.

**Keywords:** flexible learning, Web 2.0, wiki, teaching and learning, creative collaboration, knowledge management

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Biggs (1999) suggests that the increased emphasis on generic transferable skills has required a reframing and rethinking of teaching practices to obtain desired learning outcomes. At the same time, the evolving use of ICTs in teaching and learning ‘raises a whole series of questions ranging from the appropriateness of the “chalk and talk” paradigm, through the role of assessment, to the need to cater for different learning styles’ (Holmes, Tangney, FitzGibbon, Savage, & Meehan, 2001, p. 1). Several authors, writing about the role of ICTs in teaching and learning, have suggested that the ongoing evolution of Web 2.0 technologies such as blogs, wikis, RSS and podcasts offer a variety of opportunities for developing information literacy and knowledge management skills (Alexander, 2006; Boulos, Maramba, & Wheeler, 2006; Evans, 2006; Parker & Chao, 2007).

The purpose of this study is to provide an exploratory analysis of student attitudes toward the use of wikis as a collaborative assessment task in a tourism unit. The term ‘wiki’ is a contraction of the term WikiWikiWeb, which in turn is derived from the Hawaiian expression *wiki wiki* meaning *fast or quick*. Leuf and Cunningham (2001), creators of the original wiki concept, define a wiki as ‘a freely expandable collection of interlinked web pages, a hypertext system for storing and modifying information — a database, where each page is easily edited by any user with a forms-capable Web browser client’ (p. 14).

The following article will present a brief discussion of the emergence of Web 2.0 technologies and their implications for teaching and learning before focusing specifically on the use of wikis as a tool for developing knowledge management and information literacy skills. The article then goes on to evaluate student responses to the use of wikis as a learning activity in a tourism unit at a regional Australian university.

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The Evolution of Web 2.0 Technologies

The term ‘Web 2.0’ has received increasing attention in the mass media, particularly in the context of leveraging the explosive growth of associated technologies and brands for commercial purposes. Rather than being a ‘new’ version of the web as the term implies, Web 2.0 represents a shift or evolution in the way content is created, displayed and shared on the internet. Web 2.0 allows users to share a variety of information, whether they are exchanging videos on YouTube™, building a common base of knowledge using wikis, networking on MySpace™ or Facebook®, or sharing knowledge using blogs and podcasts. Web 2.0 applications such as SecondLife® also allow users to interact in parallel virtual worlds and some universities have reacted to these developments by establishing virtual campuses in these digital settings.

Web 2.0 technologies are also referred to as social software (Alexander, 2006). According to Boyd (2003) social software can be characterised by three features:

- **Support for conversational interaction between individuals or groups ranging from real-time instant messaging to asynchronous collaborative teamwork spaces.**
- **Support for social feedback that allows a group to respond to the contributions of others.**
- **Support for social networks to explicitly create and manage a digital expression of people’s personal relationships, and to help them build new relationships.**

From an information design perspective, Alexander (2006) suggests that Web 2.0 technologies break away from the page metaphor because information is predicated on blocks of content called *microcontent*. He observes that ‘blogs are about posts, not pages. Wikis are streams of conversation, revision, amendment, and truncation. Podcasts are shuttled between Web sites, RSS feeds, and diverse players’ (p. 33). Microcontent can be easily saved, summarised, modified, copied, quoted, linked and built into new knowledge.

Tapscott and Williams (2006) describe how Web 2.0 has created web-based communities where mass collaboration is possible between geographically dispersed individuals who create, edit, and influence everything from the human genome project to the international media. They illustrate how some companies have actively exploited Web 2.0 technology to drive success and innovation. This phenomenon, which they have called wikinomics, is based around four central tenets: openness, peering, sharing and acting globally. The fact that these technologies are being actively embraced by some of the most successful ‘new economy’ companies suggests that universities need to play a more active role in preparing graduates for employment in the new economy.

The ease with which Web 2.0 content can be manipulated has powerful implications for classroom teaching and individual learning. Some commentators have suggested that younger students have become reflexive users of social software and will expect to use these tools to facilitate their interactions with education providers and employers (Evans, 2006). This implies that students may want to read university blogs and use collaborative technologies such as wikis to build and share knowledge. However Collis and Moonen (2008) caution that Web 2.0 applications must be seen as bringing added quality to instructional processes in order for these tools and processes to become embedded in higher education practice.

**Wikis**

Wikis are fully editable websites that allow users to visit, read, reorganise and update the structure and content as they see fit (Augar, Raitman, & Zhou, 2004). As multiple authors edit and update the wiki over time the content gradually begins to represent the shared knowledge or beliefs of the contributors. The open source online encyclopedia Wikipedia™ is perhaps the best example of a wiki.

Wikis generally share the following basic characteristics:

- **Most wikis are completely unrestricted, allowing anyone to read, correct, modify, organise or even delete content. This system is self-regulating, with a number of contributors readily correcting errors and modifying content. However, in a learning context wikis can be restricted to small groups of contributors.** (Duffy & Bruns, 2006; Schaffert, Bischof, Buerger, Gruber, Hilzensauer, & Schaffert, 2006).
- **Wikis allow distributed teams to write and edit documents collaboratively over the internet in a shared online workspace** (Minocha & Thomas, 2007). Content can usually be edited from anywhere in the world through a simple web browser interface, obviating the need for additional software or a third-party webmaster (Schaffert et al., 2006; Schwartz, Clark, Cossarin, & Rudolph, 2004).
- **Content is usually created using a simplified hypertext format, making it easy for nontechnical users to contribute. Some wiki technologies use a WYSIWYG interface with toolbars, completely removing the need for detailed technical knowledge** (Duffy & Bruns, 2006; Ebersbach, Glaser, & Heigl, 2006; Schaffert et al., 2006).
- **Changes to content are documented and stored each time a revision is made, allowing users to view or revert to earlier versions of a page. This makes it possible to track changes by multiple users over a period of time. Pages that are deliberately vandalised or deleted can be easily rolled back to a previous version** (Duffy & Bruns, 2006; Ebersbach et al., 2006; Schaffert et al., 2006).
- **Pages within a wiki are usually linked with each other, allowing for organic connections between various content areas** (Schaffert et al., 2006). Ideas are expressed as relationships between pages, thus creating a network of interrelated topics (Duffy & Bruns, 2006; Ebersbach et al., 2006).
- **Wikis have a spatial rather than temporal structure because changes occur not according to time, but according to the evolving spatial relationships between cross-linked content** (Duffy & Bruns, 2006).
- **Wikis provide a space where knowledge is networked and contextualised, but remains ephemeral: it changes and can be changed and mediated by the community** (Duffy & Bruns, 2006).
- **Content is posted immediately, eliminating the need for distribution with the associated risk of virus transmission** (Schwartz et al., 2004).
• Modular construction means that wikis can be simple or complex to meet user needs and skill levels (Schwartz et al., 2004). To overcome complexity most wikis offer a classic full text or title search for wiki pages (Ebersbach et al., 2006)

Wiki pages can be interconnected and organised as required because there is no inherent structure hard-coded into wiki technology (Duffy & Bruns, 2006). This makes wikis a highly flexible knowledge management space that promotes creative collaboration or 'collective cognition', a process whereby two or more people reach insights that neither could have reached alone (Lund & Smørdal, 2006). The design is considered highly democratic, in the sense that every user has exactly the same capabilities as any other user (Carroll, Guzdial, Holloway-Attaway, Rick, & Walker, 2002). Wikis are becoming increasingly common in organisations, where they can be used for a range of collaborative applications (Bean & Hott, 2005). Cerny (2008) has predicted that half of the companies in the United States will have wikis by the end of 2009.

Using Wikis in Teaching and Learning

Duffy and Bruns (2006, p.1) claim that ‘the rapid development of digital technologies and their use in education enable individuals to interact within the educational domain in new ecologies of learning’. This view is supported by Reinhold (2006, p. 47), who observes that ‘the idea of using technology and electronic media to supplement real-world classroom environments is currently undergoing a transition from afterthought to integral didactic element’.

Despite this enthusiasm for digital technologies, and the fact that wikis have existed for over a decade, their use is relatively new in academia (Evans, 2006; Schaffert et al., 2006). A review of the literature indicates that wikis are increasingly being used for a variety of teaching and learning applications. While wikis can be used as a source for obtaining information and knowledge, they also provide a method of virtual collaboration allowing students to share information in group projects. The creation of a wiki can help students develop their ability to collaborate and to create knowledge, rather than simply absorb it (Cronin, 2009). Wikis therefore allow students to engage in learning with each other, using the technology as a collaborative virtual environment to construct their knowledge (Boulos et al., 2006). However, a recent study of first-year students’ experiences with technology found that 81.6% of students had not used a wiki prior to attending university (Kennedy, Judd, Churchward, Gray, & Krause, 2008). In a learning setting, a wiki provides a collaborative workspace that can instantaneously display online documents without an extensive working knowledge of HTML tags (Bold, 2006). This ease of use reduces the technical skill required to use wiki features, allowing users to focus on the information and collaborative tasks themselves with few delivery obstacles.

The ability to create, edit and restructure web-based content allows students to represent data in a more organic format than existing asynchronous learning tools such as discussion boards and blogs (Choy & Ng, 2007). To the uninitiated, the distinction between wikis and other common Web 2.0 classroom technologies such as blogs may seem unclear. While a wiki can be edited by many individuals, a blog is basically an electronic diary entry written by one person and commented on by others. Blogs are useful in learning settings where only a few people need to interact, whereas wikis are better when many students are required to work toward a common effort (Stahmer, 2006). The non-linear structure of wikis allows students to make new connections between concepts, while the ability to use multimedia provides greater scope for expression through multimodal compositions (McPherson, 2006).

From a theoretical perspective, Parker and Chao (2007) suggest that the use of wikis appears to be particularly well supported by two key learning paradigms: the collaborative learning paradigm and the social constructivist paradigm.

The collaborative learning paradigm is based on the notion that students work in heterogeneous groups to support the learning of individuals (Parker & Chao, 2007). The use of wikis as an assessment tool has the potential to overcome some of the problems associated with traditional collaborative learning approaches. While much has been written on the benefits of group work, traditional group tasks do create some challenges for students. The incidence of social loafing in groups is sometimes difficult for academics to detect and students who feel that they have contributed more than fellow team members quickly develop a cynical attitude toward group assessments (Luca & McLoughlin, 2005). A significant advantage of most wikis is that individual student contributions can be tracked using a page history function and this is very useful in managing and facilitating team work (Elgort, Smith, & Toland, 2008; Minocha & Thomas, 2007).

The constructivist paradigm conceptualises learning as an active process where learners participate to construct knowledge and understanding (Boulos et al, 2006; Jonassen, Peck, & Wilson, 1999). This contrasts with traditional approaches to university teaching that have relied on the transfer of information from academics to students. The constructivist view considers learning to be a recursive, self-referential process in which learners interact with the environment, select and transform information, and construct their own knowledge (Parker & Chao, 2007; Reinhold, 2006).

The constructivist paradigm has, in recent decades, been extended beyond a traditional focus on individual learning to address collaborative and social dimensions of learning (Bruns & Humphreys, 2005; Schaffert et al., 2006). The notion of social constructivism (or ‘communal constructivism’) suggests that students and teachers are not only engaged in developing their own information but are actively involved in creating knowledge that will benefit fellow students (Holmes et al., 2001). As students collaborate on a wiki and learn to depend on one another for feedback, they become less dependent on the instructor and have an increased sense of responsibility for what they write (Guth, 2007). There is mounting evidence that
students are more likely to learn from collaborative learning experiences mediated by ICTs than from transmissive pedagogies (Johnson & Johnson, 1996).

The use of ICTs such as wikis increase the benefits of group work and interdependence by providing a learning environment that enables students to develop social, collaborative, professional and communicative skills (Luca & McLoughlin, 2005). So, from both a collaborative learning and a social constructivist perspective, wikis offer the potential for overcoming some of the traditional challenges in teaching and learning by allowing students to collaborate in a virtual environment, at a time and place that is convenient to them.

It is also evident that the current cohort of generation Y students is increasingly constrained by employment commitments that are not always conducive to face-to-face group meetings (Krause, Hartley, James, & McNees, 2005). Students are more mobile than ever, and often find themselves multitasking, working in part-time jobs, or located some distance from their campus (Boulos et al., 2006). These trends indicate a need for flexible collaborative learning approaches where individuals can develop their skills as needed (on-demand learning) and when they have time (just-in-time learning). Anecdotally, the use of wikis as a learning tool would appear to be appealing to the current generation Y cohort of students who have grown up in a media-rich environment and have difficulty engaging with more traditional transmissive pedagogies. Benckendorff (2007) found that tourism students were enthusiastic about a range of flexible learning approaches that allowed them to better manage study and work commitments. While the utopian notion of learning ‘any time, anywhere’ has been difficult to achieve, technological advances such as wikis are making mobile learning more feasible. Wikis clearly have the ability to generate online collaboration and interaction among students who may be geographically dispersed (Bold, 2006). But while wiki technologies are useful for distance education, they are also particularly relevant in the context of blended delivery approaches using a combination of face-to-face and online learning (Reinhold, 2006). Even students who are able to meet regularly in a face-to-face setting appear to appreciate the convenience factor of wikis (Vassell, Amin, & Winch, 2008).

According to Bruns and Humphreys (2005) wikis allow students to develop a range of skills, including technical literacy, content creation in a digital environment, creative collaboration, consensus-building, creating explicit knowledge from tacit understanding and effectively communicating ideas to other people through networked knowledge environments. Skills such as negotiation and conflict resolution are implicit in the development of a wiki because the goal of producing the content encourages people to reach consensus and to resolve their arguments. Wikis therefore are a more authentic simulation of real-world settings where conflict management, compromise and consensus-building are frequently required (McPherson, 2006). It has also been suggested that wikis may develop the resources and skills necessary to cope with social and technical change in lifelong learning (Owen, Grant, Sayers, & Facer, 2006). In other words, students are mastering technical competencies as well as the curriculum (Bold, 2006).

As students collaborate on a wiki, the content moves through an evolutionary process which Boulos et al. (2006) have called ‘Darwinianism.’ This ‘social Darwinian’ process requires that unfit sentences and sections are ruthlessly culled, edited and replaced, resulting in the evolution of more relevant, higher quality content. This suggests that the process of creating a wiki requires students to understand and reflect on the learning process as well as the content by reviewing not only on their own work, but the work of their peers. Contributing to a wiki is both an individual and collaborative activity that requires students to follow what others are doing; provide links between their work and the contributions of other team members and provide an original contribution distinct from all other contributions (Ruth & Houghton, 2009). As a result, students are not just writing for the teacher but also for their peers (Guth, 2007). Knowing that real people will be reading and possibly responding to their writing provides additional motivation for students to write more enthusiastically than when completing traditional assessments (McPherson, 2006).

Research Aims
The recency of the literature reviewed above is indicative of the growing interest in wikis among educators over the last few years. However, much of the literature is conceptual or descriptive and very few studies provide an empirical assessment of the issues associated with the use of wikis. While several studies have included feedback from students, this feedback is often anecdotal or based on observations made by researchers. The purpose of this study is to provide an exploratory analysis of student attitudes toward the use of wikis as a collaborative assessment task in a tourism unit. The specific aims of the study are to:

- examine student views about the flexibility and ease of use provided by wikis
- assess the extent to which wikis encourage collaborative learning and reflection and
- evaluate the extent to which wikis support fair and equitable teamwork.

Methods
The study is based on an assessment task that required students to work as a group of three or four to construct a wiki in a subject focused on international tourism. Data were collected from two cohorts enrolled in the same subject in different years. The 2007 cohort consisted of 15 groups of students, while the 2008 cohort included 12 groups of students. The wiki was linked to two other assessment items in the unit. The wiki was a summary of a ‘destination profile’ presented by team members using a traditional 30-minute in-class presentation format. Many groups used the wiki as a tool for planning the content of their in-class presentation, although this was not the main purpose of the task. Students were also advised that their final exam would contain a question about the content of
the wikis, thereby creating an incentive for students to visit the wikis of other groups. Because the site was intended to be a summary, students were restricted to a maximum of 1,500 words, but were encouraged to link to more detailed external information sources.

The wiki technology used by students was provided by a social software package called TeamsLX, which was embedded in the university’s Blackboard learning platform. TeamsLX allows instructors and students to collaboratively build shared knowledge bases within courses. The software uses a WYSIWYG interface and toolbars to support the creation of content. The wiki’s editing features are similar to those of a word processor, allowing students to manipulate colours, fonts, pictures, external links and tables. The TeamsLX software also identifies contributions at the individual level and tracks the evolution of a group’s response, allowing teaching staff to assess each student’s input to the group project. The 2008 cohort used a newer version of the software to construct their wikis and the impact of this change is discussed later in the results.

A 1-hour briefing session was conducted early in the semester to orientate students to the wiki technology. The technical features of the wiki software were introduced to students and the rationale for the assessment was explained. The provision of training was fairly limited as it was assumed that participants would possess a relatively high degree of IT competence and would not require much technical support to develop proficiency in using the wiki. Groups worked on their wikis for about 8 weeks, during which time the wiki was not visible to other members of the class. Once the due date for the assessment had passed members of the class were able to see all group wikis constructed in the unit, but the wikis were not available to the general public. Some examples of the student wikis are shown in Figure 1.

The evaluation of the wiki assessment was conducted by asking students to complete a two-page self-administered questionnaire distributed in the final week of the semester. Students were advised that participation was voluntary and, to ensure anonymity and ethics compliance, no personal identifiers were recorded. The first page of the questionnaire included basic demographic questions and a set of five-point Likert scales to gauge student responses to the assessment. Some of the Likert items were adapted from an instrument used by Luca and McLoughlin (2005) to assess student perceptions of using blogs as a collaborative learning tool. Some items were also developed from the work of Forte and Bruckman (2006). The items contained statements about ease of use, the fairness of the assessment, flexibility, collaboration and reflection. On the second page students were asked to respond to three open-ended questions. Students were asked to indicate what they liked most and what they liked least about the wiki assessment and how the wiki assessment could be improved. Information from the questionnaire was supplemented by site statistics provided by the TeamsLX software.

The sample consisted of a mix of 78 first-year and second-year undergraduate tourism students (81% response rate). Table 1 provides a profile of the respon-
students. There was a high number of female students in the sample but this percentage is representative of the normal composition of the subject (71% female). Most of the students were studying full-time and were from the generation Y cohort born between 1982 and 2001 (Strauss & Howe, 1991).

Results and Discussion

Students adapted quickly to the wiki environment and the assessment task, with very little ongoing support required from academic staff. The TeamsLX™ software is able to track the contribution of each individual to the wiki and to each individual page by recording the number of page saves and lines of text modified. Table 2 provides a summary of the usage statistics for the class.

The results indicate that some groups and individuals clearly understood the requirements of the task and the opportunity for creative collaboration. The maximum values and, to some extent, the means indicate substantial activity on some wiki sites, with students adding content and making many minor changes and modifications to both their own work and the work of their team members over the 8-week period. Incredibly, one of the wiki sites had recorded 511 page saves and 2253 lines of text modified. On average, it appears that individuals contributed about 28% of the content for their wiki, but this varied from no contribution in one case to 88% at the other extreme. It was later determined that in several groups, individuals collected the content from their group members by email and then built many of the wiki pages themselves because their group members were uncomfortable with the technology. This clearly did not allow for true collective cognition of the material. The values in the minimum column are an indication that some individuals and teams did not engage with the assessment task.

It was also clear from observation and marking of the final wikis that some groups had developed consistent, well-planned and beautifully presented sites that demonstrated the students had worked well as a group, while other wikis were clearly the result of uncoordinated individual efforts. The use of a wiki therefore does not guarantee that students will collaborate to complete the task. This problem may be overcome by embedding the group task within a broader pedagogical framework designed to develop and support teamwork. Carefully designed marking rubrics and criteria requiring students to demonstrate true collaboration and interaction is also helpful.

Table 2

Wiki Usage Statistics

<table>
<thead>
<tr>
<th></th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of pages/wiki</td>
<td>9</td>
<td>65</td>
<td>22</td>
</tr>
<tr>
<td>Total page saves/wiki</td>
<td>29</td>
<td>681</td>
<td>242</td>
</tr>
<tr>
<td>Total lines of text modified/wiki</td>
<td>89</td>
<td>2253</td>
<td>694</td>
</tr>
<tr>
<td>Total page saves/individual</td>
<td>0</td>
<td>511</td>
<td>65</td>
</tr>
<tr>
<td>Total lines of text modified/individual</td>
<td>0</td>
<td>1830</td>
<td>191</td>
</tr>
<tr>
<td>Extent of individual contribution to wiki (%)</td>
<td>0</td>
<td>88</td>
<td>28</td>
</tr>
</tbody>
</table>

Table 3 provides a summary of student perceptions of the wiki assessment. The first aim of this study was to examine student views about the flexibility and ease of use provided by wikis. The results suggest that students were generally positive about both of these areas. Most students felt that the wiki assessment was better than a traditional paper-based team assignment (Mean = 3.97) and the convenience aspect of the assessment was clearly well received (Mean = 4.17). These findings were also reflected in some of the qualitative comments. Students used words and phrases such as convenient, simple, enjoyable, hands-on, learnt something new, quick and easy, different, exciting, and novel when asked what they liked most about the assessment. Several students also noted that the reduced need for face-to-face meetings was the most positive aspect of the task. One student added that: ‘we could add information where and when we liked’ while another stated: ‘I was able to work with a team but at my own pace and no need for face-to-face contact all the time’.

Most students felt that the technology was easy to use, but the two statements related to this aspect exhibited a slight bimodal distribution, suggesting some students clearly struggled with the technical aspects. An assessment of the qualitative comments suggests that most of these frustrations were due to the limited features of the wiki technology. Many students from the 2007 cohort commented that more features, such as support for tables and background colours would be useful. Students also found it difficult to position images because the software did not allow for text to wrap around images. The 2008 cohort had access to additional new features such as tables and the ability to better manage the placement of images but encountered other technology problems. Some students found the wiki became laboriously slow and time-consuming, particularly as more pictures were added to the site. Students also indicated that the wiki did not always save their work. These limitations are similar to those reported by Elgort et al. (2008), who used the same TeamsLX™ wiki technology with two groups of postgraduate students. One student reported that the formatting options such as linking and positioning pictures and tables were ‘fiddly’, another wished that the wiki had an inbuilt spellchecker. Clearly, some students felt that the lack of these features impeded their capacity for creative expression.

The second aim of this study was to assess the extent to which wikis encourage collaborative learning and reflection. The results in Table 2 suggest that some teams were more successful than others in using their wiki as a collaboration tool. The results in Table 3 support this interpretation. Many students appeared to be unsure about whether the wiki helped the team produce a better outcome (Mean = 3.29). Likewise some students felt that the wiki supported meaningful intellectual exchange (Mean = 3.05) and promoted discussion (Mean = 2.97), but many were less sure or disagreed that this was the case. Most students clearly had no problems editing the work of others (Mean = 3.45) but it must be noted that this item was only included on the 2008 questionnaire.

The qualitative comments also suggest that while students liked editing the work of others, they sometimes did not
appreciate having their own work changed. When asked what she liked least about the wiki task, one student stated: ‘The fact that people would go in and delete stuff you would have just completed because they did not know what was going on’. Similar findings have been reported by Cronin (2009) who observed that wikis can sometimes be a frustrating experience for students because individual effort can be diluted by inaccurate or poorly written changes by another student.

More positive ratings were associated with items that involve the sharing of group wikis. Most students enjoyed looking at the wikis of other teams and many also agreed that this public sharing of their work influenced their approach to the assessment. In the qualitative responses, a number of students noted that not all group members contributed equally or that some team members left their contribution to the last minute. The capacity to use the wiki as a tool for reflecting on individual and team progress was also evaluated more positively. Many students clearly liked the ability to identify and correct content errors (Mean = 3.60) but oddly, many students indicated that the wiki did not alert them to problems that other team members were having (Mean = 2.90). Perhaps the first statement is related purely to content quality, while the second deals with broader challenges and problems that team members may have experienced (such as an inability to use or access the technology). When reflecting on their own learning, most students agreed that the wiki was beneficial to their learning.

A third aim in this study was to evaluate the extent to which wikis support fair and equitable teamwork. Most students agreed that the weighting allocated to the assessment (10%) was appropriate. Many students were also keen to see wikis used in other units, implying that they generally considered this to be an acceptable form of group assessment. About half of the students agreed or strongly agreed that the task promoted fair and equitable teamwork. Interestingly, this finding is very similar to a recent study involving masters’ students in an information technology course (Elgort et al., 2008). Although it was easy to track individual student contributions and the marking rubric for this assessment penalised social loafers, the qualitative comments indicated that some students were still frustrated by the lack of input from some team members. As is the case with other team-based assessments, social loafing and procrastination have been identified by other researchers as challenges when using wikis for assessment (Minocha & Thomas, 2007). Minocha and Thomas (2007) also found that collaboration on some wikis was sporadic and that this created some frustration for students who were waiting for other team members to contribute. These issues were evident in a small number

<table>
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<th>Table 3</th>
<th>Student Perceptions of the Wiki Assessment</th>
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<td>Respondents</td>
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<tr>
<td>Enjoyment and ease of use</td>
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<td>‘The wiki was better than a paper-based team assignment.’</td>
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<tr>
<td>‘I enjoyed using the wiki in this unit.’</td>
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<tr>
<td>‘The wiki tools were easy to use.’</td>
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<td>‘I had no technology problems when using the wiki.’</td>
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<td>‘The wiki allowed me to contribute at a time and place that was convenient for me.’</td>
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<tr>
<td>‘The wiki reduced the need for face-to-face contact with my group.’</td>
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<tr>
<td>Collaboration</td>
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<td>‘I felt comfortable about editing the work of other team members.’</td>
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<td>‘Using the wiki helped the team develop a better product.’</td>
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<tr>
<td>‘The wiki enhanced the level of meaningful intellectual exchange between group members and others in the class.’</td>
<td>20</td>
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<tr>
<td>‘The wiki helped promote discussion with other team members about tasks required to finish the assessment.’</td>
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<tr>
<td>Sharing</td>
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<tr>
<td>‘I liked looking at the wiki’s of other teams.’</td>
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<tr>
<td>‘Knowing that the wiki would be available to the rest of the class after the due date influenced the way I approached this assessment.’</td>
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<tr>
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<td></td>
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<tr>
<td>‘The wiki allowed the me to identify and rectify content errors and problems made by other team members.’</td>
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<tr>
<td>‘Using the wiki assisted with my learning.’</td>
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<td>‘The wiki is great for tracking tasks because it keeps all team members informed about progress.’</td>
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<tr>
<td>‘The wiki made it easy to track and reflect on my progress.’</td>
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<tr>
<td>‘The wiki helped alert me to problems that others were having in my team.’</td>
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<tr>
<td>Fairness</td>
<td></td>
</tr>
<tr>
<td>‘The weighting allocated for the wiki assessment was fair.’</td>
<td>9</td>
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<tr>
<td>‘I would like to see the wiki used like this in other subjects with teamwork.’</td>
<td>17</td>
</tr>
<tr>
<td>‘Using the wiki helped promote fair and equitable teamwork.’</td>
<td>15</td>
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</table>

Note: * Mean based on 1 = Strongly disagree ... 5 = Strongly agree
of the comments provided by students in this study. Clearly, this type of behaviour limits opportunities to develop content in an organic and evolutionary manner. Several students suggested that a staged assessment of the wikis at various times during the semester might motivate some students to contribute earlier.

To further explore some of the reasons for the range of responses, means tests were conducted between various groups of students. These tests explored differences between students according to gender, age, language background, cohort and the number of hours spent on the wiki task. Given the small sample size, the nonparametric statistical tests were used. The results indicated that age was not associated with any significant differences in mean ratings. There were some significant differences between male and female students. Males were significantly more likely to agree that the wiki helped alert them to problems that other team members were having. The male mean was 3.41 while the mean for females was 2.75 (U = 330.0; p = .012). Males were also significantly more likely to agree that wikis promote discussion with other team members (Mean = 3.53) than females (Mean = 2.82; U = 328.5; p = .016). This contrast is puzzling but, given the small sample size, it would be worth exploring these differences in future studies. In most instances, the ratings of students from a non-English speaking background (NESB) did not differ a great deal to those from an English-speaking background. However, NESB students were less likely to agree that wikis allowed them to contribute to teamwork at a time and place that was convenient (NESB Mean = 3.84; ESB Mean = 4.32; U = 448.0; p = .016). This is probably due to the fact that many NESB students were international students who did not have their own computer at home and therefore had to complete their assessment using university facilities.

There was only one significant difference in the mean ratings between the 2007 and 2008 cohorts. Students from the 2008 cohort were far more likely to disagree (Mean = 2.59) with the statement ‘I had no technology problems when using the wiki’ than students from the 2007 cohort (Mean = 3.61; U = 431.5; p = .003). This is an interesting finding given that the wiki tools had been updated between 2007 and 2008, and 2008 students had a greater range of tools and features available when designing their wikis.

To explore whether the number of hours students spent on the wiki task had any impact on their ratings, students were divided into two groups: those who had spent less than the median number of hours on the task and those who had spent more than the median. The comparison between these two groups is presented in Table 4.

It is clear that those students who had spent more time on the wiki task were more likely to agree with almost all of the statements. The only exceptions included the statements: ‘The weighting allocated for the wiki assessment was fair’ and ‘I felt comfortable about editing the work of other team members’. Students who had spent more time on their wikis perhaps felt that the assessment should be worth slightly more. The results indicate that there were six significant differences between the two groups of students. Students who had spent less time on the wiki task found the wiki tools less easy to use. These students were also less likely to agree that the wiki reduced the need for face-to-face contact between team members or that the wiki helped the team develop a better ‘product’. Students who spent less time of the task were also significantly less likely to recognise the usefulness of the wiki as a tracking and monitoring tool, both for themselves and their team. These results tell the story of two groups of students, one in which students were clearly engaged in creative collaboration and another group where individuals spent too little time in the online environment to realise any of the benefits discussed in the literature.

**Conclusion and Implications**

This article started with the assertion that tourism, as an information-intensive industry, requires professionals who are able to manage knowledge using the latest technological innovations. It is proposed that the use of ICTs in teaching and learning provides some opportunities to help tourism students develop a range of knowledge management skills, including creative collaboration, consensus-building and technical literacy. While not without problems, wikis do require students to gather, construct, modify and correct information. The nature of this technology also allows students to make their own connections between ideas and concepts. This study reinforces previous findings that wikis do support the development of some of these knowledge management skills. However, it appears that this is only true for some students. While the use of a wiki assessment was clearly enjoyed by many students, some students did not spend enough time in the digital space and this impacted on their ability to collaborate and reflect on the content being created. This is perhaps not unexpected and certainly not unique to online collaboration — encouraging student engagement is a challenge in most teaching and learning contexts.

From a collaborative learning perspective, the assessment might be improved by reconceptualising it as a staged assessment in which individual contributions are evaluated at various points during the 8-week duration of the task. This might encourage some students to make a more sustained commitment to the wiki, thereby improving the prospect for collaboration. Boulos et al. (2006) also suggest that it may be necessary to re-educate learners about their participation in dynamic learning environments such as wikis. They assert that the legacy of traditional learning models means that students who have been occupied with memorising what teachers tell them may need some support when they first attempt to communicate with others using collaborative technologies. In spite of the growing body of literature in this area, there has been very little research about how the use of wikis encourages a different approach to thinking, interacting and constructing knowledge (Ruth & Houghton, 2009). Forte and Bruckman (2007) also highlight that very little work has been done to date to explicitly measure learning outcomes and to connect them with students’ wiki experiences.

There is an opportunity for further research to examine why some students did not engage with the content or
collaborate with their team mates in the virtual space. The reasons are likely to be complex and varied, but may include time constraints, lack of motivation, lack of technical expertise or even technophobia. Bruns and Humphreys (2005) observed in their work that some students were uncomfortable with altering or interfering with the work of others. This did not appear to be a problem for the undergraduate tourism students in this study, but some students did take individual ownership of particular pages, thereby deterring others from contributing.

From a social constructivist perspective, the wiki encouraged students to collectively construct a knowledge base of their selected country with very little input and guidance from academic staff. The wiki assessment was linked to other assessment tasks in the 13-week unit. This assessment structure encouraged students to look in some detail at the wikis of other groups and this aspect appeared to be well-received. This supports the findings of Forte and Bruckman (2006) who found that a sense of audience played an important role in constructing meaningful content. In some wikis the collection of multimedia, text and external links was sophisticated and the wiki usage statistics indicated that the content had been assembled over a sustained period of time from the input of all team members. The structure and richness of the information composed by students would be difficult to duplicate using more traditional assessment pieces.

Perhaps the most striking aspect of the study was that the wiki assessment was very successful as a flexible learning task. Students readily acknowledged the convenience of being able to work on their wiki ‘any time, any place’.

As the sociodemographic characteristics of students in Australia continue to change it will become increasingly necessary for universities to provide learning experiences that allow students to balance work and study commitments. The challenge for educators is to ensure that these learning experiences are equivalent to, or better than, more traditional face-to-face activities and tasks. This underscores the need for tourism educators to be at the cutting edge of developments in pedagogy to ensure that tourism as a study area remains attractive and contemporary and that universities continue to produce graduates...
able to make a contribution by raising the professionalism of the industry.

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References


