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Sustainability of a university designed and developed media annotation tool to prepare learners with skills needed for future employment

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RMIT University's media annotation tool (*MAT*) is a computer software program dedicated to incorporating video footage to the student learning experience in a novel manner. In addition to the usual functions associated with videos, *MAT* allows users to enter written comments at strategic and key positions to emphasise the required learning points. Innovatively introduced to creatively support learning for work-ready skills, in 2011 *MAT* was integrated into courses across nine student cohorts, over six disciplines, in the Vocational and Higher Education (undergraduate and post graduate) sectors of the university. This paper will focus on analysis of insights of teacher experiences using *MAT*, highlighting sustainable ways forward with university designed innovations. It will introduce the context of implementing *MAT* and discuss the process of evaluating the requirements for promoting *MAT* to the wider university community and, more specifically, to embed and sustain *MAT* into the long-term.

Keywords: media annotation tool, implementation, integration, embed, sustain, e-learning.

Introduction

The theory and practice of e-learning is evolving rapidly in tertiary education (for example, Haythornthwaite & Andrews, 2011; Herrington, *et al*., 2010). Teachers as early adopters have a significant role as future makers of educational technology; their experiences informing sustainable innovation. Innovations in educational technology have benefitted from project funding over the last 50 years (Gunn, 2011). Many outcomes of earlier projects will have progressively exhausted their natural life span, while others will have underpinned subsequent projects and contributed directly (e.g., through tool adaptation) or indirectly (e.g., through dissemination of findings) to currently used technology. This paper focuses on a recent in-house innovation at RMIT University in Melbourne of a media annotation tool known as *MAT*. *MAT* is an interactive and innovative tool that enables learners to engage with video. As well as basic learner-control functions (play, pause, re-play, etc.), students can anchor text entries to segments of video. Their peers (within small or large groups), and also their teachers, can add to these annotations to create structured, threaded discussions converging on key points of the footage. The video under learning analysis can be student-generated and uploaded to *MAT*, or teacher selected and uploaded such as in-house productions or third-party videos with correct permissions.

This tool was developed to facilitate deep learning through the annotation to video footage by students. The innovation has undergone various iterations and applications, most notably the recent use of *MAT* in a number of diverse programs from medical radiations to law. It is currently at a post-project funding stage. The challenge for *MAT* now is whether its use is sustainable in a wide range of programs or if difficulties with adoption by academics and students mean it may disappear over time. This paper addresses ways *MAT* can be used sustainably in the future, potentially scaling up to an embedded tool in the suite of university technology, with numerous learning cohorts benefiting across the institute.

Educational sustainability

According to the online JISC 'Sustaining and embedding innovations – A good practice guide':

> Sustainability in innovation projects can be defined as embedding change as well as maintaining and enhancing project outcomes [and] In other words, project teams might well introduce new ideas for teaching and learning but the true "innovation" is about how these ideas go beyond the pilot/test phase and are applied and adopted appropriately throughout an institution. One could therefore argue, that sustainability and embedding are an essential element of any innovation! (Chatterton, 2010).

Gunn (2010) argued that an e-learning initiative is sustainable when three conditions are met. These are related to: (i) course integration and evaluation; (ii) integration and adaption into other learning scenarios and (iii) embedding into university systems and promoting to teachers. In the time since completion of design and development of the first planned stage of *MAT*, 'Stage I' video annotation (Colasante & Fenn, 2009), integration and evaluation of the tool has essentially met the first two Gunn (2010) conditions, and is yet to embark on the third. Table 1 aligns these three conditions to the progress of *MAT*.

Table 1: The *MAT* initiative aligned to the Gunn (2010) three conditions of sustainability

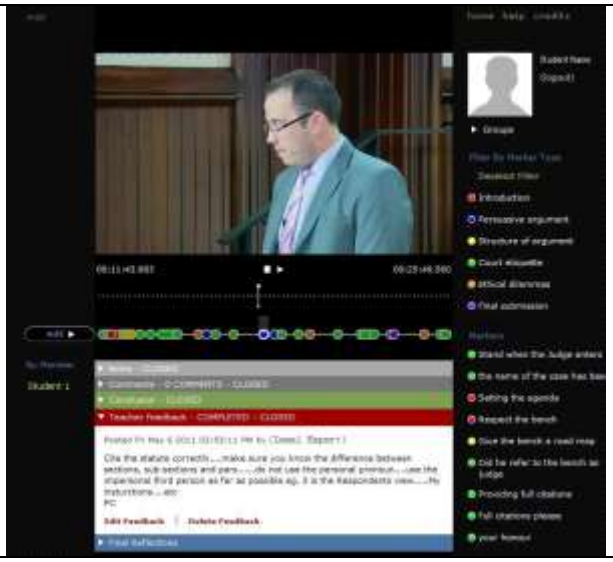
Three conditions of e-learning initiative sustainability (Gunn, 2010, p.90)	Alignment to *MAT* progress
1. Course integration and evaluation: "A learning design involving information and communications technology has been developed and implemented within a course or courses of study. It has been through a proof-of-concept stage and has been judged, on the basis of evidence produced, to be beneficial to teaching and learning."	***Achieved.*** A pilot study in 2009 saw *MAT* integration in a physical education (PE) undergraduate course; findings were largely positive for active learner-centred engagement with video for pedagogically sound purpose (Colasante, 2011a; Colasante, 2011b). Recommendations from the pilot study included integrating and examining *MAT* in other courses, including work-preparation learning options (Colasante, 2010).
2. Integration and adaption into other learning scenarios: "The e-learning concept, design, system or resources have proven potential to be adopted, and possibly adapted, for use beyond the original development environment."	***Achieved.*** A 2011 university funded project saw *MAT* integrated across a range of disciplines and tertiary sectors of the institute. In execution, the multiple-case study approach also created an effective community of practice for sharing of ideas. Evaluation is progressing, and early data analysis indicates that the tool is more effective in engaging learners where learner-learner and learner-teacher interactions are designed into the learning, where there is clear alignment with assessment, and where video upload to *MAT* is managed by teaching or support staff rather than the students (Colasante & Lang, 2012).
3. Embedding into university systems; promoting to teachers: "Maintenance, use and further development of the e-learning concept, design, system or resources do not remain dependent on one or a few individuals who created them, to the extent that, if their involvement ceased, future prospects would not be compromised."	***Yet to be fully embarked upon.*** Maintenance of *MAT* continues (albeit relies heavily on the initial web developer) and improvements have been implemented as a result of teacher and student feedback across the multiple-case study. The innovation is still only known by a relatively few teachers across the university, although sharing through seminars (recent and planned) should improve this. In the university's educational technology landscape, *MAT* has not yet moved from 'student-facing pilot' to 'ongoing'.

The third condition—that of embedding into university systems and promoting to teachers—is a preferred way forward for *MAT*. Use beyond the university is also not unimaginable, as proven possible, for example, by the internationally deployed *VideoANT* (Hosack, 2010). The post-project stage will likely fall to others, instead of the funded project team. While the project team (primarily teachers and learning support academics/ professionals) were effective in further proving the concept and developing a community of practice, the skills required "to extend use of the product and findings beyond the development environment; that is, to address a key sustainability factor … are not the same as those for promotion or dissemination.", and so "the Principal Investigator or research team are not usually responsible for these later activities" (Gunn, 2010, p.98). Project team members are, however, keen to play a minor and/or hand-over role, to complete the project cycle towards

the future success of integrating *MAT* into learning and teaching. This may include providing teacher 'champions' in promotional activities, and learning support professionals in teacher professional development and learning design roles, as well as sharing findings. The next section of this paper gives detail of the 2011 project that provided for the integration of *MAT* in various disciplines.

The tool and the funded project

MAT is a web-based annotation tool that currently allows textual annotations to discrete segments of video, which may be further added to by others in threaded discussion panels. The *MAT* project was funded by a 2011 university grant and titled 'Using a media annotation tool to enhance learning that is work-relevant and enables industry collaboration (A multiple case study evaluation across disciplines and sectors to inform models to achieve this)'. It was aligned to the university strategic objective: 'To be work-relevant and industry-partnered', and followed a successful 2009 pilot evaluation of *MAT* integration in undergraduate physical education (PE). The 2011 project incorporated a collaborative approach by academics from varied disciplines and across academic colleges, as well as learning support professionals. Each academic had his or her own specific work-relevant learning needs for integrating *MAT* into learning and teaching, and most included industry representative participation in the learning processes (see example in Figure 1). The participating teachers, from the disciplines of medical radiations, chiropractic, and education (undergraduate); law (postgraduate); property services, and audiovisual technology (vocational); formed key project contributors, plus their student cohorts.



Industry representative participation

Industry professionals participated primarily by involvement in video production (by interview, or demonstrating or role playing practice) and/or providing feedback to students in *MAT*.
In the use of *MAT* for the Juris Doctor (JD) cohort, illustrated here, two legal industry representatives participated by co-scripting 'moot court' proceedings with the JD teachers, and then acting as judge and barrister in the video that the students subsequently analysed.
Further, one of the legal representatives provided direct feedback to the student groups on their moot court video analysis work in *MAT* (an example of which can be seen in the red 'Teacher Feedback' text panel).

Figure 1: Screen capture (de-identified): Example of the use of *MAT*, with markers and anchored text.

Examination of the project was via a multiple-case study of the varied learning cohorts' use of *MAT* in their respective work-relevant contexts, to inform models of *MAT* use and to develop guidelines and publications to support wider application of such models. The project produced both process and product outcomes (Colasante, *et al.*, 2012). For example, the process of integrating this new educational technology into nine case cohorts over six disciplines involved *MAT* training and support mechanisms for teachers and students, learning design, and meetings and reflections on the various case applications of *MAT* in a project-wide community of practice. To inform the models (currently in development) of work-relevant learning that optimise virtual authentic learner engagement by integrating *MAT*, a range of data was collected. Surveys, observations, interviews and learning artefacts captured the student experience over two semesters (being reported in other papers). The teacher experience (plus that of industry representatives where possible) was harnessed by 'interactive process interviews' and cross-validated by post-subject artefact analysis of learning evidence within *MAT*. These interviews were semi-structured, lasted 30-45 minutes and were audio-recorded. The first 10-15 minutes involved the teacher demonstrating the processes of *MAT* use in their cohort, by a think-aloud walk-through of examples within the tool, followed by interactive questions using a themed protocol. In a minority of cases, the first part of the interview involved observation of active feedback processes in *MAT*. For the focus of this paper, emergent themes from the teacher interviews are discussed and analysed in regards to *MAT* sustainability.

Multiple Cases of *MAT* Curriculum Integration

Below is a summary of the various cohorts using *MAT* including the ways *MAT* was using video content and industry involvement, as well as the number of students (Table 2).

Table 2: The nine *MAT* course integrations

Tertiary sector	Discipline	Work-preparation theme	Video content	Industry involvement	Number of: students in MAT; teachers in project	
Post-graduate *'JD'*	Juris Doctor (law)	Advocacy skills	Scripted and acted moot court proceedings[1]	Video co-scripters and informed actors; feedback to students in *MAT*; guest lecture	32	3
Undergraduate *'Education'*	Education (literacy)	Literacy teaching skills	Students storybooks in development[2]	Guest lecture from an author of children's books	18	1
	Education (visual arts)	Visual arts teaching skills	Students own art processes and art environments[2]	Practical placement in schools including art classes	59	1
Undergraduate *'Health'*	Chiropractic	Clinical thinking for clinical cases	Scripted and acted chiropractic consultation in two parts[1]	Video scenarios co-scripter and informed chiropractic actor	78	2
	Medical Radiation	Image evaluation skills	Senior radiographer critiquing a range of x-ray images[1]	Expert radiographer in videos	57	1
Vocational Education and Training (TAFE) *'VET'*	Property Services (Cert IV, traineeship)	Customer service	Teacher interview of 3 professionals across different sized companies[1]	Experts in property services industry in videos	20	1*
	Property Services (Cert IV, owners' corp)	Conducting meetings	Student role-plays of industry-styled meetings[2]	Concurrent employment in the field	29	1*
	Property Services (Diploma)	Customer service and leadership	Teacher interview of a professional from a large company[1]	An expert in property services industry in video	22	1*
	Audiovisual Technology (Diploma)	Quality service	Two commercial videos on customer experiences[3]	N/a	39	1
TOTAL	**9 cohorts (6 disciplines)**	***Notes:*** [1]*Professionally produced videos (in-house or contracted)* [2]*Student-generated videos* [3]*Third party videos* **Same teacher (across 3 courses)*			**354**	**10**

A major part of the 'process' outcomes of the project involved integration of *MAT* into the curriculum of varied learning cohorts. By integrating this new educational technology into nine case cohorts over six disciplines and across university sectors (see Table 2), direct outcomes included:

- 354 students having access to *MAT* in their learning
- 10 teachers exploring how to achieve various work-readiness learning objectives via an interactive multi-media approach using *MAT*
- project-wide community of practice, with sharing of teaching and learning experiences with *MAT*
- sub-communities of practice: a research group (over 50% of the project team), and a small strategic group (one member from each of the three academic colleges)
- five small group technical training sessions for participating teachers (plus five teaching assistants employed under project funding), over two campuses

- 13 in-class technical training and learning with *MAT* support sessions across the nine student cohorts (including repeat tutorial-sized sessions for the larger classes).

Teacher perspectives on the use of *MAT*

A number of issues emerged from the teacher interview data that raise issues of sustainability. These can be categorised under the themes of: recommending *MAT* to other teachers; technology ease of use; support mechanisms; future use; and professional development.

Recommending *MAT* to other teachers

All ten teachers recommended *MAT* for other teachers to use. Some added qualifiers, such as recommending a pedagogical fit for purpose, not using *MAT* in isolation of other learning strategies, and the need for support, time and cost coverage in relation to video production. For example, participants stated:

> Yes I would [recommend it], but I think it needs to be thought about exactly how it should be integrated into … their learning, their teaching … I don't think it's something that you could just use *MAT* and nothing else, I think it should be integrated as part of your package for your delivery for that particular program. ('VET' teacher-1)

> Yeah, I think it's a great innovation; I think it's a great visual tool; it's a very reflective tool; it's very active learning because you're engaging in dialogue; I love the industry element that we included, the industry representative. … [and advise other teachers] just to give themselves time to prepare; to use the instrument themselves if they can– and also I think to recognise that cost is a big part of any learning and teaching innovation and this is a pretty big innovation. It's been excellent but it's a big leap. ('JD' teacher-1)

Technology ease of use

The ease of using the *MAT* technology was not an explicit question in the teacher interviews, however, six out of ten teachers volunteered in interview that *MAT* was easy to use, and one of these teachers noted a pre-conceived view that the tool would prove difficult to use, and was relieved that it was not. Two teachers offered that the technology was quick to learn, for example,

> it's very easy to navigate through, because as I said, it only took me half an hour to figure out how most of the things work … [and] it was very easy to use, it can be flexible, everything is all there stored, I was able to log onto it ... when I was working from home. ('Health' teacher-3)

Seven teachers noted that time was a factor in their adoption of the tool, in that either *MAT* activities took up a lot of their time, or that they worried about the time commitment once the project supports were removed (e.g., project funded teaching assistant). For example,

> working with *MAT* in the future, we all know how to do it, to enrol the members, to put media in there … [etc.]. But because you have to do one group at a time, that admin aspect is actually fairly labour intensive and we had the luxury of the Teaching Assistant … it's one of those activities that you would have to realise are admin rich … with larger groups. ('Health' teacher-1)

Another factor relating to technology involved student ability. While some student cohorts coped with the technology easily, such as the Audiovisual Technology and Juris Doctor cohorts; other students had some difficulties. For example, the Property Services teacher appreciated in-class technical support for his mature-aged students, as some very basic technology ability gaps were evident and these needs required direct technical support. The Education-Visual Arts teacher felt her students were not the "tech-savvy" digital natives that she expected them to be, and noticed they needed more technological support than anticipated. Uploading student-generated video was a particular frustration for this cohort. In addition to the research interviews, the Education-Visual Arts teacher shared her student experiences in the project-wide community of practice, which helped other teachers prepare and/or arrange additional support to enable a smoother process, for example,

> at this stage, *MAT* needs to download the video overnight – and I really like it as a tool that students can use for videos that have already been downloaded by either for them or by the teacher because I think it's important that they don't get bogged down in the back end of *MAT* …

> If I had of expected my students to download their own videos … [as well as] put in their own markers I wouldn't have had the high participation … that I achieved. ('VET' teacher-2)

Support mechanisms

Technological and video production costs were factors widely raised by teachers. Another concern was the withdrawal of project supports affecting the ongoing use of *MAT*. For instance, one of the Property Services cohorts (Cert. IV, Owners' Corporation) required significant support. This cohort required filming of four student groups' simultaneously conducting role-plays of meetings, in evening classes, using 'Flip' cameras purchased with project funds. The cameras remain available after project funds are exhausted, but funding for additional staffing support is not ongoing. A snap shot of teacher comments, quoted or paraphrased, across the disciplines and related to project support include:

- "it gave me confidence that if something went wrong that I knew he [the teaching assistant] was there … Because I've never used it [*MAT*] before" ('VET' teacher-2)
- the technical support offered in the project freed the teacher to think of the pedagogy ('VET' teacher-1)
- any issues, contacted either project leader or teaching assistant employed by project ('Health' teacher-3)
- teachers within disciplines supported each other ('JD', 'Education', and 'Health')
- "clear written instructions would be helpful, [and/or] maybe one on one if someone could sit down with a teacher and show them how to use it" ('JD' teacher-2)
- support to use *MAT* was not available pre-project, then available in abundance during the project when we didn't have time to take advantage of it all ('Education' teacher-1)
- "the whole introduction to *MAT* and the practicalities of it really came from the student teachers or the teacher assistants … It was good for peer support but then I would say a lot of students were perhaps slightly lazy and took advantage of that and didn't learn how to do it themselves and relied on the two [teaching assistants]" ('Education' teacher-2).

Clearly, ongoing technical support for *MAT* is important to participants but this level of support is unlikely to continue due to the finalisation of grant monies.

Future use

One of the positives of the project was the rich reflection of project team members in relation to the future use of *MAT*. Staff reflection identified future applications such as the following:

> I see that this [*MAT*] could be used in a number of ways for effective learning … [and] could be maintained … as an electronic library but I think it's more flexible than that. The students could use this to apply that skill in a particular setting … [plus as a review tool for] revision for the exams, [and] students could use it as a refresher before next year starts so they can revise this content because next year's content extends on this. ('Health' teacher-3)

> it's got so much applicability in different contexts, presentations even; even in this [other] program … our students do so many presentations, because that's what they have to do when they go out there in the field. … [My other program] is Criminal Justice Administration, anything with the criminal justice sector but they do a lot of government projects and presentations and we go out, so being able to see what you can do and how, how to sell something, I'd love to use it here. ('JD' teacher-3)

Such creative applications of *MAT* were, however, qualified by the earlier resources concern. For example, one participant reflected:

> Possibly the problem is cost and resources, how will we pay for that in the future... [video and expert time costs] … there are some resources but … I'm worried about the future and … I'm wondering if we should sit with what we've done; do it again and then move next year – just because I think we need to solidify, consolidate. ('JD' teacher-1)

Professional development

Many of the issues emerging from the teacher interviews can inform professional development options for *MAT* integrations in the future. Some of these issues (paraphrased or quoted) include:

Establish purpose:
- evaluate if suitable, as even though it suited my course, *MAT* may not suit all content in all courses ('Health' teacher-3)
- "you have to think about exactly why you want to use it and how it's going to be purposeful for your course and that's really constantly articulated across to the students." ('Education' teacher-2)

Learning design and student considerations:
- use *MAT* as one tool in amongst other learning strategies, as one part of a total delivery. ('VET' teacher-1)
- "Make it a reasonable percentage of your assessment" ('Health' teacher-1)
- plan your usage of *MAT*; develop good, clear instructions for the students ('Health' teacher-1)
- go beyond a technical focus in training, for example, structure the pedagogical framework of how the students will interact with the video ('JD' teacher 1)
- "if it is student's work that is being presented, they have to really respect each other and respect each other's work as well, because being critical of each other can be painful and hurtful." ('VET' teacher-2)

Planning process:
- "play with it first, I think have a trial run, and you really need to practice and … think about every single stage … really think about, 'Okay, what's going to happen next; planning', absolutely planning the life out of it so that you've got a contingency plan and ... just making sure the students are constantly kept in the loop about the benefits for them and why they're doing it." ('JD' teacher 3)

Recommended teacher PD approach:
- use modelling and/or champions: "it would be useful for teachers to look at what we've done and what has been done in similar projects, to hear some of the really good things and things that went wrong and the different ways that has been used to get ideas." ('JD' teacher-2)
- "work with someone else and also to have confidence in the person or people that need to give you the technical support … it's not only technical support, because technical support without understanding of the tasks you're doing isn't worth a great deal. So you actually need people to engage with you and what you are doing so they understand how you are trying to make the technology work" ('Education' teacher-1)

Sustainability of project's focus and outcomes

MAT has progressed through design and development (Stage I: video), pilot integration and evaluation, to multiple-case integration and evaluation across various disciplines in the most recent project. Embedding into university systems and promoting to teachers has been identified as the next step (Gunn, 2010) and options from this project for sustainability or scaling up supports—further supported by literature—include promotion, professional development in innovative teaching and technical training, as well as general ongoing support.

Promotion

Champions are a key factor in promoting and sustaining technological innovations. There is a learning curve involved with the uptake of a new educational technology and creating a culture of use in the institute is important for its acceptance (Breslin, *et al*., 2007). As a result of the 2011 project, there are now ten newly proficient teachers using *MAT* who unanimously recommended this innovation (with some qualifiers) for other teachers to use. These teachers could become champions, however, it takes more than a champion to effect success in technology integration, including "a complex environment that supports change, with engagement from a number of key players, all working together and developing and sharing a common vision or set of goals for the use of technology" (Bates & Sangrà, 2011, p.84). Positive aspects of appointing champions to promote technology also need to be weighed up with risks, such as champions leaving the institute, or evidencing excessive dedication and time to get the technology to work, which might deter others (Bates & Sangrà, 2011). Time commitment was noted as a factor of concern for the project teachers.

Development of models of *MAT* use from the various cases across the project (in-progress) is another planned step to help promote effective use of the tool, by way of offering pedagogical examples. The intention is to explicitly exhibit ways *MAT* was used to support learning in co-dependant visual and textual forms, which can be accessed via the web or during presentations and promotional activities by the 'champion' teachers and other training staff. A University of Reading pilot project in learning design (Papaefthimiou, 2012) found that academics needed to critically think about their learning design decisions, reflect on them, and discuss with others. The report identified that success in their pilot required "[r]epresentations and visualisations of courses or modules … to facilitate wider sharing and collaboration … beyond the localised pockets of good practice

identified" (Papaefthimiou, 2012, p.28). A caution offered in the report was that stimulation and subsequent generation of innovative learning design ideas can result in more change than can realistically be implemented. In view of that, refinement stages are required within courses to decide what can realistically be achieved.

Professional development in innovative teaching and technical training

As indicated by the project teachers, teaching with *MAT* requires not just technical training, but a significant, integrated pedagogical component as well. Breslin, *et al*., (2007) noted the need for technical training and funding for embedding technological resources in learning, but emphasised the more complex requirement for pedagogical integration to be of learning value. Bates and Sangrà (2011) examined eleven cases of implementation of technology, and found the optimal position for success is where training is provided along with a focus on learning and teaching. They suggested that redesign of the curriculum is required to benefit current student cohorts, rather than simply adding technology to teaching (Bates and Sangrà, 2011).

To help facilitate *MAT* training (including self-training), technical guides have been developed as part of the project. The suite of guides was completed immediately post-project, informed by the student, teacher and support staff experiences with *MAT* across the nine cases of the project. They were peer reviewed in draft by non-project teachers, then reviewed in final version by project teachers. These include two manuals (teacher and student versions), two quick guides, and two video production technical support flyers. The manuals feature case use examples from the project (and from the preceding pilot) to contextualise *MAT* integration options. The guides have been recently uploaded to the web in a first step to meet the goal to provide "staff, students, and faculty access to information and services easily over the web" (Bates and Sangrà, 2011, p.72). To help facilitate a re-think on teaching involving *MAT*, models of *MAT* use are under development for eventual sharing across the academic community. One such model is already on offer from the 2009 pilot study (Colasante, 2011a; Colasante 2011b), with up to nine models to follow from the multiple-case study to demonstrate various possible approaches and to stimulate new application ideas.

Ongoing support

The data indicates that the success of the *MAT* project in 2011 was dependant on a number of issues, including resource and technical support. However, this level of support is unlikely to be provided by the university into the future as the grant provided a temporary injection of funding. A key positive outcome of the project was the gathering of interested and committed staff to apply *MAT* in new contexts. This group have developed an informal community of practice (Lave and Wenger 1991), and have shared ideas and identified new applications of this unique tool. Further, Owen and Davis (2010) summarised the nature of organically emerging communities of practice as self-sustaining but noted that some sort of formal leadership can add benefits, such as formalising support as needs arise. Indeed, Kran (2010) recommended communities of practice as "the best place to sustain project outputs". The *MAT* communities of practice that formed project-wide and intra-project were valuable for support while the project was active, but have been ad hoc since, although as Kran pointed out, "[s]ustainability does not mean forever; it can mean long enough."

Ongoing maintenance and cost issues are an important concern emerging from the data. According to Bates and Sangrà (2011), teaching technology should be adequately funded as a core rather than desirable activity, and that funding should include identification and budgeting "for the real cost of training faculty and instructors to use technology effectively." (p.93). They pointed out that:

> [w]here these projects operated in isolation of a more general strategy for technology integration, or were the initiative of a single senior administrator, they were more likely to fail or at least to restrict the extent of technology integration within the institution … Thus, while specific projects can be valuable, at the same time it is important to establish ongoing and permanent structures to support technology integration. (Bates and Sangrà, 2011, p.110-111)

Conclusion

The data analysed in this paper shows that *MAT* can be sustainable in the future if a number of strategies are adopted, aligned to the third Gunn (2010) condition of sustainability related to wider uptake and embedding into institutional systems. Firstly, the community of practice established through the LTIF project in 2011 needs to be nurtured and encouraged through continued meetings, with widening participation, sharing of ideas and collective writing. Participants in a continuing community of practice will benefit from reflections about what is successful and what needs fine-tuning in the use of *MAT*. Additionally, several of the project teachers have

continued to use *MAT* in their courses in 2012; some have also integrated it into additional courses, and others are planning integration into alternative courses with a better understanding of how *MAT* supports various learning approaches. Importantly, some also intend to continue to evaluate *MAT*'s effectiveness, which will feed back into further understanding.

A notable concern from the data was the sustainability of *MAT* given the cessation of funding with the completion of the 2011 grant, and how the university systems might fill the void. Some of the teachers in the project required technical support in order to successfully implement *MAT*. Other teachers and students were able to quickly adopt *MAT* due to established technical ability and intuitive responses to the tool. As noted, a suite of guides has been produced, informed by the experiences of the multiple-case study and with case examples embedded in order to assist with the use of *MAT* into the future. While these should aid in the issue of reduced support to project teachers post-project, plus help those who are new to *MAT*, they will need updating as the tool matures. The various models of *MAT* use will be progressively available. In another issue of sustainability, this model formalisation process is currently reliant on post-project, spare-time commitment from project team members, with all funding and work-plan support since exhausted. Additionally, practical support for video production, in the form of technical support and/or equipment, needs to be considered on a larger scale as more teachers integrate *MAT* into their curriculum.

The full case models (in development) and the guides (completed) will be available to support further use of *MAT* in the university, and as new products, these will be open to further (post-project) evaluation. Also university IT department staff can be trained in the use of *MAT* to provide a level of ongoing support to those staff and students who require detailed support. These two approaches will assist with the sustainable future of *MAT* and ensure the ongoing experimentation and development of this innovative learning tool. The overall benefits of *MAT* in providing a tool for engagement and reflection in a variety of disciplines can be sustained with the continued good efforts of staff with various skill sets across the university and the acceptance and uptake by teachers and students.

From this research, a number of papers are in progress on specific discipline and/or sector applications, including detailing the student experiences. Future research directions beyond this will depend upon *MAT*'s sustainable growth within and beyond the university.

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