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Using social media to engage and develop the online learner in self-determined learning

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Social media technology provides educators with an opportunity to engage learners in the online classroom, as well as to support development of learner skills and competencies. This case study explores the role of social media in promoting cognitive and meta-cognitive learner development while using a heutagogical teaching and learning approach. Research was conducted using questionnaires and interviews and incorporated the perspectives of both students and instructors on the use of social media in the online classroom and how media influenced interaction and learner development. Results indicate that students perceived specific social media (Google Docs, mind mapping and e-portfolio software) in conjunction with a unique learning activity as influencing specific cognitive and meta-cognitive skills (constructing new knowledge, reflecting on course content, understanding individual learning process). Research also indicated an increase in student familiarity with using social media and student research skills. This paper presents the findings from the case study, as well as general guidance to instructors for incorporating social media in the online classroom.

Keywords: social media; heutagogy; e-learning; self-determined learning

Introduction

Use of social media is on the rise within education, both outside and inside the classroom (Pearson 2010; Seaman and Tinti-Kane 2013). As more educators incorporate social media in the classroom, they have needed to seek out new – and old – teaching and learning theories for incorporating the technology in pedagogically meaningful ways. When incorporating any kind of media, educators must consider the construct of the course, the technologies used and the pedagogical approach to designing and delivering learning activities. With the multitude of tools and approaches available, the challenge is in finding the approach that has the most meaningful learning outcome. One approach is to encourage students to use social media actively in their learning and research, opening up the potential for them to develop the skills they need for creating a personal learning environment (PLE) and bringing them a step closer toward becoming more self-directed learners. This paper describes a graduate level course that applied a heutagogical framework, combined with social media, to the design of its learning activities, and reports on the results

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of this approach over 14 cohorts of the same course, specifically in examining learner familiarity and research confidence with social media over time. Student feedback on how the use of social media within these learning activities influenced their perception of individual cognitive and meta-cognitive skill development has also been included.

Literature review

According to a recent survey on the use of social media in higher education, over 80% of faculty are using social media, with 70% of faculty using social media at least once a month or more; of the faculty that use social media, 41% use media in their teaching (Seaman and Tinti-Kane 2013). Active use of social media in the classroom, which has been primarily passive, or consumptive in the past (e.g., in the form of watching an online video), is on the rise. According to Seaman and Tinti-Kane (2013), the number of faculty who are actively using social media (e.g., in the form of learners interacting and creating own content in a blog or wiki) has risen to nearly 30%, as compared to 10–12% of faculty in 2010 (Pearson 2010). Weisberger (in Educational-Portal blog 2010) suggests that active use of social media may be more pedagogically beneficial. Weisberger's hypothesis is supported by research by Junco, Heiberger and Loken (2011) and Blaschke, Porto and Kurtz (2010), which indicates that the active use of social media can increase learner engagement levels (student–student, student–instructor and student–content) and promote the development of cognitive and meta-cognitive learning skills, such as reflection, critical thinking, construction of knowledge and understanding of one's individual learning process. McLoughlin and Lee (2007, 2008, 2010) report on the pedagogical benefits of social media and identify specific affordances of social media – connections and social rapport, collaboration (information finding and sharing), learner-generated content and accumulation of knowledge and information – that contribute to the cognitive development of learners. McLoughlin and Lee (2008) also propose that the inherent design of social media supports the development of learner self-directedness, a capability that is essential in preparing lifelong learners for the complexities of today's workforce (Canning 2010). Social media also brings with it the freedom for learners to connect and collaborate outside of institutional boundaries, as well as to gain practical experience for the workforce (Coleman 2013; Minocha 2009). By using social media, students also have an opportunity to manage their own learning environments and thus become more independent, lifelong learners (Rahimi, van den Berg and Veen 2013; Kimber and Wyatt-Smith 2006).

A pedagogical approach that aligns well with the use of social media is that of *heutagogy*, the study of self-determined learning, which places responsibility for the learning path in the hands of the learner and where the learner is 'the major agent in their own learning' (Hase and Kenyon 2007, p. 112, 2013). The relevance of heutagogy as an approach is partially due to the adoption of social media within education, as the affordances of social media support a heutagogical educational approach (McLoughlin and Lee 2007). The heutagogical educational approach is considered to be 'a natural progression from earlier educational methodologies ... [which] may well provide the optimal approach to learning in the 21st century' (Hase and Kenyon 2007, para. 1; Eberle 2013) and a 'net-centric' theory for today's emerging technologies (Anderson 2010, p. 33). Research into the theory has shown

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that the approach can support development of lifelong learning capacity, as well as aid learners in managing and solving complex problems within changing work environments (Ashton and Newman 2006; Ashton and Elliott 2007; Bhoryrub *et al*. 2010; Canning and Callan 2010).

Above all, heutagogy emphasises learner-centeredness and the development of learner capabilities, which need to be developed 'as a complementary set of attributes to competency' in order to create a culture of lifelong learning (Gardner *et al*. 2008, p. 257). Capability is thus an extension of competency (knowing in familiar environments) in that the learner is able to apply what she or he has learned to complex situations (knowing in unfamiliar environments). Examples of capabilities include: knowing how to learn, working well with others, creativity, critical thinking, empathy, active and experiential learning, autonomy, self-efficacy, self-confidence, active citizenship and deliberative dialogue (Gardner *et al*. 2008; Walker 2008). A review of the literature demonstrates that there is limited research into heutagogy as an approach for development of learner capabilities (Blaschke 2012).

As development of meta-cognitive learning skills through double-loop learning is characteristic of heutagogy, the active use of social media could support a self-determined learning approach, a connection that is further supported in research by McLoughlin and Lee (2008, 2010) and Cameron and Tanti (2011). However, missing in the current literature is research into how the combination of a heutagogical educational approach and the use of social media can support development of learner competencies and, by extension, capabilities. The question explored in this research was: What role can social media play in engaging learners and in promoting cognitive and meta-cognitive development? In particular, does the approach that was applied (for each combination of learning activity and media) support the development of cognitive and meta-cognitive skills? If so, which ones? The focus of this study is on learner perceptions of their personal cognitive/meta-cognitive development when completing learning activities using social media, and the potential value and implications of the research findings for influencing practice.

Background

This case study research was conducted during the six semesters from 2012 to 2013 at the University of Maryland University College (UMUC) within the newly revised *OMDE601 Foundations of Distance Education and E-Learning* online course of the Master of Distance Education and E-Learning (MDE) program and included 14 cohorts of the same course. The MDE program is a joint program developed and delivered by UMUC and the Carl von Ossietzky University of Oldenburg, Germany, and has the goal of developing future practitioners and managers of distance education and e-learning (Bernath and Rubin 2003). The program is offered completely online and is delivered through UMUC's Graduate School (http://www.umuc.edu/academic-programs/masters-degrees/distance-education.cfm). Students within the MDE program are primarily White (63.64%), female (72%), employed full-time (70.6%), 30 years old and older (96.45%) and are located within the United States (70.22%). While enrolled in the MDE, students take between one and two courses per semester.

The OMDE601 course, taught completely online over a 12-week period, is the foundations course for graduate students within the MDE program and is the first course taken upon entry into the program. The course is:

> A study of the history and evolution of distance education. Social and political/economic factors, theories, learning and teaching models, technology and media innovations, institutions and systems, and major writers that have shaped the development of the field are critically examined. A variety of technologies are used to support the development of foundational skills that are integral to current practice. (UMUC 2013–2014 Catalog, The Graduate School 2013, p. 134)

In the summer and fall of 2011, the OMDE601 course underwent an extensive redesign intended to help new students build a stronger foundation of knowledge and skills in preparation for their MDE graduate studies. The course incorporated a variety of learning activities, called skill builders, which utilised social media. As future managers of distance education, it is imperative that MDE students are able to use these, as well as other, technologies in their daily practice, and to help achieve this program objective, MDE courses introduce students to a variety of technologies. The most important of these is the e-portfolio, which serves as a record of the student's academic achievements upon graduating from the program.

In redesigning the course, a holistic design-based research approach was undertaken. Using the backward design, or results-based, approach to course design (Wiggins and McTighe 2005), the author and another MDE faculty, Jane Brindley, identified the desired outcomes at both course and program level and then worked backward in developing learning activities and course content that would support development of those outcomes (Figure 1). For example, a key outcome at the program level is to develop distance education managers, researchers and practitioners who have a sound knowledge of distance education practice, principles and theories and who are also able to use and adapt to new and emerging technologies.

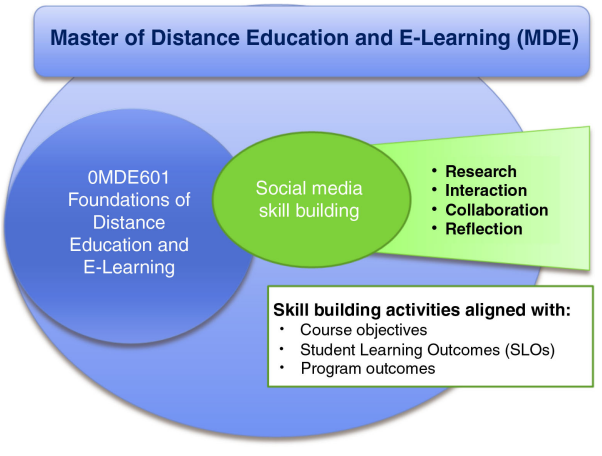

Figure 1. Holistic approach using backward design.

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Specific aspects of a heutagogical teaching approach were incorporated into the new design, for example:

- *Considering students' level of learner autonomy and adjusting accordingly.* Learner questionnaires were used at the start of the course to gather information about the new student and his/her self-assessment on past experience with online learning and technologies, as well as the student's level of research skill and paper writing ability. Learner support could then be scaffolded, depending on the student feedback. For example, in courses where students reported a low level of confidence in using APA, additional tutorials and writing support would be provided.
- *Building learner skills while allowing students to determine and reflect on their learning path*. To achieve this objective, learning activities were scaffolded to build upon each other over time. For example, in one skill builder, students would use the UMUC online library to search for research articles related to one of the course assignments (or a distance education-related topic of their choosing), and then create a bibliography of resources. For a later skill builder, students would select one of the articles from the bibliography and prepare an annotation, which they would share with the class using Diigo, a social media bookmarking tool. Learner-directed questions for reflection were also included, for students to use as a springboard for on-going reflection.
- *Incorporating activities for self-reflection, self- and information-discovery, and collaborative information creation.* Throughout the OMDE601 course, students kept track of their learning progress and experiences in an online learning journal. In addition, they were involved in one collaborative group project throughout the semester.
- *Assessing learner achievement by negotiating the assessment process.* Both formative and summative assessment was provided for the learning activities, giving students an opportunity to improve upon their performance with each submission.
- *Shifting from teacher-centred to learner-centeredness.* The new redesign of the course allowed students additional freedom in choosing and exploring topics and technology platforms, for example, within skill building activities and the e-portfolio.

Digital skill building activities, which incorporated social media tools for research, interaction, collaboration and reflection, were developed as part of the redesign (Table 1).

These activities were closely aligned with UMUC's student learning outcomes (SLOs) of written communication, technology fluency, information literacy, program content knowledge and critical thinking, as well as course and program objectives. Each learning activity had specific learning outcomes, in addition to the overall goal of giving students skills that they could apply to their current and future work environments. (Initially, the study included two additional skill-building activities: using GoogleMaps to identify location on a world map and adding to a class wiki on e-portfolio best practices. The first skill building activity using GoogleMaps was dropped after two cohorts due to concerns about student privacy and the activity's pedagogical value; the second skill building activity was eliminated after six cohorts in response to the high number of student complaints regarding the level of technology use required for the course.)

Table 1. OMDE601 learning activities using social media.

Learning activity description	Learning objectives	Social media used	Time frame
Students created an individual website using a wiki, blog, or other web tool as an ***e-portfolio***, including pages for a reflective learning journal and artefacts (group grid, bibliography, annotation, mind map).	• Think critically about individual platform requirements • Review and choose an e-portfolio platform • Create new content (e-portfolio, artefacts, journal) • Reflect upon content and learning process	E-portfolio (e.g., wiki, blog, other)	Weeks 3–12
Students joined ***Twitter*** and followed OMDE601 course and a distance education scholar. During the course, students were required to retweet an interesting article by or tweet from the scholar.	• Search for and discover potential research resources • Share information discovered with others • Communicate and connect with others	Twitter	Weeks 3–12
Students created an ***online mind map*** using key words that represented their initial and on-going definition of distance education. Students had the option of updating the mind map as the course progressed.	• Reflect upon understanding of distance education • Design and create new content based on current and new knowledge • Share ideas and experience • Track learning progress	Mind Mapping	Weeks 1–2 (optional: expand until Week 12)
Using ***Google Docs***, students worked with assigned group members to develop a grid that depicted the evolution of distance education across waves of development as part of an on-going collaborative group project.	• Think deeply about and reflect upon course readings • Interact and collaborate with other students to evaluate and create new content	Google Docs	Weeks 4–12
Students used the online UMUC library to research a topic of their choice, create a bibliography, select a scholarly article, and write and post an annotation of the article to the class ***Diigo*** account.	• Research and find information • Create new content • Share resources and content	Diigo	Weeks 6–8

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Methodology

This case study explored whether a heutagogical course design approach combined with the active use of social media (as described above and in Table 1) would support the development of cognitive and meta-cognitive skills and help students become more competent in their research and learning activities and their use of the media, as well as give them skills that could be used in the workforce. The hypotheses for the study were:

Hypothesis 1: The use of social media supports the development of cognitive and meta-cognitive skills, as well as skills relevant to the workplace.

Hypothesis 2: Through the use of social media in learning activities, students will become more familiar with social media, gradually incorporating the media into their research and learning activities.

Hypothesis 3: Through the use of social media in learning activities, students will perceive that they are competent in using the media.

Data gathering techniques included student and instructor interviews (qualitative) and surveys on student perceptions regarding their use of social media in the classroom. Two surveys were conducted, one at the start of the course and one at the end. The pre-course student survey gathered data about students' familiarity with online learning and social media, ways in which they used social media, their preferred ways of learning and their confidence level in research and writing (Table 2).

The end-of-semester survey gathered data about students' experiences using social media in the OMDE601 course and their perceptions of how social media influenced (1) their sense of connectedness in the classroom (e.g., with other students and the instructor) and (2) development of their individual cognitive and meta-cognitive skills, such as critical thinking, knowledge construction, reflection, empathy, understanding of own learning process and application of social media competency in other contexts (current work environment) (Table 3).

From these surveys, before and after measurements (unpaired) were undertaken to compare students' familiarity with the social media used in the course, as well as their research confidence using media. Levene's test was used for data evaluation, as survey data from the pre-course survey and end-of-semester survey was across groups of data (same students), but the data was not paired (Field 2009). In-depth student interviews were also completed as a follow-up to the student surveys, as well as interviews with the two course instructors. In the instructor interviews, questions gathered information about the instructors' perceptions on the active use of social media and its influence on student engagement levels and development of student cognitive and meta-cognitive skills. Before the research was undertaken, approval was obtained from UMUC's institutional review board (IRB), which reviewed the research methodology and tools; in undertaking the research, ethical practice was observed in that surveys were conducted anonymously, names were not used (coded) and data were aggregated to ensure non-traceability.

Results

Fourteen sections of OMDE01 were offered from Spring 2012 to Fall 2013, with 300 students completing the pre-course survey and 131 completing the end-of-semester survey. Data from these surveys were coded and stored in two datasets in SPSS,

Table 2. Questions from pre-course survey.

Topic	Question
Familiarity with online learning and social media Wikis Blogs Twitter Facebook LinkedIn MindMaps Mashups (e.g., Google Maps) Google Docs Diigo	How familiar are you with using different types of social media? Never used Somewhat familiar Familiar Very familiar
Ways in which the student uses social media	For what purposes do you use social media? Check all that apply: • Making business/academic connections • Maintaining business/academic connections • Interacting with friends and family • Learning about new things • Creating new information • Other
Student's preferred way of learning Reading Listening Discussing Watching Doing	Currently, how do you think that you best learn? Rank each of these methods as follows: Not at all Fits somewhat Fits better Enjoy learning this way
Student's confidence level in research and writing Using a face-to-face (physical) library Using UMUC's online library (or other online library) Locating journal articles Evaluating journal articles for use in assignments Finding information in databases and other sources Using Google search Using APA Avoiding plagiarism	How confident are you in doing library research? Could Use Some Help Somewhat Confident Confident

Version 21. Nine students who completed the end-of-semester survey also participated in the in-depth interviews after the course had ended. Two OMDE601 instructors also participated in interviews.

Pre-course and end-of-semester surveys

Pre-course survey findings showed that 76% of the students had taken an online course previously ($N = 300$), with a mean of 9.81 courses per student. In terms of familiarity with social media, students were least familiar with (never used) mind maps (61.7%), Diigo (48%) and Twitter (37.3%). Students were most familiar (familiar or very familiar) with Facebook (81%), GoogleMaps (62.7%), LinkedIn (49.7%), Google Docs

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Table 3. Questions from end-of-course survey.

Topic	Question
Student familiarity with social media used Wikis Blogs Twitter Facebook LinkedIn MindMaps Mashups (e.g., Google Maps) Google Docs	How familiar are you with using different types of social media? Never used Somewhat familiar Familiar Very familiar
Student ability using each form of social media Wikis[a] Blogs[a] Twitter Facebook[b] LinkedIn[b] Mindmaps GoogleMaps[c] Google Docs Diigo	How would you rank your current ability to use the following types of social media? Never used Somewhat competent Competent Very Competent
Student use of social media Wikis[a] Blogs[a] Twitter Facebook[b] LinkedIn[b] MindMaps GoogleMaps[c] Google Docs Diigo	For what purposes did you use the following forms of social media in the OMDE601 classroom? Never used Create new content Interact with other students Interact with the instructor Reflect on course content Conduct research
Student perception on how social media influenced: 1 sense of connectedness in the classroom (e.g., with other students and the instructor) 2 development of their individual cognitive and meta-cognitive skills, such as critical thinking, knowledge construction, reflection, empathy, understanding of own learning process, and application of social media competency in other contexts	For each type of social media used in the course – e-portfolio tools, MindMap tools, Google Docs, Diigo – students were asked the following questions: Do you agree/disagree with the following statements? Using < social media type > in the OMDE601 classroom: Agree Disagree Did not use/does not apply Helped me feel connected to other students Helped me feel connected to the instructor/teaching staff Helped me better understand course content Helped me construct new knowledge, e.g., by documenting new ideas and concepts and incorporating these into my current framework of knowledge

Table 3 (*Continued*)

Topic	Question
	Helped me to reflect on course content
	Made me more empathetic to the situations of others
	Gave me a better understanding of my learning process, e.g., making me more aware of how I learn
	Gave me skills I can apply to my current work environment

[a]In developing their online e-portfolios, students had a choice of platform, with some students choosing a website, others choosing blogs and still others using wikis.
[b]Facebook and LinkedIn were not used as part of the OMDE601 learning activities; however, some students reported using these media to connect with other students outside of class.
[c]GoogleMaps was used in the first two cohorts of the class, but discontinued after that point.

(48.3%), blogs (46.7%) and wikis (44.7%), although Facebook and LinkedIn were not used in the course learning activities. (GoogleMaps was only used for the first two cohorts of the course.) Primary uses of social media were: connecting with friends and family (84.3%), learning new things (62.7%), making business and academic connections (50.3%) and maintaining those connections (48.3%), and creating new information (23%). In terms of their preferred way of learning, most students reported that they preferred to learn by doing (70.7%), followed by reading (46.3%) and then watching (40.7%), discussing (40%) and listening (32%).

The *end-of-semester surveys* ($N = 131$) showed that the majority of students perceived themselves as competent to very competent (61.5%) in the social media tools used in the course, with 34.7% reporting that they felt they were somewhat competent (3.8% with no response). Students felt most competent in the use of Google Docs (69.5%), followed by blogs (64.2%), Twitter (62.6%), MindMaps (55.7%), wikis (54.9%) and Diigo (41.2%) (see Table 4).

In terms of the perceived influence of social media in helping students develop cognitive and meta-cognitive skills, the *e-portfolio/learning journal, Google Docs* and *mind map* tools seemed to have been most effective. Over 70% of students agreed that the tools helped them construct new knowledge, reflect on and better understand course content and their individual learning process, as well as give them skills they could use in their current work environment (Table 5). Students perceived that the use of *Twitter* and *Diigo* contributed the least to development of cognitive/meta-cognitive skills.

Table 4. Students' perceived competency in social media use (end-of-course survey).

Social media	Very competent (%)	Competent (%)	Somewhat competent (%)	Not specified (%)
Wikis	19.8	35.1	34.4	10.7
Blogs	29.8	34.4	24.4	10.7
Twitter	32.1	30.5	29.8	7.6
MindMaps	18.3	37.4	36.6	7.7
Google Docs	35.1	34.4	20.6	9.9
Diigo	12.2	29	50.4	8.4

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Table 5. Student perceptions of influence of social media in developing cognitive/meta-cognitive skills (agreement).

Social media	Helped me feel connected to other students (%)	Helped me feel connected to the instructor/ teaching staff (%)	Helped me better understand course content (%)	Helped me construct new knowledge (%)	Helped me to reflect on course content (%)	Made me more empathetic to the situations of others (%)	Gave me a better understanding of my learning process (%)	Gave me skills I can apply to my current work environment (%)
E-Portfolio	34.4	61.1	75.6	87	92	39.7	84	77
Twitter	66.3	63.4	50.4	55.7	48.1	41.2	45.8	56.5
MindMaps	38.2	51.9	84.7	84.7	80.9	35.9	77.1	69.5
Google Docs	81.7	70.2	77.9	78.6	77.1	66.4	72.5	74.8
Diigo	61.8	67.9	62.6	75.6	63.4	42	57.3	64.1

The only tool that seemed to support empathy was *Google Docs* (66.4%). Use of *Google Docs* also helped students feel more connected to other students (81.7%), more so than any of the other social media tools used.

In comparing student perceptions of their familiarity with social media tools before and after the course, an increase of familiarity with social media tools of 21.4% was identified. Levene's Test in SPSS indicated that the homogeneity of variance before and after the course, for students' familiarity with wikis, blogs, Twitter and Google Docs was significantly different ($p < 0.05$), although the variance ratio for all social media types did not confirm this result (Hartley's $F_{\text{Max}} < 1.67$) (Table 6). For MindMaps and Diigo, the homogeneity of variance was not significant ($p > 0.05$) using Levene's Test. Results from the *t*-tests showed that differences in familiarity between the groups were significant ($p < 0.05$) for wikis, blogs, Twitter and Google Docs, although the effect size for wikis and blogs was small ($r = 0.1$ and $r = 0.14$, respectively, equal variances assumed) with Google Docs and Twitter having a medium-sized effect ($r = 0.25$ and $r = 0.28$ respectively, equal variances assumed). The differences in familiarity were not significant for MindMaps and Diigo, although Diigo had a large effect size ($r = 0.68$) and MindMaps had a medium effect size ($r = 0.4$).

In reviewing students' perception of their individual research skills, results showed an increase in confidence of 16.5% with students perceiving that most of their research skills had improved since the start of the course, with the exception of using a face-to-face library, applying APA and avoiding plagiarism (Table 7). The biggest jump in confidence was in using the online library for conducting research, and in locating and evaluating journal articles (over 20%). Levene's test indicated a significant difference in the homogeneity of variances for using an on-line library, locating and evaluating journal articles, and using online databases and Google searches; this significant difference was further confirmed by Hartley's F_{Max} variance ratio (Hartley's $F_{\text{Max}} > 1.67$). Effect sizes for these measurements of students' research confidence were medium-sized, except for GoogleSearch ($r = 0.17$). There was no significant effect size in measuring students' research confidence (before and after) for using a face-to-face library, applying APA and avoiding plagiarism.

Table 6. Students' perceived familiarity with social media use (comparison of pre-course and end-of-course survey).

	Pre-course survey[a]				End-of-course survey[a]						
Social media	Very familiar (%)	Familiar (%)	Somewhat familiar (%)	Never used (%)	Very familiar (%)	Familiar (%)	Somewhat familiar (%)	Never used (%)	F_{Max}	Levene's test	*t*-test for equality of means[b]
Wikis	18	26.7	28	26.3	19.8	35.1	35.1	8.4	1.31	$F(1, 429) = 7.313$, $p < 0.01$	$t(429) = -2.799$, $p < 0.01$; $r = 0.1$ $t(281.59) = -2.799$, $p < 0.01$; $r = 0.141$ Start: $M = 2.34$, SE = 0.06 End: $M = 2.63$, SE = 0.08
Blogs	19.3	27.3	32.7	20	26.7	35.1	30.5	6.1	1.32	$F(1, 429) = 4.400$, $p < 0.05$	$t(429) = -3.372$, $p < 0.01$; $r = 0.14$ $t(266.81) = -3.372$, $p < 0.01$; $r = 0.2$ Start: $M = 2.45$, SE = 0.06 End: $M = 2.79$, SE = 0.08
Twitter	19.3	19.3	23.7	37.3	32.1	30.5	32.1	3.6	1.42	$F(1, 429) = 13.609$, $p < 0.01$	$t(429) = -6.337$, $p < 0.01$; $r = 0.35$ Start: $M = 2.20$, SE = 0.07 End: $M = 2.88$, SE = 0.09
MindMaps	8.3	12	17.7	61.7	16	37.4	38.9	6.1	1.24	$F(1, 429) = 2.455$, $p > 0.05$	$t(429) = -9.383$, $p > 0.05$; $r = 0.17$ Start: $M = 1.66$, SE = 0.06 End: $M = 2.60$, SE = 0.08

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Table 6 (*Continued*)

Social media	Pre-course survey[a] Very familiar (%)	Familiar (%)	Somewhat familiar (%)	Never used (%)	End-of-course survey[a] Very familiar (%)	Familiar (%)	Somewhat familiar (%)	Never used (%)	F_{Max}	Levene's test	*t*-test for equality of means[b]
Google Docs	18.3	30	26.7	24.7	35.1	35.1	22.9	5.3	1.20	$F(1, 429) = 11.194$, $p < 0.01$	$t(429 = -5.342$, $p < 0.01$; $r = 0.25$ $t(269.87) = -5.342$, $p < 0.01$; $r = 0.3$ Start: $M = 2.41$, SE = 0.06 End: $M = 2.97$, SE = 0.08
Diigo	4.1	1.8	8.8	84.7	11.5	27.5	49.6	9.9	1.16	$F(1, 429) = 3.617$, $p > 0.05$	$t(429) = -19.295$, $p > 0.05$; $r = 0.46$ Start: $M = 0.70$, SE = 0.05 End: $M = 2.37$, SE = 0.08

[a]Remaining percentages are categorised as not specified.
[b]For wikis, blogs, Twitter and Google Docs, effect sizes were measured based on both assumed (df = 429) and not assumed equal variances.

Student and instructor interviews

Of the 131 students to complete the end-of-semester survey, nine students volunteered to participate in an extended interview. In the student interviews, the researcher further explored learner perceptions of the role social media played in student learning, asking for specific examples of the ways in which social media supported (or did not support) the student in the learning process. In general, responses to the use of social media in the course were positive, although students responded differently regarding how various media influenced their learning processes, depending on the type of media used. Also, students noted that it was difficult to separate the learning activity from the media which supported the activity, with one student responding:

> ... the course itself—delivery platform, structure, assignments, expectations, demands, and requirements—was more responsible for developing, encouraging, and supporting independence in my learning approach than the particular social media tools ... inasmuch as social media were tools or agents for expressing and sharing the questions, opinions, and reflections, it can be said that they assisted in greater independence in learning, but perhaps more in a secondary manner after the primary context of the course. Any means or tool that required, encouraged, and supported interaction with and reflection upon the material (and to some extent with a community of like-minded students engaged in the same) can be said to be an aid to learning, independently or not. (OMDE601 Student, Fall 2013)

Active use of social media was viewed as encouraging deeper thinking, with one student stating that using social media 'compelled me to process content and then to express it in various textual and visual forms' (OMDE601 Student, Fall 2013) and two other students reporting that using the social media forced them to reflect upon and evaluate personal learning preferences (OMDE601 Students, Spring 2013). Other students found that the media helped to improve communication both within the team and also between students and the instructor (OMDE601, Summer 2012). Four of the interviewed students also found that using the media made them more independent in their learning and research approach, with one commenting that its use made the task of researching 'more fun and interesting ... and forced students to expand sources of content beyond course information' (OMDE601 Student, Summer 2012).

Students not only used the social media to complete their learning activities, but also to support the learning process itself. One student commented:

> Throughout the class, I used social media to connect with my classmates outside of class. I communicated with a couple classmates via twitter and Google chat. We swapped knowledge regarding the class, recommended sites and tools, and guided each other through using social media. It was wonderful to have this active network of students to communicate with and lean on for support throughout the class. (OMDE601 Student, Fall 2013)

Two of the interviewed students also reported that there were drawbacks to using the media such as a steep learning curve, with 'many hours, many period[s] of complete frustration ... all the accounts, the digital footprint' (OMDE601 Student, Spring 2012). Use of social media was particularly challenging to those who had never used it before with one student commenting: 'I have never used social media before and I felt overwhelmed by the exercises and found it to be a daunting task.

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Table 7. Students' perceived confidence in research skills (comparison of pre-course and end-of-course survey).

	Pre-course survey[a]			End-of-course survey[a]					
Research activity	Confident (%)	Somewhat confident (%)	Could Use Help (%)	Confident (%)	Somewhat confident (%)	Could use help (%)	F_{Max}	Levene's test	*t*-test for equality of means
Using a face-to-face library	66	24.7	9	65.6	19.1	10.7	0.80	F (1, 429) = 0.472, $p > 0.05$	t (429) = 0.904, $p > 0.05$; $r = 0.00$ Start: $M = 1.42$, SE = 0.04 End: $M = 1.36$, SE = 0.06
Using an online library	42.7	37.7	18.7	76.3	21.4	1.5	2.60	F (1, 429) = 57.86, $p < 0.01$	t (380.129) = 8.468, $p < 0.01$; $r = 0.4$ Start: $M = 1.75$, SE = 0.05 End: $M = 1.24$, SE = 0.04
Locating journal articles	51	33.3	14.7	80.9	16	1.5	2.59	F (1, 429) = 96.85, $p < 0.01$	t (379.217) = 7.711, $p < 0.01$; $r = 0.4$ Start: $M = 1.62$, SE = 0.04 End: $M = 1.18$, SE = 0.04
Evaluating journal articles	44.7	38.3	15.7	72.5	24.4	1.5	2.22	F (1, 429) = 44.86, $p < 0.01$	t (357.958) = 7.057, $p < 0.01$; $r = 0.35$ Start: $M = 1.70$, SE = 0.04 End: $M = 1.26$, SE = 0.05
Using online databases	50.7	35.3	11.7	67.9	28.2	1.5	2.01	F (1, 429) = 31.66, $p < 0.01$	t (343.323) = 5.115, $p < 0.01$; $r = 0.27$ Start: $M = 1.62$, SE = 0.04 End: $M = 1.29$, SE = 0.05
Using Google Search	74.7	17	8	84.7	13	0.8	2.42	F (1, 429) = 42.28, $p < 0.01$	t (370.484) = 3.927, $p < 0.01$; $r = 0.17$ Start: $M = 1.33$, SE = 0.04 End: $M = 1.13$, SE = 0.05

Table 7 (*Continued*)

Research activity	Pre-course survey[a] Confident (%)	Pre-course survey[a] Somewhat confident (%)	Pre-course survey[a] Could Use Help (%)	End-of-course survey[a] Confident (%)	End-of-course survey[a] Somewhat confident (%)	End-of-course survey[a] Could use help (%)	F_{Max}	Levene's test	*t*-test for equality of means
Using APA	31	41	25.7	33.6	49.6	15.3	0.79	F (1, 429) = 0.882, $p > 0.05$	t (429) = 2.036, $p > 0.05$; $r = 0.00$ Start: $M = 1.95$, SE = 0.05 End: $M = 1.79$, SE = 0.06
Avoiding plagiarism	56.3	33.3	10	61.8	29.8	6.1	0.89	F (1, 429) = 2.754, $p > 0.05$	t (429) = 1.909, $p > 0.05$; $r = 0.00$ Start: $M = 1.53$, SE = 0.04 End: $M = 1$–40, SE = 0.06

[a]Remaining percentages are categorised as not specified.

It forced me to seek help from my tutor and classmates' (Student 2, OMDE601, Summer 2012). Another student noted that generational gaps made it difficult to keep up with the new media, and, although she was able to complete the activities successfully, they were very time consuming. Student privacy issues can also be a concern, as one student said:

> The intrusive nature of some social networking/media sites introduces issues that go beyond the course. Google, Facebook, and Twitter all sell user information and anyone who has not noticed that the ads that pop up on web sites generally reflect your recent searches or shopping isn't paying attention. (OMDE601 Student, Summer 2013)

A summary of the interviewed students' insights into the use of the individual media types can be found in Table 8.

Instructor perspectives

Both instructors found that the *e-portfolio/learning journal, Google Docs* and *mind map* activities were helpful in development of critical thinking and knowledge construction (although mind maps only partially). Specifically, *e-portfolios* and *learning journals* were found to provide 'a broader and at times deeper picture of a learner', although journals were 'low to average' in terms of reflective quality (Interviewee A; Interviewee B). One instructor did not find the social media tools to be instrumental in the development of cognitive and meta-cognitive skills such as empathy, creativity, student autonomy and the students' understanding of their learning process; however, the instructor noted that there is potential for on-going development of these skills across courses and in the program and recommended tracking students as they progressed through the program (Interviewee A). The other instructor only partially agreed, finding that the social media tools also supported creativity and the student's understanding of his/her learning process (Interviewee B).

The first instructor also found the tracking of student activities within the social media tools to be very time-consuming (Interviewee A). Tracking was necessary in order to observe how students used the media and in providing formative feedback (for Google Docs). Students would also sometimes use high security settings for their e-portfolios, which required tracking of passwords to view student sites. Both instructors found that assessment was also challenging due to the work required in keeping track of each student's social media 'handles' (e.g., for Twitter).

Discussion

Three hypotheses were considered in conducting this case study research:

Hypothesis 1: The use of social media supports the development of cognitive and meta-cognitive skills, as well as skills relevant to the workplace. End-of-semester surveys, as well as student interviews, found that students perceived that the e-portfolio, mind maps and Google Docs supported the development of cognitive and meta-cognitive skills the most, specifically their ability to construct new knowledge, to reflect on course content and to understand their individual learning process (Table 5). A number of factors could figure into this perception, for example, the

Table 8. Summary of student responses regarding media used (student interviews).

Media	Student responses
E-portfolio (blogs, wikis, websites)	Nearly all students (7 out of 9) interviewed found that the e-portfolio enhanced their learning the most, supporting creative expression, as well as allowing them to document and assess their individual learning processes and progress and evaluate study habits. Students also found the e-portfolio to be most useful to their academic and professional careers, for example, by letting them showcase their academic work. Incorporation of the learning journal into the e-portfolio supported deeper thinking, learning and reflection about course content. One student reported that using the e-portfolio for 'blogging and micro-blogging helped to build my confidence for posting content online and taught me new ways to express myself' (OMDE601 Student, Fall 2013).
Twitter	Student responses on using Twitter were mixed. Two of the interviewed students reported that using Twitter helped put them in touch with new writings/scholars and sparked an interest in finding new articles and research within the field, as well as to use the tools for both personal and political purposes. Another reported that Twitter helped her to follow and create and explore her own trails of learning, as well as aided her in becoming more self-directed in her learning, stating that following 'key industry thought leaders and academics frequently sharing research, blogs, and articles ... enrich[ed] the base content we studied throughout the weeks' (OMDE601 Student, Spring 2012). Four other students did not enjoy using Twitter for research at all, citing issues such as information overload, and disorganized and swiftly moving information. One commented that it seemed necessary 'to wade through a tremendous amount of otherwise uninteresting, uninformative, irrelevant, and useless chatter and junk in order to find the really useful, valuable, and interesting content' (OMDE601 Student, Fall 2013).
MindMaps	Students reported positive effects of using MindMap software to create their definitions of distance education: supported them in creatively structuring thoughts; allowed them to create a visual, non-linear representation of their understanding of a concept; and was a transferable skill to teaching and other work environments. One student said: 'After using mind maps for a couple of work and personal projects, I am convinced that it is a literal representation of how my brain stores information. Outside of class, I created a content training mind map using Mind42 for my advising team. We are test driving the tool now' (OMDE601 Student, Fall 2013).
Google Docs	For the students interviewed, this media was reported as being the most supportive of all media in completing the learning activity. The tool supported effective collaborative writing and the group development and review process by allowing 'easy web access, synchronous individual updates, and centralized version control' giving the group a 'common, Cloud based repository to capture team input/research/analysis' (OMDE601 Student, Spring 2013). Students were also able to use the tool to construct knowledge both asynchronously and synchronously. That said there was one student interviewed who found Google Docs to be a hindrance, but saw this to be an issue related to group cohesiveness and not all students had a Google account.

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Table 8 (*Continued*)

Media	Student responses
Diigo	Like Twitter, Diigo was another tool about which students had divisive opinions. Two students reported that the tool helped them become more self-directed in their learning and provided more context to course assignments, while two found that the tool was frustrating and difficult to use and did not see the purpose of using the media.

extended length of the e-portfolio (10 weeks) and Google Docs (9 weeks) learning activities and the freedom students were given in designing their social media products. These media were also found to be the most relevant for use in the students' workplace, which could signify that the more cognitively engaged a student was in an activity, the more relevant s/he saw the social media for use in practice. Students felt most connected with other students and the teaching staff, as well as more empathetic, through the use of Google Docs, which was the media used for the group project. This would indicate that the learning design and the context of the learning activity play an important role in determining the skills acquired, which was also noted within the student interviews (Table 8).

Hypothesis 2: Through the use of social media in learning activities, students will become more familiar with social media, gradually incorporating the media into their research and learning activities. Survey results showed that students felt more familiar with the social media at the end of class than at the beginning (Table 6), although group homogeneity (Levene's test) could not be fully determined. Despite this, it was found that the effect of the percentage change for Twitter, MindMaps, Google Docs and Diigo was medium-sized. A similar result was not found with blogs and wikis, a result that could be due to the student's actual use of a blog or wiki in developing his/her e-portfolio (students were given a choice of blogs, wikis and websites in determining the media used for this activity). Students also found that their research skills had improved through the skill building activities in class, in particular their ability to use the online library and its databases, as well as find and evaluate journal articles for assignments (Table 7). Due to the limitations of the study and the survey tool used, the existence of a relationship between the students' familiarity with social media and if there was a resulting increase in use of the media in conducting research and learning was neither measured nor established; this could be an area for future research.

Hypothesis 3: *Through the use of social media in learning activities, students will perceive that they are competent in using the media.* According to the end-of-course survey, the majority of students felt they were competent in using the social media for completing learning activities, albeit to different degrees (Table 4). Students exhibited competency in using social media through the successful completion of the skill building activities, as well as development of online e-portfolios (which contained social media products such as mind maps, Diigo links, Twitter feeds and blogs) and collaborative documents describing the history of distance education.

To a large degree, the ability to achieve learner engagement and skill development is not only dependent upon course design (e.g., alignment with learning objectives) and delivery, but also upon the individual learner and his/her level of autonomy. Students within the study exhibited self-confidence upon gaining a competency (e.g., using Twitter to tweet more often and using new tweet formats), and in one student

interview, the student gave an example of applying what she had learned to a new situation (e.g., using Twitter to follow political candidates in order to gain a better understanding of a candidate's platform) (OMDE601 Student, Spring 2012). That there was minimal evidence of capability could be due to the length of the learning activities combined with the students' inability to achieve full competency in using social media tools. As a result, capability could not emerge or be observed as emerging as an extension of the competency. It could also be the case that a capability evolved, but was not observed within the online classroom environment where the research was conducted, or that learners within a beginning graduate course do not yet have the level of learner autonomy to move from competency to capability. Further research could explore the role of social media in development of learner competency and capability during the course of the learners' graduate studies, both inside and outside of the classroom, as part of a longitudinal analysis, for example, by evaluating student e-portfolios by coding for evidence of achieved competency or capability. Other areas of research could include investigating individual social media and their ability to promote engagement and support learner capability development (such as the Twitter research by Welch and Bonnan-White, 2012).

As reported in the student interviews, student preference for specific media often depended on past experience, as well as students' individual learning style and preference (Table 8). Allowing students to choose the social media platform or tool with which they will work, also seems to result in higher levels of student engagement, similar to the findings by Welch and Bonnan-White (2012). The study also demonstrates how learning outcomes can be influenced by a specific medium, how it is incorporated and for which purpose (see Table 1 for a description of learning activities). The influence of a learning activity on development of a specific skill is thus dependent upon the instructor's intention (e.g., in regard to the learning outcome) and the context, which was also found to be the case in Twitter research by Kassens-Noor (2012).

The researcher acknowledges that the reduced number of participants in the end-of-semester survey (43%) could indicate bias. Another explanation for the disparity could be that students were asked to participate voluntarily in the survey during finals week and that they may have been intimidated by the length of the survey. The study also only takes into consideration the specific context of this course design and its learning activities. Because of this limitation, it is not feasible to make generalisations about the case study research results.

Guidance for incorporating social media

Based on feedback from the students and instructors who participated in this case study and the follow-up interviews, the following guidance for using social media in the online classroom can be given:

- Incorporate social media in a holistic way, clearly aligning its use with overall course goals and objectives and learning activities, and taking into consideration the pedagogical benefits of the media.
- Plan for possible gaps in learner skill level; for example, provide learner support and additional informational resources.

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- Provide guidance and support – sometimes extensive – on media use and mirror desired behaviour where possible.
- Be prepared for students who are fundamentally opposed to social media due to privacy issues.
- Make expectations about the use of social media clear.
- If students have already established personal social media accounts and prefer not to share personal information using these accounts, encourage them to create social media accounts/e-mails for academic purposes only.
- Allocate time for managing social media use and be prepared to spend significant time tracking student activity.
- Incorporate activities that are relevant and applicable to the student's current and future work environments.
- Strive for establishing competency and building capability by providing students with opportunities to use social media in new and original ways that are related to the learning activities that they are undertaking.

Conclusion

In describing the relationship between technology and distance education pedagogy, Anderson (2009) writes:

> Although distance education educators like to assert that the pedagogy alone defines their distance learning designs, it is only in a complex dance between technologies and pedagogies that quality distance education emerges. The technology sets the beat and the timing. The pedagogy defines the moves. Both the design and the technology morph in response to developments or changes in theory and technological affordances. Further, the creative energy and context created by the participants also effects the dance. As any change occurs, the dance is thrown out of synchronization and all parties adjust their activities and their plans to return to the creative flow of the dance. (p. 9)

From this case study research, it is evident that social media alone is not the exclusive factor in influencing cognitive and meta-cognitive development in learners. Rather, it is the combination of the pedagogy in the course design and delivery, together with the technology, that creates the kind of nurturing environment for this development to occur. Although students noted that certain media such as e-portfolios, online mind maps and Google Docs helped them create new knowledge, connect with other learners, reflect and better understand how they learn (Table 5), they were also quick to add that it was not solely the media that contributed to this development, but the combination of the media with the learning design. Combining heutagogy, or self-determined learning, with the affordances of social media, educators can design a holistic, learner-centred learning environment where students have flexibility in decision-making while still working toward specific learning objectives (see learner activity examples in Table 1). A heutagogical approach combined with social media technology also provides opportunities for students to actively create, connect and collaborate – a significant factor to consider when designing a course where the majority (71%) of the students surveyed indicated that they preferred to learn-by-doing (much more so than learning by reading, watching, or discussing). A self-determined learning approach together with social media can engage learners in the 'doing', as well as further support and extend

learning by giving students independence in deciding how they will learn and allowing them to make new connections and develop networks of learning. By helping students become more competent in social media use, educators have the potential to empower them in finding new ways of acquiring knowledge and in building an own PLE. At the same time, any incorporation of these media requires careful consideration so that the key affordances of the media are fully exploited and support the objectives of the learning activities in a holistic and pedagogically meaningful way.

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