Scholarly Approaches to Learning Technology Integration in a Research-Intensive University Context: Impact of a New Faculty Initiative

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Abstract:

Increasing use of educational technologies on university campuses globally demands that these initiatives, at both institutional and faculty levels, be rigorously evaluated for impact and on-going improvements. Very few studies have documented new faculty member initiatives that focus on scholarly approaches to learning technology integration in research-intensive contexts. This paper examines multidisciplinary applications of learning technologies by new faculty members following the 'Technology in Pedagogy' faculty development initiative to enhance scholarly approaches to learning technologies integration at the National University of Singapore (NUS). Data suggest that new faculty members in multidisciplinary settings at NUS, when engaged in a community of practice demonstrated examples of flipped learning, games and simulations of real-life experiences, social media tools for knowledge and reflection, and, collaborative and peer-learning tools for student engagement. Key challenges and useful new faculty initiatives for technology integration are discussed.

Key Words:

New faculty member technology initiatives; technology integration; scholarship of teaching and learning; communities of practice.

Introduction

A growing body of evidence suggests that the use of learning technologies can have a positive impact on the quality of teaching and student learning experiences (Johnson, Becker, Estrada & Freeman, 2014; Laurillard, 2013; Keengwe & Onchwari, 2011). The use of learning technologies are also described as technology-enhanced learning, blended/hybrid learning, e-learning, computer-based learning, and online learning. Furthermore, applications and tools of learning technologies include multimedia/animations, virtual learning environments, hypertext and hypermedia, blogs, wikis, video and audio podcasting, social media, games and simulations, mobile learning, digital portfolios, virtual worlds, open courseware and open educational resources (Mayer, 2010; Graesser, Chipman, & King, 2008). Learning technologies are opening the door to profound change on university campuses – they are not merely supporting learning but are helping to transform how we learn and how we come to interpret learning (Säljö, 2010; Harasim, 2011).

As universities around the world embrace the use of learning technologies, faculty members are faced with significant pedagogical challenges and rapidly changing technological advancements. Thus, it puts compelling pressure on educators to confront these challenges of teaching and learning in higher education to engage their students in flexible and effective technology-enhanced learning experiences. New faculty members at research-intensive university campuses, for example, are often well-trained for the rigours of discipline-specific research and scholarship, but are not (or far less) prepared for scholarly approaches to teaching and student learning (including learning technologies integration in university courses). In this context, scholarly approaches to teaching and learning are key to being able to assess the efficacy of educational initiatives and to initiate on-going improvements to teaching and student learning experiences in diverse disciplinary contexts.

New faculty members are the future of research-intensive institutions but they are seldom aware of effective strategies to launch their research and teaching careers (Brent & Felder, 2012). It is therefore imperative to know how best to support their academic and professional development. Essentially, an institutional commitment to scholarship and effective faculty development initiatives that focuses on scholarly and evidence-based approaches to teaching and learning for new faculty members is key for sustaining successful careers and realising the strategic goals of these institutions. Very few studies have documented effective new faculty member initiatives that focus on scholarly approaches to learning technology integration in research-intensive contexts. This paper examines multidisciplinary applications of learning technologies by new faculty members following the ‘Technology in Pedagogy’ faculty development initiative to enhance scholarly approaches to learning technologies integration at the National University of Singapore (NUS).

Context

NUS is widely regarded as a leading research institution of higher learning in Asia. The mid-1990s saw the University launch its global campus initiative, thereby connecting the wired community to some of the best teaching and research resources in the world. Along with the development of the NUS’s home-grown learning management

system, and the formation of two dedicated centres – Centre for Instructional Technology (CIT) and Centre for Development of Teaching & Learning (CDTL) – to support education practice laid a strong foundation for a technology-enhanced education culture. NUS is thus well-positioned at the fore-front of educational technology—in terms of infrastructure and expertise to provide a supportive environment for technology-integrated learning.

As emphasised in its mission and strategy statements, NUS recognises the importance of offering high quality and high engagement student learning experiences and providing diverse opportunities for intellectual, personal and professional growth of students; along with the need for responsive, evidence-based, impactful teaching and learning practices. In response to these professional, institutional and scholarly challenges, for example, a group of NUS educational leaders and teaching fellows participated in a 4-month on-line/blended International SoTL Leadership Program from the University of British Columbia (UBC), Canada in order to strategically develop, implement, evaluate and disseminate educational scholarship within and beyond NUS's multidisciplinary context. Such initiatives are viewed as essential for on-going improvements to NUS's educational initiatives, as well as for building internal and external network capacity for engaging in SoTL in research-intensive contexts. In this regard, CDTL at NUS emphasises the importance of SoTL in its strategic planning and program offerings. To this effect, the centre has organised symposiums and dialogue sessions on the theme of SoTL, and has invited global SoTL leaders to talk about new fields of educational scholarship in academic and professional fields of study. In summary, NUS is committed to research-informed and evidence-based approaches to effective, efficient and strategically-aligned curricula and pedagogical practices.

Emerging Trends in the Field

Learning technologies and university transformations

The emergence of cutting edge technologies both inside and beyond the classroom is opening up new opportunities and is beginning to have a stronger influence on conceptualisation of teaching, learning and assessment. Though learning technologies offer the possibilities of self-directed and independent learning, the power of transforming teaching and learning—to create opportunities for inquiry, interaction, discussion, collaboration, knowledge building and acquisition—largely lies in the hands of faculty and students.

Technology integration in university courses and classrooms has immense potential to transform educational experiences and support faculty's pedagogical developments and interrogation of beliefs about teaching (Price & Kirkwood, 2008; Kirkwood & Price, 2013). One of the major concerns with technology integration is that faculty members, especially those new to the academy, are often insufficiently informed nor trained in pedagogical principles that will guide their use of technology for teaching and learning. Meaningful technology integration centers on best practices to incorporate technology into the curriculum as teaching tools to actively support the tasks of teaching and learning (Keengwe & Onchwari, 2011). To create a culture of innovation and change in teaching and learning (Bates & Sangra, 2011), equal attention to pedagogy, technology

and organisation is required; a purely technology-focused approach is unlikely to yield results.

New instructional technologies also change the ways in which faculty will be able to conduct and disseminate SoTL projects, and reciprocally SoTL contributes to developing effective technology integration in both online and face-to-face classrooms in order to transform the practice of teaching and learning (Kreber & Kanuka, 2007). It is, therefore, becoming increasingly important to understand and monitor evidence-based best practices, and in particular effective new faculty initiatives for technology integration in a research-intensive university context.

Responsive faculty development initiatives for new faculty members

New faculty members, defined as those within the first three years of a tenure-track appointment, are crucial to a dynamic and growing educational enterprise both to its present and the future of the academy. As new faculty explore the use of learning technologies within their university course offerings, many are uncertain about the appropriateness of the selection of technologies and whether those technologies are compatible with their designed lesson plan and desired learning outcomes. Faculty members often add the latest technology on to their courses without substituting existing tasks, activities and resources. Furthermore, in these blended and online pedagogical contexts, new faculty members are often unaware about learning-centred course design and teaching methodologies which promote high levels of student engagement and collaborative learning environments (Hughes, 2005; Koehler & Mishra, 2005).

Kirkwood & Price (2013) suggest that technology-enhanced learning projects lack a scholarly approach to technology integration and that new faculty should begin with an understanding of the type of student engagement they wish to stimulate and then explore the emerging technologies that would support their needs. In short, all academic staff, and in particular new faculty members need to have a clear idea of the form of pedagogy that they wish to adopt based on their teaching philosophy and then look for ways to implement it. Therefore, aligning learning technology with the desired pedagogy rather than allowing technology to drive the teaching methods is key for successful implementation.

Research suggests that new faculty value learning experiences and practices gained through participation in such programs to validate their own personal and professional experiences and to meet colleagues to learn about their own institutions (Austin, 1992; Austin, Sorcinelli, & McDaniels, 2007). For any faculty development program to be effective, faculty need to be intrinsically motivated to engage with real-life problem solving experiences that they might encounter in their own teaching. Constantly changing technological innovations and related challenges (Austin & Sorcinelli, 2013) and possibly any negative student feedback can deter new faculty members from trying new ideas or engaging in faculty development programs (Dixon & Scott, 2008; Galbraith, 2004).

The future of new faculty development initiatives needs to be tied to an expanded knowledge base—how best to prepare aspiring and new faculty members, how faculty can learn new roles and adapt to new challenges and how best to embrace broader

opportunities for building scholarly expertise and reflection on practice (Austin & Sorcinelli, 2013). The rapid rate at which new technology is being introduced makes it difficult for new faculty members to keep up on their own. Building relationships with peers around a new instructional tool is an effective way to build a support network. Participation in a professional learning community, characterised by a focus on peer collaboration, stimulating discussions, reflective dialogue, and discourse about educational practice is crucial for new faculty members in their attempts to implement educational innovations (Darling-Hammond, 1997; Wenger, 1998; Schlager & Fusco, 2004).

Conceptual framework for faculty development programming: New faculty members' initiatives

Informed by emerging trends in the field as indicated previously, Fink's (2013) model provides a useful heuristic framework to design a responsive faculty development program for new faculty members in a research-intensive university context. Central to Fink's model is the potential scope and fundamental purpose of faculty development programs (see figure 1).

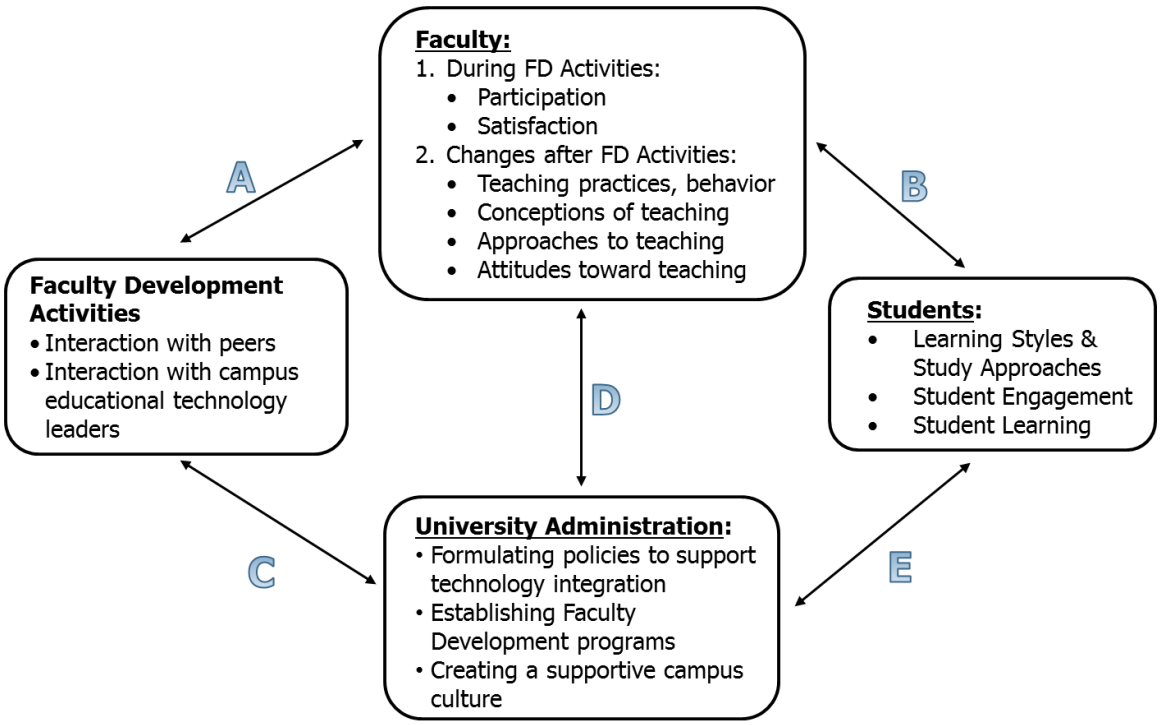

Figure 1. Fink's model for the design of a faculty development program

This framework was particularly useful to design and implement the NUS new faculty initiative that focused on scholarly approaches to learning technology integration. For example, emphasis was placed on the importance of the interaction between new faculty and the faculty development activities (arrow A) and the encouragement from university administration through changes in policies and culture (arrow C).

When studying the impact of any faculty development initiative, Fink's framework emphasises that we should not stop at looking at how well the faculty members attend faculty development activities – the participation and satisfaction. But it is important to venture further into better understanding the changes—teaching practices, conceptions of teaching, approaches to teaching, and attitudes—that were effected due to participation in faculty development activities. Furthermore, even as we look at changes in practices of faculty members, it implores to study the impact the initiative has on student learning (arrow B); and the influence that administrators can have on faculty members and students (arrows D and E).

Anchored in inquiry and engagement, SoTL reconceptualises faculty development as a scholarly process with an emphasis on improving teaching and student learning (Hutchings, Huber & Ciccone, 2011). Fundamental to a scholarly approach to technology integration is that it should be informed by inquiry and evidence, and should relate more to the nature of teaching and learning, not just to specific technology applications. In order to meet diverse needs and circumstances, a responsive faculty development program, the 'Technology in Pedagogy' series (TiPS), anchored in inquiry and engagement, and centered on the theme of learning technology integration, was implemented to engage new NUS faculty members as a community of practice; to explore the relationship between educational technologies and learning-centred teaching methods; and to enhance transformation, reflective practice, and dissemination within and across disciplinary contexts. New faculty members were given opportunities to discuss their problems with technology integration openly and honestly with fellow colleagues and campus leaders in order to help them discover the potential for shared concerns and solutions. Further, key topics of discussion were closely related to University-specific policies and initiatives for technology integration.

About the NUS faculty development initiative

TiPS, a faculty development initiative, was launched in 2011 by CDTL. The TiPS workshops are primarily dialogue sessions where identified technology champions have 30 minutes at the beginning to present their activity. Participants are then free to ask questions and share their own experiences. A total of 20 sessions has been featured since its launch. The presentation and lively discussion allows participants to engage, expand their knowledge on usage of the technology presented, and explore new opportunities in adopting new technology.

The TiPS program has featured about 6 one-hour sessions per year with 10-25 participants in each session. We were well aware that that the emphasis should be pedagogy and not technology skill acquisition (Lloyd & McRobbie, 2005). Therefore, the program was designed in such a way that 25% of each session focused on pedagogy while another 25% introduced the usage of learning technology tool(s) followed by problem solving and discussion for the remaining 50% of the time.

The main objective of the TiPS program is to prepare teachers for the changing technological contexts and model pedagogies and tools for better forms of learning. Hence the activities planned were situated in nature, focused on context and content, and linked new knowledge to practice. It used the communities of practice approach to help educators integrate technology tools into their own classrooms so as to enhance

their students' learning experience. Care was therefore taken to provide a conducive environment enabling faculty to discuss, reflect upon their teaching, share ideas, practices and resources, and feel empowered to try different teaching, learning and assessment strategies. This allowed participants to find ways to try things together or share notes on things they've done independently— and become a great way to bounce ideas off of someone and learn from each other's successes and challenges. To foster the community beyond the registered participants, the TiPS sessions were documented on multiple platforms—blog posts, PDF documents (particularly to benefit those who are not using technology in their classes) and on Facebook pages. Such documentation enabled NUS academics to use the ideas presented in their own teaching/classrooms and also allowed colleagues to debate, discuss, and provide alternate methods or ideas. Inspired by the participation in the International SoTL Leadership Program, TiPS program was further operationalised and enhanced from a research-informed, evidence-based, and scholarship perspective.

For the purpose of this study, multidisciplinary applications of learning technologies by new faculty members were examined following the TiPS initiative to enhance scholarly approaches to learning technologies integration at NUS. The research was guided by the following questions:

RQ1. What are the starting points (unique needs and circumstances) regarding learning technology integration for new faculty members participating in a faculty development initiative in a research-intensive university context?

RQ2. In what ways do new faculty members at NUS integrate learning technologies in their own disciplinary teaching practice following the TiPS initiative?

RQ3. What is the scholarly impact of the faculty development initiative which focuses on scholarly approaches to learning technologies integration for new faculty members at NUS's research-intensive university context?

Methodology

A total of 45 new faculty members participated in the TiPS faculty development program at the National University of Singapore. The sample of this study is limited only to responses from faculty (n=25) in the TiPS program, who are participants of the voluntary faculty development program. Enrolled faculty members had less than three years of teaching experience and came from varied disciplines—Arts and Social Sciences, Business, Computing, Design and Environment, Engineering, Science, and Medicine. Eight participants from this group of faculty have applied for teaching enhancement grants or other faculty-level or university-level grants. Table 1 summarises the multidisciplinary applications of learning technology integration featured in the TiPS program. Faculty members attended one or more of the sessions listed below.

Table 1: Summary of multidisciplinary applications of learning technology integration at the TiPS program

Applications of learning technology	Field/Discipline
Facebook for teaching and learning	Political Science
The lunchtime guide to student blogging	Information Systems
Google Docs and the lonely craft of writing	Law
Wikis for Participatory Learning	Sociology
Enhancing Your Academic Reputation with Social Media	Medicine/ Biomedical Engineering
Using PLEs to encourage peer learning and learner autonomy	Language Communication
If you can't Say it, Voice it: Using Text-to-speech in Presentations	Computer Science
Teaching Computational Thinking using Cloud Computing	Biochemistry
Apps for Educators	Physics
Using Multimodal Communications for Critical Thinking Assignments	Language Communication
Using SMS to Increase Interaction with Students during Lectures	Statistics and Probability
Teaching Large Classes: Technology to the rescue	Electrical Engineering
Gamification: How to do it Right and Why it is No Good	Computer Science
The Slow Road to Flipping	Public Policy / Chemical Engineering
Collaborative Learning using Google Docs & Maps	Geography / Language Studies
Social media in education	Social Sciences
Online assessments	Medicine
Leveraging peer feedback	Computer science
How shall we know them? Learning through assessment	Chemistry
Using Technology to Scaffold Student Learning	Chemistry

Table 2 summarises the alignment between the research questions and data collection methods employed in this study. Data sources were analysed using the constant comparative method and member checking to establish major themes, patterns, contradictions, interconnectedness, use of language in context. The use of iterative and multiple data sources establish trustworthiness of the research findings through triangulation (Cousin, 2009).

Table 2: Alignment of research questions and data collection methods

Research Question (RQ)	Data Collection (n=25)
RQ1 Unique needs and circumstances for learning technology integration for new faculty members	• Feedback survey • Email and telephone Interviews • Instructor field notes
RQ2 Multidisciplinary applications of learning technology by new faculty members	• Interviews • Learning management system (LMS) data mining of module information, course syllabi and usage of e-tools
RQ3 Transitions from scholarly approaches to the scholarship of learning technology integration	• Documentation analysis: Teaching grant proposals and article submissions

Results

RQ1. Unique needs and circumstances regarding learning technology integration for new faculty members

As indicated in the methodology section, new faculty members in this study were representative of diverse disciplinary backgrounds, professional needs and circumstances for technology integration. Our data indicate that new faculty were involved in instructional activities that are mostly at administrative or basic level of technology use—providing basic functions like disseminating course materials and assignments, posting lesson plans and syllabus, online readings and resources, facilitating communication with students. Data from email and telephone interviews suggested that new faculty members typically lack appropriate technology skills and pedagogy in using technology and had initial hesitation about taking time to participate in faculty development opportunities. However, they were also well aware that such programs provide opportunities for them to develop their professional, technical and pedagogical practices.

Several participants mentioned ‘a love for learning new pedagogies and technologies’ and a desire to ‘share their passion for their disciplines with others.’ The

majority expressed an interest for 'intellectual challenges' to look 'differently at their academic work, students, and learning' coupled with an eagerness to 'participate in opportunities to continue their own intellectual development through interaction and stimulating conversations with colleagues.' Initial survey data suggested that new faculty anticipated an intellectually stimulating and supportive environment with frequent informal interactions with peers and university leaders about scholarly issues, teaching, and other professional matters. However, they are seldom proactive in initiating such informal dialogues themselves. The TiPS participants, therefore, appreciated the discussion of specific methodologies using real-life examples and practices based on facilitators' and peers' experiences. For example, to further enhance the process of systematic rethinking and questioning, participants were required to work in groups thinking and talking about how they used technology to scaffold their teaching, and how they employed scaffolding in their teaching through the use of technology to support best practice in their own classrooms. Each group then provided a summary of their discussions to the entire group. The disciplinary diversity of the participants helped to broaden perspectives through peer sharing experiences and critical discussion opportunities.

Survey data highlighted the program's usefulness in allowing new faculty to re-examine their pedagogical approaches to using technology. Thus, the desire (or need) to incorporate new technologies into one's courses has prompted many new faculty to rethink their goals and ask questions about student learning that they hadn't conceived before. Furthermore, several new faculty members found it particularly useful to explore new scholarly connections between their discipline-specific research activity with approaches to teaching and learning within their course offerings at NUS.

RQ2. Multidisciplinary applications of technology integration by new faculty members

Data revealed that the TiPS program enabled new faculty members to better understand and recognise the pedagogical affordances and constraints of a range of technological tools, when applied to specific learning activities within disciplinary and classroom contexts. Multidisciplinary applications of learning technology by new faculty were evident from major themes that emerged from the data. The categorisation of the five key themes are listed below:

'Flipped' learning: Data revealed the use of flipped classroom approaches in engineering, science and arts courses to transform student learning experience from a content-based teaching methodology to a context-specific and problem-based learning methodology. New faculty, for example, commented how they carefully integrated online content (e.g., video lectures, visualisations, audio podcasts, readings, web resources and/or links) and face-to-face class time (interactions, discussions and experiments). Under these circumstances, LMS data and interview follow-ups suggested that staff perceived that it helped wean students away from passive approach to learning and move towards a more critical and proactive approach. In particular, students were able to 'pause and rewind' audio and video lectures, and also 'revisit and review' the uploaded content as many times as needed. This, they believed was particularly useful for students who wanted to learn at their own pace in their own time, to set their own

learning objectives, and to manage both the content and the learning process. Finally, new faculty noted that these approaches tended to encourage their students to discover knowledge on their own while receiving appropriate guidance (scaffolding) and timely feedback (just-in-time feedback), when needed.

Social media tools for knowledge and reflection: New faculty tended to comment that social media tools increased accessibility and easily captured their students' interest. In particular, informality involved in social media tools such as blogs (in language and pharmacy courses), Facebook (in a biology course), and Google Docs (in language and biology courses) had enabled their students to effectively communicate and break down academic and social boundaries. Others highlighted how they used Facebook to post pertinent information (for knowledge building) along with digital field trip images to enhance their students' sense of belonging within their newly formed groups. Data suggested that social media tools accelerated the feedback process and allowed both faculty and students to make connections between theoretical classroom concepts and real-world problems. Several new faculty commented that social media provided an effective forum to discuss and reflect on the social construction of knowledge, as well as enable their students to respond to thought provoking questions and digital insights related to complex course issues.

Collaborative learning tools for student engagement: Data suggested that the use of collaborative technologies (e.g., Google Docs, questionSMS, Google Calendar, Google forms) increased students' engagement with course content and enhanced learning outcomes in a variety of ways including: collaborative writing, monitoring students' work, peer review, provide immediate feedback on students' writing, and consolidating ideas from different groups in the class. For example, several new faculty members commented that they used Google Docs, to better understand students' thinking processes; and to provide a collaborative platform for students to prepare information and materials. One new faculty member commented that the use of Google Docs was particularly useful for requiring groups of students to prepare specific learning assignments before a biology course field trip. It also enhanced her own ability to write in different and sophisticated ways. Less frequent reported applications of collaborative learning tools included (1) Google calendar for scheduling class presentations in a physics course, (2) Google form for the grading of viva voce sessions in a physics course, and, (3) SMS to increase interaction with students during lectures in an engineering course.

Peer learning: Data suggested that many new faculty members created specific learning activities that required their students in engineering, science and arts courses to participate in peer feedback, peer sharing of resources and peer tutoring. For example, an online form was used for collecting peer feedback for group work, using a grading system to grade peer work along with qualitative comments that gave reasons for the assigned grade. New faculty members commented that students' peer review activities were particularly useful to enhance effective teamwork.

Games and simulations for real-life experiences: Interview data from new faculty members indicated that the development and application of mobile apps and games were particularly useful and responsive for engaging their students with real-world problem solving challenges. For example, new faculty members reported using

simulation of virtual patient records (in medicine and pharmacy courses); virtual video field trips (in geography and biology courses); role-play videos (in medicine and pharmacy courses); videos to illustrate working in laboratory environments (science courses); visual multimedia (in chemistry courses) and games (in engineering and pharmacy courses). These strategies were employed to illustrate the important aspects of communication, ethics, counselling, safety and dispensing to students. One new faculty member reported using apps as a specific analytical tool for engineering design in order to help students with course project assignments.

Other applications: Other applications of learning technology included the use of online assessments (in physics and chemistry courses) and bring-your-own-device (BYOD) assessments (in pharmacy and engineering courses) to complement in-class pen-and-paper quizzes. Two new faculty members, for example, commented about their successes with the use of BYOD assessments for continual assessments (CA), where students were able to use their own laptops in order to take the CAs. Several new faculty members also reported using Google Docs for live assignments or tutorial discussions between instructor and student, rather than the more common use of sharing work documents.

RQ3. Transitions from scholarly approaches to the scholarship of learning technology integration

Interview data and documentation analysis suggested that the TiPS sessions helped new faculty members to counter simplistic views of teaching, learning and technology in a research-intensive university context. In particular, bringing new faculty members together as a community of practice in order to discuss and receive feedback about diverse applications of learning technology, encouraged an ethic of inquiry in their own classrooms.

As documented in RQ2, it is apparent that new faculty members were encouraged to adopt new techniques and employ greater variety of innovative teaching methods. Concurring with Fink's framework, interactions between new faculty members, faculty development initiatives coupled with encouragement from university administration played a key role in these transitions. For example, at NUS, recent policies have promoted technology enhanced learning, as well as providing grant support opportunities such as the Learning Innovation Fund – Technology (LIFT) and Teaching Enhancement Grant (TEG). Eight new faculty members in this study applied for TEG which indicates a significant transition from scholarly approaches, to the scholarship of learning technology integration. Documentation analysis revealed how new faculty members examined their teaching activities with rigorous critical, creative and reflective analysis, similar to those employed in their discipline-based research activities. Each of the eight title proposals listed below, for example, indicates the nature of their systematic pedagogic research in multi-disciplinary settings.

- A systematic study on the adaptability and acceptability of the flipped classroom concept in an introductory and multidisciplinary student setting.
- Critical analysis of the use of social media and electronic resources for solving practical real-world problems.

- Development of a game concept to allow students to work independently as well as collaboratively in teams and be able to complete assigned tasks based on the learning objectives.
- Modeling critical media and visual literacy in the writing classroom through the use of photojournalism (multimodal representations)
- Design of new displays of fundamental building blocks as learning objects for an Engineering design class.
- Development of an interactive learning tool to monitor students learning activity and to solicit real-time feedback from the class using technology that did not burden the teacher in a large class setting nor affect the level of mental fatigue of students' understanding the subject, so as to better direct the subsequent delivery of lessons.
- Development of a self-directed e-learning research module for nursing students to foster learning and student engagement in their research study; and to enable them to achieve the optimal learning outcomes.
- Development of blended learning online course for a general education module.

It was evident from our study data that some new faculty members had the opportunity to present their ideas and findings at academic conferences and seminars, at local and international forums. The shift towards SoTL also became apparent when nine new faculty members indicated that they had written up the results of their studies for a pedagogic publication. Of the nine, five articles were published in *CDTLBrief*, a newsletter at NUS, with each issue focusing on a specific pedagogical topic with the aim of triggering reflection and discussion on the philosophy and practice of teaching. Another four articles by new faculty members are slated to be published in forthcoming issues of *CDTLBrief*. Indeed, it was the engagement in UBC's *International Faculty SoTL Leadership Program* that enabled the authors of this article to disseminate educational scholarship pertaining to research-informed and evidence-based learning technology initiative for new faculty members within and beyond NUS's research-intensive university context.

Concerns, Challenges and Improvements

Data offered some useful suggestions for improving the efficacy of new faculty development initiatives for technology integration at NUS. The majority of new faculty members reported that the main challenge they faced when experimenting with new learning technologies is the large class sizes at NUS. Class size tends to be large during University formation years, while the later years tend to have smaller cohorts, and therefore it can be significantly challenging to implement new technologies in the early years. Thus, the shared in-class writing experience using Google Docs or Map is probably better suited to small, tutorial-sized classes. However, writing skills, collaborative work and social media tools are all important for students in the early years, and therefore, creative pedagogy with learning technology is required. New faculty members commented that the physical classroom learning spaces also created challenges for students such that in many cases, where possible, furniture needed to be

re-arranged in order to effectively engage students in collaborative work (in either small or large lecture-theatre settings).

Technological knowledge is always in a state of flux—more so than content and pedagogical knowledge. Keeping up to date with technological developments can easily become overwhelming to novice (and experienced) instructors. Data suggest that new faculty not only needed more time for effective pedagogic design, but being first-timers in many cases, they would have also benefitted from experienced mentors, at departmental or disciplinary level, to guide them through their initial course offerings with their students. Several new faculty commented that discipline-specific mentoring support would significantly reduce the barriers faced when experimenting with learning technology and student engagement. Furthermore, if implemented carefully, mentors could support time-starved new faculty members by modeling a vision for learning technology integration, just-in-time learning, access to technical equipment and support, and appropriate professional development activities.

Several new faculty members also commented that adoption of emerging learning technologies would be made much easier at NUS if they were better integrated within the university's LMS. Similar challenges included new faculty member's unfamiliarity with the LMS platform, the inability to test it with their classes beforehand, and difficulties with motivating their students to use the LMS.

Conclusion

New faculty members are often comfortable in using technology for course administration and basic instructional activities (though some can be at an advanced level), and are not sufficiently exposed to the pedagogic design for conducting meaningful learning with technology in higher education. Data in this study suggest that new faculty at NUS have significant enthusiasm for new pedagogies and new technologies coupled with a strong desire to participate in stimulating discussions and a supportive professional development environment. The 'Technology in Pedagogy' faculty development initiative had a positive influence on new faculty members for technology integration in multidisciplinary settings at NUS. When engaged in a community of practice (e.g., critical reflection and discussion during sessions, subsequent engagement through online platforms like Facebook and blog, and "networked" opportunities for further follow-ups with colleagues and campus leaders), new faculty members in multidisciplinary settings at NUS demonstrated examples of flipped learning, games and simulations of real-life experiences, social media tools for knowledge and reflection and collaborative and peer-learning tools for student engagement. New faculty members also adapted to new roles and pedagogical challenges within their university classrooms. For example, new faculty members in this study embraced broader opportunities for developing scholarly expertise by connecting teaching and learning development processes with that of their disciplinary research pursuits in the NUS context. Furthermore, one third of the sample of new faculty members in this study (through submissions for teaching grants, journal publications and conference presentations) made the transition from scholarly approaches to the scholarship of technology integration.

Acknowledgement

The first author is grateful for the support provided by CDTL and NUS for her participation in the UBC's *International SoTL Leadership Program*.

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