

TEACHER LEARNING IN AN ONLINE SOCIAL NETWORKING WEBSITE¹

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This study was designed to explore teacher learning using an online intervention with in-service secondary teachers in Trinidad and Tobago. It has been argued that traditional teachers' professional development practices do not adequately meet the needs of today's practitioners and that new models of teacher learning need to be explored for in-service teachers. In addition, non-traditional learning spaces such as social networking sites are being currently debated for their use in education. In this paper, an online social networking site is considered as an alternative learning space, which is mediated through Web 2.0 tools and the Internet. Social constructivism provides a framework to understand teachers' participation on the site as they interact with colleagues and add content to the site. Data were collected directly from the site and analysed using a mixture of methods. Data consisted of digital text and mixed media such as pictures, videos, and hyperlinks. Findings indicated that teachers participated in activities across space and time, and preferred certain activities over others. They shared knowledge and opinions of their classrooms and schools, reflected on their practice, and connected with new people. Learning is concluded to have taken place through participation on the site. This study provides an avenue for further research on how teachers can experience a shift from traditional professional development.

Introduction

Teachers have been expressing dissatisfaction with the way professional development has been made available to them. Professional development is viewed as a means of assisting teachers in acquiring skills and expertise in content, pedagogy, and technology. In Trinidad and Tobago, many of these programmes are government-initiated and are meant to fill gaps in teacher expertise, but are often unpopular with teachers as they

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are felt to be “not of high quality” (Borko, 2004, p. 3), “episodic, myopic ... and disconnected from the realities of classrooms” (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009, p. 2). Teachers are faced with a number of demands from politicians, administrators, students, and the community at large. Changing curricula and high-stakes assessments, more diverse school populations, and the introduction of new technologies and tools have impacted teachers’ practice. Teachers often become frustrated with professional development because it is ineffectual or requires large investments of time they do not have (Dede, Ketelhut, Whitehouse, Breit, & McCloskey, 2009).

Teachers often face challenges within their schools while attempting to implement new methods and techniques that they may have acquired at workshops/seminars. Secondary schools in Trinidad and Tobago are not designed for collaboration as classrooms can be far apart and teachers’ staff rooms are inadequately resourced. The literature reveals a persistent problem of teachers’ classrooms being off-limits to their colleagues, which disadvantages them from learning from one another (Darling-Hammond, et al., 2009; Lieberman & Mace, 2010). This denies them the opportunity to work collaboratively either through observation or research, or team-teaching. Additionally, teachers may suffer from a lack of administrative support in implementing new techniques. This often leads to teacher isolation and a further reluctance to learn new pedagogies and approaches. This points to a need to explore alternatives to the ways teachers experience learning in practice and to minimize their isolation from each other.

Teacher Learning

The idea that teaching is a learning profession (Darling-Hammond et al., 2009) engages a substantial body of literature, and researchers distinguish between the concepts of professional development and professional learning. Recently, newer, more complex and broad-based ways of looking at teachers’ learning have emerged over observations of “discrete” activities like workshops and seminars (Desimone, 2009). Bruce, Esmonde, Ross, Dookie, and Beatty (2010) propose that in professional learning, “professionals learn from experience and that learning is ongoing through active engagement in practice” (p. 1599). Desimone asserts that the most difficult part of teacher professional development to measure is teacher learning; however, she argues for more appropriate ways of measuring teacher knowledge change, and proposes that recent research in the field has allowed a conceptual framework for teacher learning to emerge and should be used without

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bias. Research on teacher learning includes that of teacher education and professional development, and also what is learnt from informal interactions with colleagues and daily classroom practice (Feiman-Nemser, 2008; Vermunt & Endedijk, 2011). Moving from formal settings for professional development to teachers' informal interactions that take place in a workplace context, such as corridors and lunch rooms, as teachers engage in their daily practice, has motivated researchers to examine how learning can take place in informal settings (Borko, 2004; Opfer & Pedder, 2011).

Research into teacher learning is not as well developed as that of student learning (Vermunt & Endedijk, 2011), and a number of researchers suggest the need to study it within multiple contexts, such as in the workplace (Eraut, 2004), and through different lenses (Borko, 2004; Desimone, 2009; Lawless & Pelligrino, 2007; Opfer & Pedder, 2011; Vermunt & Endedijk, 2011). Borko suggests that teacher learning needs to be studied taking into account "both the individual teacher-learners and the social systems in which they are participants" (p. 4), while Vermunt and Endedijk conducted empirical research into models of patterns in teacher learning, and found that teacher-learning patterns are directly related to both personal (personality characteristics, personal experience in teaching and learning, and gender) and contextual factors. These authors suggest that the most direct factor in teacher learning is the learning environment. For in-service teachers, the learning environment includes the social environment (fellow teachers and students); the type of intervention used (such as peer coaching, informal learning, collaboration); and the wider school climate (in terms of openness to innovation) (Vermunt & Endedijk, 2011).

Opfer and Pedder (2011), in their review of literature on teacher learning, also identified the role of the learning activity (or process) as important as that of school factors and individual teacher characteristics. They used a complexity theory lens to study the interrelations among factors in teacher learning, and critiqued the linearity and discreteness of other approaches to studying teacher learning. In a longitudinal study of secondary school teacher learning at their workplace (schools), Bakkenes, Vermunt, and Wubbels (2010) adopt a definition of teacher learning as an active process in which teachers engage in activities that lead to a change in knowledge and beliefs (cognition) and/or teaching practices (behaviour) (p. 538).

Although research is still inconclusive about the impact of individual or collective factors in teacher learning, there is agreement that teacher professional learning represents an important, but "subtle," shift in how

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we perceive professional education and professional development of teachers (Feiman-Nemser, 2008).

Online Social Networking Sites

Social networks such as Facebook, Twitter, and YouTube have traditionally been associated with young people's desire to make their social relationships public and visible (Greenhow, Robelia, & Hughes, 2009), but have been transitioning into other areas of life such as education (Roblyer, McDaniel, Webb, Herman, & Witty, 2010). The combination of synchronous and asynchronous Web 2.0 tools, such as blogs, wikis, and chats, embedded on a social networking site (SNS) presents users with mechanisms to be connected to each other while supporting individual thoughts and actions and goals, even while being geographically dispersed. Learning in this context is less formal and structured (Dede, 2008), and as such can provide educators with the tools necessary to promote such an environment (Lockyer, Dawson, & Heathcote, 2010).

Teacher SNSs have been gaining ground in popularity in education, and *Global Educators for All*, *Teachers' Network*, and *Caribbean Educators Networks* provide live models of how SNSs can be used to engage teachers across large geographical spaces and educational contexts. These SNSs are somewhat different to popular SNSs like Facebook and Twitter as they allow a high degree of customization, and educational SNSs have been launched on platforms such as *Ning.com* and *Spruz.com*. This higher degree of customization is favoured in education while still maximizing the potential for connectivity and data sharing that SNSs are known for (Brady, Holcomb, & Smith, 2010). Teachers in Trinidad and Tobago who join these large-scale networks can interact with others from abroad and engage in a number of global issues, but they do not adequately allow for conversations about topical issues or provide for local teachers to connect more closely with each other. Further, there is a need for teachers here to engage with and through local contexts, as much of what is shared has to be adapted for local use and interpretation. This builds the case for an indigenous SNS, which caters to teachers of Trinidad and Tobago (and the wider Caribbean), to share and access culturally relevant resources and form local networks for teaching and learning support.

Theoretical Underpinnings

It has been argued that conventional theories of behaviourism, cognitivism, and constructivism were designed at a time when it was inconceivable for learners of diverse backgrounds, races, and geography to participate in the same learning space (Siemens, 2005). Theories of social and online learning are important to understanding how learning was constructed in an informal and non-traditional space. Social learning theory proposes that individuals learn by observing the actions of others and the consequences of those actions. Constructivist theorists claim that learners interpret the world according to their personal reality, and that learning takes place based upon prior knowledge and experiences (Ally, 2008). The constructivist approach is based on ideas developed by educational philosophers such as Dewey; renowned educational psychologists such as Vygotsky, Bruner, and Piaget; and educational technology visionaries such as Papert. As such, social constructivism provided a framework for teacher participation on this SNS.

Frameworks for Understanding SNS

In gaining an understanding of what learning on an SNS can be, participation seems to be of significance. Lave and Wenger (1991) describe learning as meaningful participation in learning activities, while Davies and Merchant (2009) do not describe online social spaces in terms of community, but draw upon Gee's (2004) ideas of affinity spaces and Bhaba's (1990) Third space to describe learning as easy and enabled through interactions among members. These accounts favour the importance of social interaction. Since participation is significant to learning and social interactions are important to learning, then socio-constructivism is a useful framework to explore how learning can take place on an SNS. Conole, Galley, and Culver (2011) argue that Web 2.0 tools allow for a shift from individualized learning through affordances of communication and collaboration, and suggest that learning is a social and participatory practice. Merchant (2009) also describes learning as social participation, where participants interact in an online space and build a participatory culture. Through designed activities, participants can construct new meanings from prior knowledge. A stated assumption here is that learning is considered across formal and informal learning spaces.

This literature suggests that SNSs can be useful in education and that learning is possible in non-traditional and informal ways. This paper reports on how secondary teachers participated in a designed SNS, and

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whether learning took place as a result of that participation. Specifically the study focused on answering these research questions:

1. *How did teachers participate in designed activities on the SNS?*
2. *What change in teacher learning, if any, took place as a result of participation in this SNS?*

Methodology

Design

A designed research study was used to answer the research questions about participation in online social networks with in-service secondary teachers. Design research is a form of action research that allows research using emerging media to be explored (Dede et al., 2009). This method was considered since there is a dearth of literature on appropriate and robust designs for research on learning in online spaces. While one can argue that teacher learning in face-to-face environments is well-researched, there is a need for caution in assuming variables and considerations are the same in online environments. A site was designed and hosted on *spruz.com*, since the cost was minimal and it allowed a range of Web 2.0 tools to be embedded. These were blogs, wikis, discussion forums, media (photo and video) sharing, file download and upload, online chats, user profiles, and building and customization of personal networks. Moreover, the site facilitated levels of privacy and customization needed to become an educational space for teachers.

Participants

Teacher participants in this study were volunteers who demonstrated interest and competence in technology tools. Thirty-six participants were purposively sampled from all seven geographic districts in Trinidad. No teachers from Tobago participated even though they were sent invitations. There was a fair spread across all curricular areas, with Technology Education/Information Technology specializations being more common than others. There was a balance between male and female participants. Ages ranged from mid-20s to early 50s.

Data Collection

A significant challenge to this research was that the data in this study were generated in the web and through the web. The field of Internet research is still a “shifting ground” (Baym & Markham, 2009) and research studies are not yet conclusive about choice of methods. Data

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were collected through the Internet and from the Internet, for a period of four months crossing the third term of the academic year. In this study, data were captured automatically on the website itself as digital talk and digitally created texts. The website is a repository of data reflecting conversations and connections among participants. Artifacts on the website include “naturally occurring talk” created by participation in activities such as blogs, wikis, and forums. Visual images uploaded by participants such as videos, photos, and hyperlinks are included. Some of these images are of the participants themselves or of their students, while others are not. Images of participants or their students can be useful to gain insights into participants’ practice. Moreover, a history of participation was automatically created through postings that provide data on the name of the poster, date posted, and the selected Web 2.0 tool. User-created profiles, login history, e-mails, participation in online courses, and opinions on polls were also generated on the site. As participants were free to engage in different activities on the website and to select Web tools of their choice, capturing data on the selection of these choices and the nature of the discourse among participants are important to this study, as these choices indicated how participants saw themselves and others on the website.

Data Analysis

In attempting to develop a model for analysing the data in this study, I decided to combine both qualitative and quantitative approaches according to the type of data analysis needed. While there is ongoing debate about the epistemological challenges in mixing methods in studying human behaviours and practices, analysing and interpreting data on social networking websites requires lenses that are non-traditional, as describing data from the website is problematic in itself, as data is in a state of flux and websites are not time or space bound. Webpages contain data that are captured live on the site as participants make multi-modal contributions to the site. In his description of social research methods, Bryman (2008) cites only two examples of analysis of websites: one using narrative analysis—a qualitative approach—and the other a quantitative approach. Bryman acknowledges that analysis of websites and webpages is a “new field that is very much in flux” (p. 629) and that new approaches are being developed at a rapid rate. Data in this study required a bricolage (Denzin & Lincoln, 2005) of approaches, which depended on the phenomenon that the researcher was interrogating in order to interpret and synthesize data (Kincheloe, 2001). A mixture of

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analytical techniques, including social network analysis and discourse analysis, was selected for use.

Limitations of the Study

This study was predicated on teachers' participation on the SNS and was limited to their technical familiarity with the tools therein. Also, for those teachers who were familiar with SNSs, there was an expectation that the site would more closely resemble popular social networks like Facebook. Further, the design of the SNS could have had limited participation in terms of its usability, and in fact may have caused anxiety among participants who may have been unfamiliar with SNSs and Web 2.0 tools. In addition, teachers were limited in accessing the site due to constraints of time, Internet access, and computer access. Attrition also took place over time and the number of participants varied across the period of the study. This would have directly affected participation and resulting discourses on the SNS. Finally, there are relatively few models of good practice to draw upon, and existing frameworks for examining learning on SNSs are inadequate for a nebulous cyberspace.

Findings

The findings are aligned to the two research questions posed earlier. For the first question, an analysis of participation in designed activities enabled by different Web 2.0 tools is presented. For the question on teacher learning, analysis of artifacts of learning, such as the content generated by participants, is presented through coded themes. These themes are aligned to changes in teacher knowledge, beliefs, and attitudes—the essential components of teacher learning (Bakkenes et al., 2010).

RQ1: Teachers' Participation in Site Activities

The site allowed a number of activities for teachers to select for participation, afforded through various Web 2.0 tools embedded on the site. The findings are presented by looking at how participation took place and what it looked like in both synchronous and asynchronous activities. A sample of discussions is presented under selected activities. Artifacts of learning that are held on the site are selected for presentation and analysis.

Participation took place on the site regardless of geography/location. Participants came from all educational districts in

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Trinidad, with slightly more teachers from urban schools. They used mobile and desktop technologies to access the site directly or indirectly through a search. From analysing participant data, teachers seemed to access the site more regularly from home than at school.

Participation took place across time. Teachers visited the site at all times, but night visits seemed more popular. Teachers also visited the site differently over the duration of the study, and also varied the number of times they visited and how long they spent on it. Teachers preferred to visit the site during non-school hours and there was no particular day of the week that was preferred, except that the number of visits to the site increased significantly during a public holiday during the term. Teachers had greater participation during the school term than during the vacation period.

Participation took place through the affordances of various asynchronous and synchronous Web 2.0 tools. The site allowed teachers to select activities for participation, afforded through various embedded Web 2.0 tools. Asynchronous activities included media sharing of lesson plan files, videos, photos; blogs; discussion forums; creating a user profile; adding colleagues; emails; signing on to an online course; and taking opinion polls. Synchronous activities are wikis, online chat, and Google docs; the last being facilitated offsite. Affordances varied significantly by activity. Blogs, media sharing, forums, and online chats brought a range of affordances to the participant. Blogs, discussion forums, and media-sharing activities are selected for further analysis.

Activity: Blog posting

A number of blog posts were created, including:

- *Experimenting with PPT*
- *My first Google docs document*
- *Information technology and me*
- *Configure your laptop*
- *My students and me – why oh why do they make these mistakes?*
- *How do you give feedback to your students?*
- *Using ppt as an interactive learning tool*
- *TTUTA's protest actions*
- *Collaborative classroom lessons*
- *CXC, CAPE Pure Math unit 2 p2 fiasco*

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- *Technology integration is not about technology*
- *Introductions*

In a selected example, LD [Pseudonyms are used to ensure anonymity] posted a blog entitled “*My first google docs document*” and introduced her thoughts. There were a number of views of this post. In the introductory paragraph, LD talked about a plan she has for her Form Ones, which indicates she is reflecting on her practice. In the second paragraph, she explored her plan and continued to reflect on her practice:

Last night I started working on a Music Project I have had in mind for my Form Ones. (I think I will try it with the Form Twos for the new school year as they should all be more familiar with their laptops.)

I plan to give each child a printed copy of the interview questionnaire, however the project must be submitted online. The idea is that even if they do not have internet access at home they would use the school library computer to submit project. (I know this will take a lot of work on my part making sure the projects are actually done, I am looking forward to the challenge.)

In the third paragraph, LD shared an opinion on Google Docs, then proceeded to share details of the plan with a hyperlink. Thus she was sharing a piece of knowledge that she had on the topic:

I was looking at all the different things you can do with Google Docs and was particularly interested in the fact that it enabled me to do a template for an interview idea I have had for a while. What I particularly like is that Google Docs can do a summary of all projects submitted.

The Proposed Project: To interview a grandparent, parent or guardian about the type of music they listened to when they were your age.

Please follow the link to view proposed Project Questionnaire

https://spreadsheets.google.com/spreadsheet/viewform?hl=en_US&formkey=dG0yck9rMzVUQlZiQ1ZPNU5Ed05CZHc6MQ#gid=0

She concluded the post by saying ‘*I welcome your comments,*’ which suggests that she was actively seeking the opinions of her colleagues. In the posted comment, YEMS started off using “*I think this is a great idea!...*”, indicating her willingness to give LD emotional support for her post. She continued the post by giving her opinion on LD’s plan.

Activity: Discussion forum post and response

The forum is different from a blog tool as it allowed a number of queries/comments to be posted to a moderator for that section under pre-created categories. The forum page has a Curriculum, Technology, and Pedagogy category, with a moderator for each section. Discussion forums were set up under different curricular areas: Mathematics, Spanish, VAPA, and so on. Participants created forum topics under different curricular areas, such as:

- *The New Interactive Math Classroom*
- *Link to Spanish websites*
- *Go Animate*
- *Steelpan website*
- *VAPA curriculum*
- *Internet Access for Form 1 students*

A new topic was started under Mathematics about an interactive Math classroom. The forum allowed the participants to ‘talk’ with others on the topic of concern or respond to contributions. The question posed was “*Do your classrooms look like this?* <hyperlink given to video>. One response from a teacher, RR, indicated that she had looked at the video and gave a response. This response was in the context of her classroom experience. She reflected on her own practice and shared her opinion based on what she had experienced in the video:

Not yet but as the first formers move up into third form with their laptops, I can foresee classrooms eventually looking like this one. Teachers & principals have to come on board and be more conducive to this kind of approach. In staff meetings, I would hear principals commending teachers that have their classrooms nice and quiet rather than like the one mentioned in the article.

Forums also allowed for answers to questions. In the forum topic of “Technology,” ST asked:

Anyone experiencing issues with their IT Technician? What exactly is their job description? An IT Technician who says his job is not to tote and carry equipment or set it up for teachers...is this true?

There were two replies to this, which gave some sort of clarity on the question being asked. AN replied:

The IT technician at our school seems willing to do whatever he is

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capable of to help. He and his assistant set up equipment before classes and return to remove the equipment-which is under their custody so it's only right that they take charge of it. We have many technical problems at our school but at least the technicians are easily approachable.

MSW added:

Well the IT technician at our school is always willing to assist and quite approachable. In fact, sometimes we share him with another school in the area as they are without a technician. So too, I have noticed that the Form One students and parents have gravitated to him with their numerous computer concerns. I personally do not know the job description of the IT technician but I usually set up my equipment with the assistance of the technician, if need be. However, I have seen him setting up equipment for teachers who were not in the know.

The discussion forum allowed for teachers to express concerns, connect with colleagues, and share information that was previously unknown.

Activity: Media sharing — photos and videos

Photos and videos were uploaded, which were teacher-made materials or samples of student class activity. In this example, YH uploaded a photo of her students doing a class activity entitled “Students working on a Geography lesson on the Form 1 laptops.” It was photo 3 out of 4 of a collection called “Students PBL work.” While YH did not add comments to the photo initially, this form of digital text conveys messages that can be analysed. The photo showed students engaged in a project using a pair and share strategy, and the site allowed the contributor to share what she was doing in her classroom as she reflected on her practice as well. It can be interpreted as a way of showcasing her classroom work and connecting with her colleagues.

Additionally, DH uploaded a Powerpoint on “Problem Solving in Information Technology,” and wanted to share this with other colleagues:

Be kind, the sound is a little off on the timing and some of the slides and text change a bit too fast but hopefully the more creative of you out there will appreciate the idea and come up with some better examples. Feedback is welcome.

This contribution demonstrated DH’s willingness to share his classroom work with colleagues and solicit feedback. Thus the site provided an avenue for that sharing and request.

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Activity: Online chat

Online chats allowed for real-time conversations about topics of interest to participants. In this example, YH is having a conversation with me about a strategy that she wishes to try in an effort to assist a student with learning difficulties:

6:22 PM YH: OK well..I am going to work on an article for the wiki, called making connections

6:23 PM YH: I realised one of my students that is his problem he has difficulty making connections so I have to design an entire set of worksheets now specific to his problem

6:25 PM Me: between topic areas?

6:26 PM YH: yes but in general between text

6:28 PM Me: so he is not integrating content?

In another chat between Yems and myself, a conversation on lesson planning took place:

[21:24] yems7218: ah! yes the follow up to the lesson

[21:24] Me: and adaptation for slow learners

[21:24] Me: then assessment

[21:25] yems7218: ah extensions i understand

[21:25] Me: actually the extension is not only for follow up it is for the students who finish the act

[21:25] yems7218: yes i iunderstand

[22:09] yems7218: i mean planning on the whole is not popular in schools

[22:10] yems7218: written lesson plans that is

[22:10] yems7218: lol

[22:10] yems7218: indeed

[22:10] yems7218: but in general i think the move to planning is increasing

[22:10] yems7218: so yes, it will be used, just will take time.

[22:11] yems7218: hmmm.

[22:12] yems7218: the problem is

[22:12] yems7218: that the union and the ministry are still arguing over terms like

[22:12] yems7218: 'lesson notes' and 'lesson plans'

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[22:12] yems7218: so at some schools, HODS follow the principal mandates to submit lesson plans

[22:12] yems7218: at others they don't

It is also significant to note that this chat took place between 2100 and 2200 hours (that is 9 and 10 pm at night). This further shows that the site allowed for participation across time and space. Unfortunately, a large number of chats did not take place due to drops in Internet connectivity.

In summary, teachers participated over time and in a number of different activities on the SNS, enabled by Web 2.0 tools. Through participation, teachers interacted with each other and with me, and shared in a number of discourses. Artifacts of learning are held on the site and were produced by all participants on the site over the duration of the study. Blogs, discussion forums, and media-sharing were favoured activities, and a range of artifacts were seen, including videos, photos, and hyperlinks. From the content shared and the discourses, participants appeared to engage in knowledge sharing, opinion sharing, reflection on practice, willingness to explore new ideas, and making connections with other teachers.

RQ2: Learning Through Site Participation

In order to explore this research question, themes from the previous section were collated and analysed. Analysis of participation in these activities suggests that a number of connections with colleagues were made as teachers interacted with each other. Knowledge exchanges took place, as well as sharing of opinions related to practice. Through site participation, emotional support was also sought and shared. In summary, participation in site activities afforded participants opportunities for (a) knowledge/opinion sharing, (b) exploring new ideas, and (c) reflection on classroom practice.

Knowledge/Opinion sharing. One of the recurring observations in teachers' discourse in activities such as blogs, wikis, discussion forums, chats, and media sharing is knowledge sharing. The participant shares something that he/she already knows on a certain topic. The participant adds content to the site by sharing this knowledge and contributes actively to site content. The knowledge was either a pedagogical strategy such as '*using laptops in pair and share activity*' or '*using Google docs as a template.*' Knowledge of content and pedagogy was shared in textual as well as in non-textual forms such as photos and hyperlinks. A number of activities simultaneously allowed knowledge exchanges among participants, and there were a number of examples where

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participants were seeking knowledge of some kind. Those wanting to learn something new did so by enrolling in an online course, or by asking questions on a blog or forum post. Questions were also asked in online chats. Included in knowledge sharing is the sharing of opinions such as “*I think the move to (lesson) planning is increasing.*” These findings indicate that both content knowledge and opinions were sought by participants, either when they shared a new idea or information they had or when they wanted feedback from colleagues. Sometimes participants wanted a specific answer to a posed question on technology use, or responses by colleagues on similarity of experiences with other teachers and schools. It seems that the idea of reciprocity (Hew & Hara, 2007) facilitates exchanges of knowledge, especially in conversations where there is a post, a response, then another response. This is particularly highlighted by the topic in the technology forum. So knowledge-sharing often took place together with knowledge-seeking (Phang, Kankanhalli, & Sabherwal, 2009). As such, teachers were learning by receiving information that was previously unknown.

Exploring new ideas. A number of postings seem to indicate that the teacher was exploring a new idea and seemed to be aimed at improving classroom practice. Participants were *thinking out loud* as it were, and sometimes they sought advice and opinions from colleagues. In this example, LD comments: “*The idea is that even if they do not have internet access at home they would use the school library computer to submit project.*” Another comment showing that the teacher was thinking of the future was: “*I can foresee classrooms eventually looking like this one*” after looking at a video on the site. This is a key to assessing whether or not learning took place, as it indicated that teachers were considering new ideas which could have influenced their attitude towards the problem at hand.

Reflection on practice. There were a few posts where teachers offered comments that were reflective of their classroom practice. These were facilitated through discussions in blogs, forums, online chats, and in media sharing. Two examples are selected to illustrate that the teacher was thinking about his/her classroom practice. For example, YH said in an online chat:

I realised one of my students that is his problem he has difficulty making connections so I have to design an entire set of worksheets now specific to his problem.

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In a discussion post, DH said:

the sound is a little off on the timing and some of the slides and text change a bit too fast but hopefully the more creative of you out there will appreciate the idea and come up with some better examples.

Further, reflection on school-wide practice was also evident when Yems spoke about the reality of lesson plans:

so at some schools, HODS follow the principal mandates to submit lesson plans at others they don't.

Findings in this section suggests that forums (Borko, Whitcomb, & Liston, 2009); online chats (Loving, Schroeder, Kang, Shimek, & Herbert, 2007); and discussions in media-sharing tools can allow similar affordances to blogs, which are well-known for promoting reflective practice (Deng & Yuen, 2011; Ray, Hocutt, & Patterson, 2005). Yet, I did not find extensive evidence of reflection on these blogs, even though teachers had time to reflect on what the issue was about. A number of tools did facilitate interactions through posting and responding along a topic of professional interest. Participants seemed to have some latitude in selecting a topic and revealing what and how they were feeling and thinking.

In order to examine learning, the definition provided by Bakkenes et. al. (2010) is useful. Themes from participant discourses in activities were analysed for changes in knowledge and beliefs, and/or teaching practices. Table 1 is used to demonstrate instances where teacher learning may be interpreted to have taken place.

Table 1. Themes From Participant Discourses and Evidence of Learning

Themes	Examples	Teacher Learning
Knowledge/ Opinion Sharing	I am uploading a photo of my students using laptops in a Geography class. The lesson is designed so that either I can use it as a group activity, with the entire class engaged with me, or students can use it on their own individually. My objective is to design a lesson that can be used as a whole class activity or autonomously by using interactive learning tools. I was looking at all the different things you	Change in knowledge Change in practice Change in attitude

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Themes	Examples	Teacher Learning
	<p>can do with Google Docs and was particularly interested in the fact that it enabled me to do a template for an interview idea I have had for a while. What I particularly like is that Google Docs can do a summary of all projects submitted.</p>	
<p>Explore New Ideas</p>	<p>Last night I started working on a Music Project I have had in mind for my Form Ones. (I think I will try it with the Form Twos for the new school year, as they should all be more familiar with their laptops.)...The idea is that even if they do not have internet access at home they would use the school library computer to submit project. (I know this will take a lot of work on my part making sure the projects are actually done, I am looking forward to the challenge.)</p> <p><i>I can foresee classrooms eventually looking like this one. Teachers & principals have to come on board and be more conducive to this kind of approach...than like the one mentioned in the article.</i></p>	<p>Change in beliefs/attitudes</p>
<p>Reflection on Practice</p>	<p><i>I realised one of my students that is his problem he has difficulty making connections so I have to design an entire set of worksheets now specific to his problem</i></p> <p>The sound is a little off on the timing and some of the slides and text change a bit too fast but hopefully the more creative of you out there will appreciate the idea and come up with some better examples.</p>	<p>Change in beliefs/attitudes</p> <p>Change in practice</p>

These few examples are reflective of discussions on the site, and indicate that through participation on the site, knowledge, experience, and opinion sharing took place, as well as reflection on practice. Interactions with colleagues allowed voluntary sharing and collaboration through working on shared documents. All content on the site was constructed on the SNS. Teachers connected with colleagues and shared in discourses (Davies, 2006), and some evidence of teacher learning took place through activities facilitated by different Web 2.0 tools. The

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participation in embedded Web 2.0 tools generated content on the site and “allowed a social networking space to become a learning space” (Davies & Merchant, 2009, p. 121). Teachers shared information about strategies and ideas and so generated knowledge on the site. They also reflected on their classroom and school practice, which provided new knowledge to others and opportunities to change their practice.

Discussion

Generally, teachers participated in all activities designed on the SNS and demonstrated exchanges in knowledge and opinions, reflection on their practice, and an exploration of new ideas/concepts. These exchanges, as well as other contributions, made up their artifacts of learning. Practical teaching resources often accompanied knowledge sharing. The sharing and soliciting of opinions is significant to the discussion of knowledge sharing, even though teacher education has focused more on the cognitive aspects of teaching. Teachers did discuss the intervention/strategy they were using or wished to use in their classroom (Google docs template and pair and share group activity); described their working environment (as in the case of the ICT technician); and even discussed school-wide practices (lesson plan policy and practice). These discussions align well with discourses of in-service teachers (Vermunt & Endedijk, 2011).

Artifacts of learning on this space contained images, comments, and views, and these artifacts showcase what teachers are experiencing in the classroom (Davies, 2006). However, the majority of their contributions took place through text rather than non-text forms. Teachers also used different Web 2.0 tools to facilitate these exchanges with other teachers, and were able to connect with colleagues that they did not know before. They seemed to favour blogs and forums; even though wikis and online chats did take place, they seemed less popular. Perhaps this is because of the synchronous nature of wikis and chats and the requirements for reliable Internet access. Perhaps the delay in response for blogs and forums allowed these to be more widely used (Deng & Yuen, 2011; Ray, Hocutt, & Patterson, 2005).

Teachers also exercised flexibility in time and space by interacting with others at times outside of school working hours, and often from at home instead of the workplace. This flexibility is seen as a major factor in the success of participation on this SNS (Davies, 2006). All the interactions took place online and a variety of tools were used by participants. Teachers interacted with colleagues who were previously

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unknown and distant (Lee & McLoughlin, 2008). On the other hand, time seemed to be significant to greater participation on the site, in spite of flexibility in time to access the space, such as at home or on weekends. During the July-August vacation, teachers did not access the site more than during the school term. As such, there is need for further research into teachers' use of time and a relationship with independent learning.

Through the site, teachers engaged in learning that was less formal and structured (Dede et. al., 2009) than what normally pertains through workshops and seminars. There is therefore evidence that a shift to teacher professional learning did take place through this SNS, and this has been described as important to effective practice (Feiman-Nemser, 2008). Teachers availed themselves of opportunities to connect and share with other teachers, which was made possible through this space that harnessed the affordances of Web 2.0 tools (Brady, Holcomb, & Smith, 2010; Davies & Merchant, 2009; Greenhow, Robelia, & Hughes, 2009).

Conclusions and Implications for the Future

Participation on this SNS indicates that learning that is less structured and formal can take place in non-traditional spaces. There appears to be a link between participation in activities and learning, and this participation allowed a social networking space that is still under-used and under-researched in education to be considered as a learning space (Davies & Merchant, 2009). A shift in the concept of teacher learning can allow for future research in alternative spaces and modes of teacher education.

The flexibility in time and space is significant to future directions in research on SNSs in education, and the embedding of different tools to allow for both synchronous and asynchronous interactions (Lee & McLoughlin, 2008) can provide important information for facilitating teachers' reflection on practice and, hence, teacher learning. The conceptualization of learning as a change in knowledge/beliefs or attitudes, according to Bakkenes et al. (2010), was helpful to analyse teachers' discourses on the site.

However, it is unclear whether this SNS allowed for the building of a participatory culture, even though social and participatory processes were facilitated through the SNS (Conole et al., 2011). What is important is that this participation was democratic (Lieberman & Mace, 2010), as participants exercised control of their experiences on the SNS and selected activities of their choice in which to participate, instead of being

told when and what they had to learn—the norm in top-down types of teacher education programmes.

Exploration of teachers' interactions can prompt educators with an interest in learning online to pay attention to how students participate in online activities. This study did not focus on teachers' use of technology tools even though those concerns are significant to teacher education, but it is important not to look at technology in education with traditional lenses and to see its potential to reform educational practices and transform learning. This SNS for teachers can be viewed as empowering as it gave voice to teachers who perhaps can be considered marginalized in a traditional schooling system like Trinidad and Tobago's. While there is an expectation that educational reform requires teachers to be agents of change, they must be "empowered to do so" (Feraria, 2008, p. 277). If teachers avail themselves of the opportunity to participate on this designed site, then deeper research on teacher participation can take place and its linkages to teacher learning further explored.

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