

# HOW INTERNATIONAL ONLINE STUDENTS FROM A PROFESSIONAL DOCTORATE IN EDUCATION ARE USING SOCIAL MEDIA AND ARTIFICIAL INTELLIGENCE TOOLS INTO THE THESIS STAGE?

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## Abstract

The context for this paper is based on an exploratory case study aimed at uncovering the use of digital tools - Social Media and Artificial Intelligence (AI) tools - by students in the thesis stage of an online Professional Doctorate. Data were collected using a survey of the thesis student population, followed by a number of interviews with a convenience sample of the thesis students. This paper draws on the results of the survey to discuss the preliminary findings of the study, which indicate that, for the purpose of their theses, social media tools were the most used ones by the students mainly to keep contact with supervisors and peers. AI tools, in turn were used by a very small number of respondents mainly due to their lack of familiarity with such tools.

Keywords: Web 2.0, Web 3.0, Social Media, Artificial Intelligence, Online Doctoral Student, E-Learning.

## 1 INTRODUCTION

Increasing accessibility, interconnectedness, and technological advancement have made the use of digital tools such as web-based social media sites such as Facebook, Skype, YouTube, Blogs and Twitter in Higher Education (HE) more prevalent in learning and teaching. These popular social media sites are examples of Web 2.0 tools which are defined as “the collaborative web - with an emphasis on online collaboration and sharing amongst users” [1] Web 2.0 presents students with new opportunities for socialisation as well as for collaborative learning and enquiry with a possible positive impact on knowledge acquisition and development [2],[3]. At the same time, the relatively newly developed Web 3.0, which includes immersive 3D virtual worlds enabling users to connect, communicate and interact in real-time through their avatars [4] has also begun to have an impact on current and future directions of HE. Whilst Web 2.0 promotes social networking and mass collaboration between the creator and user, the more sophisticated Web 3.0 entails ‘intelligent’ applications using natural language processing, machine-based learning and reasoning[5]. For the sake of clarity, in this paper, we will use the terms social media and Web 2.0 tools interchangeably and in the same way we will use the terms Artificial intelligence (AI) and Web 3.0 tools.

A relatively large amount of the literature has been conducted with students at school and undergraduate level. However, far fewer studies are available in relation to the use of digital tools for scholarly communication, high-level thinking and peer support among online mature students at post-graduate and doctoral level ([6],[7]).

The initial impetus for proposing this study emerged from the research team’s professional roles in an online professional doctorate programme, which consists of a pre-thesis and a thesis stage. In the pre-thesis stages, students undertake nine taught modules over a maximum of 4 years during which they work closely with their peers and tutors within a well-structured online learning environment. In the thesis stage, which is expected to last no longer than 2.5 years very little peer communication and collaborative work is formally required. Students conduct their thesis research individually with the support of a primary and secondary supervisor.

We are mindful that doctoral students in general often experience an array of hardships and some drop out because of loneliness, lack of social networks and support amongst other emotional and social reasons[8]. The doctoral journey is an “intensely emotional, ego-threatening venture within a highly charged political environment” [8]. Attrition rates on some programmes are as high as 50% or more for online learners ([9],[10]). Given this context we feel that, as an underexplored area lacking

any comprehensive studies, it is important to try and better understand ways to address these issues through the systematic study of meaningful and authentic data.

Whilst there are networks and tools available to support online doctoral learners, little attention has been given to the ways in which doctoral students use these tools to shape their own learning or adapt them for their own purposes. It seems to us that doctoral students have not been regarded as active agents in the investigation process. Hopwood concurs when he points out, that “relatively few accounts of doctoral education present students as agentially shaping their own learning, practices or wider social environments”[11]. Thus the impact of these digital tools on their overall well-being and learning is unknown and this has helped to frame our research.

Our intention is to focus the study specifically on the thesis stage of an online professional doctorate in education in which a gap clearly exists in understanding students online experience as both individuals and learners. We aim to explore whether digital tools play any role in their learning experience as student researchers.

However, before going into the details of the study it is important to establish what the literature reports on how currently these tools are used in other educational contexts.

The majority of the studies on the use of these tools are quantitative or quantitative/qualitative in nature. ([12], [6],[13],[14],[15],[16],[17],[18]). Only few of them used a qualitative approach ([19], [20]). Yadav & Vohra's [16] study for example, surveyed 116 postgraduate students in India in order to understand how as Social Sciences students used the web 2.0 tools and technologies and how much this affected their education. Their findings indicate that the main use of the web tools was for professional and educational purposes such as finding relevant materials, sharing with friends and promoting their research. However, despite their enthusiasm students did indicate that they had concerns about maintaining privacy when using the tools. Indeed, another quantitative study carried out in India by Shabna & Mohamed [17] via a questionnaire completed by 300 doctoral students, confirmed Yadav & Vohra's [16] results reporting how students used mainly search engines and Wikis for retrieving information on a daily basis. They used the Web for searching research related materials, searching subject databases, accessing e-journals and e-books, for publishing articles, communication, carrier information and entertainment. In contrast a study from Aucoin [18] using a mixed method approach consisting of an online questionnaire and 30-minute follow-up interviews, reported that among online adult mid-career Canadian learners the perceived value of using Web 2.0 in their learning environments was mixed. It appears that some respondents who used them in their personal lives were far less likely to use them in their working or learning lives. Some also suggested that they only engaged with them reluctantly for a marked fear of being left behind. These two studies appear to be at variance with each other. In India participants were keen to embrace the tools in a professional sense but those in Canada appear to display a general reluctance. Geography, context and the date when the studies were undertaken may explain the differences. This also helps to illustrate the dangers of generalisation in this complex area and the last point in particular highlights the need to be cognisant of the speed at which these technologies change and the uses to which they are put.

## **1.1 What web 2.0 and web 3.0 tools students use and how?**

Research on the use of Web 2.0 and Web 3.0 among Higher Education students report some interesting outcomes in the type of tools used and the purpose attached to them. For example, a study of 150 undergraduate Nigerian students [21] found that they mainly used social networking sites including Facebook, 2go, Whatsapp, Google+, YouTube, Yahoo, Skype, Blackberry messenger and Blog for entertainment, communication and educational purposes. Yaoyuneyong, Thorton and Lieu [22] indicated positive US students experience with networking sites like Facebook and Twitter and video tools like Youtube but less so with collaborative thinking tools, virtual worlds, blogs, social bookmarking and wiki. More in details there are specific studies on the use of Facebook among Australian and US students ([23],[24]). In the case of the former study Facebook was used mainly for discussions purpose, and in addition Twitter was used for gathering and providing information. This study concluded that online collaboration through social media assisted participants by enhancing their learning and that many enjoyed and benefitted from using these tools to engage with a diverse range of people with whom to network and exchange knowledge. However, there appears to have been a reluctance to use social media within the students structured online learning experience. In the latter study, in which 62 faculty and 120 students were surveyed on the use of social media especially Facebook, the research indicated that faculty and students differed somewhat in their current and anticipated uses of social networking sites, relating to the perceived role of this tool as a social, rather than educational facility. Students were much more likely than faculty to use Facebook and were

significantly more open to the possibility of using it and similar technologies to support classroom work. Faculty members were more likely to use more “traditional” technologies such as email to communicate. Research carried out by Goh, Hong and Goh, [25] via an online survey sent to 153 undergraduate Malaysian students showed that Facebook was primarily used for social purposes such as keeping up with family and friends. However, a minority of the students used Facebook for academic purposes. Students were undecided about whether Facebook was helpful, effective, enjoyable and suitability as a learning tool even though they might have used it in that capacity before. Students with limited or no experience of using Facebook were more reluctant and pessimistic about it.

A further interesting aspect on the use of these tools that emerged from the literature related to the increasing importance of the use of these tools via mobile platforms. A recent study from Xiangming & Song [26] on the use of “Rain Classroom” mobile technology in China, which provides real time feedback from teachers to students, showed how a test and control group among 387 engineering students at graduate level reported statistically higher scores in the former case in both learning engagement and their willingness to continue and share the learning experience. The difference between two groups helps to prove that the mobile technology produced positive effects on participants’ commitment to learning. Mobile apps helped with informal but spontaneous learning guidance and interaction after the class. Another study from Sun, Lin, Wu, Zhou, and Luo [27] indicated a different use and purpose of mobile technology when compared with one which is more Web based. Seventy eight pre-service students/teachers were surveyed on the use of the two tools for learning purpose. Social Network Analysis (SNA) of the interactions inside the training were also used and the findings showed how mobile instant messaging among some students helped them in developing social interactions. It was also interesting to see how an instant messaging mobile app could be used for team building and for social interaction while classic discussion board could be used later on for knowledge construction purpose. The above studies indicate how mobile technologies such as instant messaging or similar technologies can help in creating more engagement and commitment among online learners.

Few other studies are however available in relation on the use of web 3.0 tools. Atabekova, Alexander and Shoustikova [28] undertook a study in Russia among university students on the use of web 3.0 tools especially of Google web based 3.0 tools for informal learning. The research revealed that their use within the formal academic curriculum allows the institutions, teachers and students to develop students’ self-diagnostic abilities, foster their motivation for social interaction in quasi professional contexts, enhance learners’ reproductive, productive, reflective and strategic skills, and improved their abilities in relationship to self-control. A study from Morris [30] on the impact of the semantic web on teachers and students reported that it is not easy to increase the use of these tools unless they become easier to use and more understandable. Indeed, the evolution of Web 3.0 tools and the semantic web make it possible to develop software which can better determine the needs of learners and tailor and to adapt their learning experiences. However, as already reported, studies on web 3.0 tools are still scant if compared with the more diffused use of web 2.0 ones.

Last but not least, the Costa, Alvelos and Teixeira’s [31] study related to how students can use social media both for learning and leisure purposes. Their findings indicate that when using Web 2.0, in order to improve the teaching and learning process, teachers should take into account the need to attract the occasional users in both contexts and to shift the non-occasional users from the leisure context to the learning one. Hence the use of these tools and their effect on students’ learning cannot be simply attributed to the use of technologies per se but on the way how these technologies are used.

## **1.2 How web 2.0 and web 3.0 tools support students’ online collaboration, engagement and learning?**

Several of the studies emerging from the literature indicated that Web tools should be used for enhancing the following 3 key elements:

- 1 students online collaboration and interaction;
- 2 students’ engagement and;
- 3 students’ online learning.

Even if not all of the studies are specifically related to doctoral or thesis stage activities, and even if the majority of them refer to web 2.0 rather than to web 3.0 tools it is worthwhile reporting some of the studies here for additional reflection.

The literature suggests that there is a positive impact resulting from the use of Web based learning technology on students online learning and engagement in terms of the level of academic challenge, active and collaborative learning, student-faculty interaction, supportive campus environment and the degree of socialisation ([32],[33],[34],[20]). The Wandera et al. study [34] in particular referring to postgraduate students use of social media among a cohort of 229 EdD students in US, found they perceived that social media had no significant impact on their academic success. However, social media did provide them with a platform to share ideas efficiently. The participants also found it beneficial to use social media that had a clear and meaningful relationship with their academic work.

A qualitative study on the use of social media for teaching and learning carried out among 46 Higher Education students in Malaysia and Australia who were divided into a total of 9 focus groups, [20] highlighted how the use of this media positively impacted the level of interaction amongst them. In addition, social media helped the students to better interact with learning content, improve peer to peer learning and develop critical thinking. An interesting aspect of this study reflected on how cultural differences impacted the use these students made of this media.

Huang, Wood and Yoo [35] investigated how 432 US college students used Web 2.0 tools. One of the outcomes of the study interestingly highlighted how the use of social networking tools and video sharing were the most preferred among female participants and created less anxiety among them in comparison with when they used online games for example. A later study from Yucel [36] using the Technology Acceptance Model (TAM) theory supported Huang et al. [35] study outcomes. The mixed study approach undertaken with 42 Turkish Higher Education students, also indicated that the use of Web 3.0 tools depended on the ease of use and effectiveness of these same tools. Moreover, whilst it appears that the use of Web 2.0 tools helped students to better communicate with each others, Web 3.0 tools helped them to access information and gain knowledge quicker even if the process was more mechanical. They thought that Web 3.0 would provide access to information faster and easier, and would prevent information being corrupted.

Other studies reported that Web 2.0 tools were mainly used for communication, educational and professional purposes [19] although they caution that effective use is dependent training and preparation ([37],[38],[39],[40]). Moreover, Bennet et al. [39] added that sometimes the use of social media need to be aligned with educational aims and purposes in order to be effective.

## **2 METHODOLOGY**

The main goals of this study is to explore and understand if, how and for what purpose students who are in the thesis stage of an online professional doctorate use digital tools. Additionally the research team would like to establish what kind of impact these tools may have had on their doctoral journey.

Hence the research questions are the followings:

- 1 Are online doctoral students using digital tools to support their learning in the thesis stage?
- 2 What are they using?
- 3 How do they use them?
- 4 What impact do these digital tools have on the final phase of their doctoral journey?

### **2.1 Research Design**

We used an exploratory case study approach [41] based on the two following stages: 1) an online survey involving all the online doctoral thesis students which captured key demographic information as well the use of digital tools. The information gathered helped to determine who participates in stage 2: ten semi-structured online interviews with selected online doctoral thesis students. This approach has been adopted because of the need for rich and deep data, which is better provided by a more qualitative rather than a quantitative approach. The use of an exploratory case study serves to highlight how the doctoral thesis stage is a unique online context when compared with the focal point of other research.

The study population consists of all the students in the thesis stage of the program. They currently number 170. The research was undertaken within the strictures of the host University's ethical approval process to protect the dignity, rights and privacy of participants.

Twenty six students responded to the online survey and from them 10 accepted the request to be interviewed via Skype by a team member without direct connection to them. Currently, interviews are still being undertaken - hence the paper will present mainly preliminary results coming from the submission of the online survey via Survey Monkey Gold © tool.

The survey was based on the model developed by Aucoin [18] on the use of Web 2.0 tools and modified to include the use of Web 3.0 tools. The survey was initially piloted with 3 faculty members and students currently involved in the program and then a final version produced. It was designed to ascertain the type/s of digital tools participants were using in the thesis stage, the extent of their usage, and the purposes for which they use them. Additional information including nationality, gender, age, year of professional experience, people with who they are connected with in the thesis stage and how long they have been in the thesis stage was collected. The anonymous semi-structured qualitative interviews are designed to collect rich information in order to fully answer research question 3 and 4. The focus and structure of the interviews have emerged from a literature review of work done in other studies.

Survey data has been analysed using basic statistics while interview findings transcripts will be analysed using Thematic Analysis techniques in order that meaningful comparison between themes and the survey findings can be undertaken.

### **3 RESULTS**

#### **3.1 Participants demographic information**

The survey results indicate that the age group of respondents was mainly between 40 and 60 years old (25), they hold senior managerial positions and have more than 10 years of professional experience. The majority of respondents (20) were female while only 6 were male. The location of the students was quite varied with 4 from European countries, 6 from Canada and the US, 9 from Asia, 2 from India, 4 from Emirates countries and 2 from Africa. Sixteen respondents identified themselves as good at using technology while 9 reported to know only the basics.

#### **3.2 Social Media and AI tools usage in the doctoral thesis**

The social media tools being used most for the doctoral thesis were: Skype (26) Youtube (19) GoogleDocs (18) and WhatsApp (14). This is very similar with what has been used at a professional level (numbers of usage were only slightly different) with an addition tool "LinkedIn" (13). For the purpose of "recreation" and "networking", Facebook was at the top of the list. However, WhatsApp was being used across all categories followed by Skype and LinkedIn (this last used mainly for networking purpose). Blog and Virtual Reality together with few other less known social networks, were never used by students.

In contrast, the AI tools being used most for doctoral thesis activities were: Google Search and Google Earth. In fact, these are the only two being used across all categories, whilst tools such as 3D augmented reality, 3D gaming technology, 3D virtual lab, 3D Encyclopedia, 3DWiki and Intelligent Tutoring system were hardly used or not at all.

When students were asked what kind of tool they preferred using in the thesis stage Skype was at the top of the list followed by WhatsApp, Youtube and Google. Below are some of their comments extracted from the survey:

"I used YouTube for delivery of video content related to my study and Skype was the go to technology for communicating with my thesis supervisor."

"Skype, because it is the next best thing to fact-to-face. Moreover, one can record the sessions and reach back when necessary to make sure that one has understood correctly what was said during the exchange with tutors for instance"

"Google Docs because it allows different persons to work on the same document and sharing is easy.[...]. WhatsApp because it allows me to interface other thesis students and share resources and Skype because for meeting with my Thesis supervisors and to share information."

However once the topic shifted into AI tools usage, students reported mainly that they had no preference in usage (24) since they did not have any significant experience about them except for Google Intelligence Search (7) that was used into the thesis stage too.

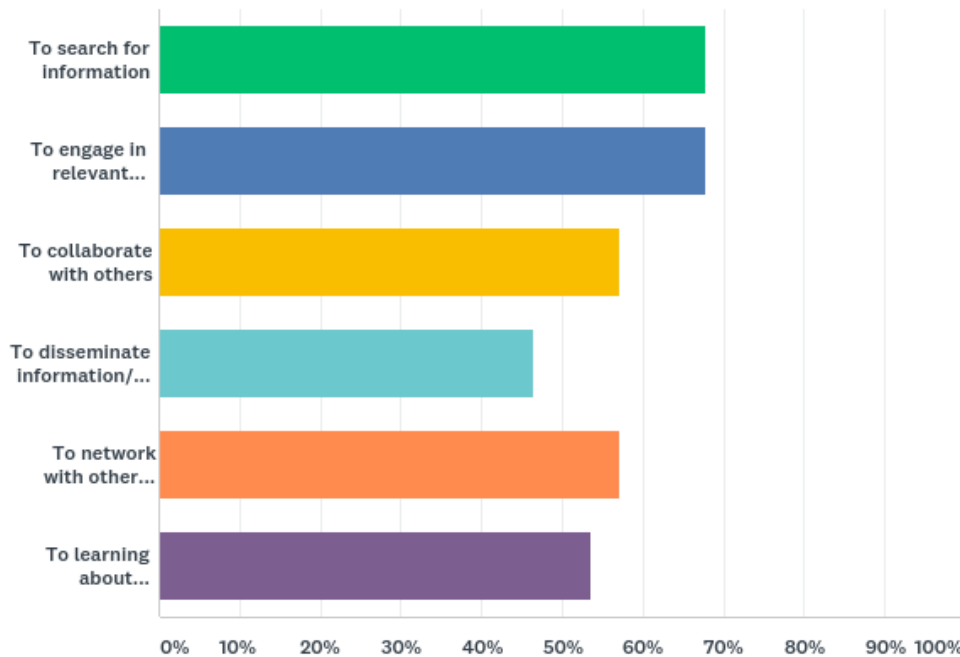


Chart 1. For what purpose did/do you use social media tools whilst engaged in the thesis stage?

Chart n. 1 indicates that the purposes for using Web 2.0 tools during the thesis stage were varied and ranged from searching for information to engage in relevant discussion to collaborate with others. Interestingly 13 students purposely used these tools for disseminating information.

Students also reported that whilst working on the thesis it was either important or extremely important to maintain contact with supervisors and peers as indicated in Chart n.2

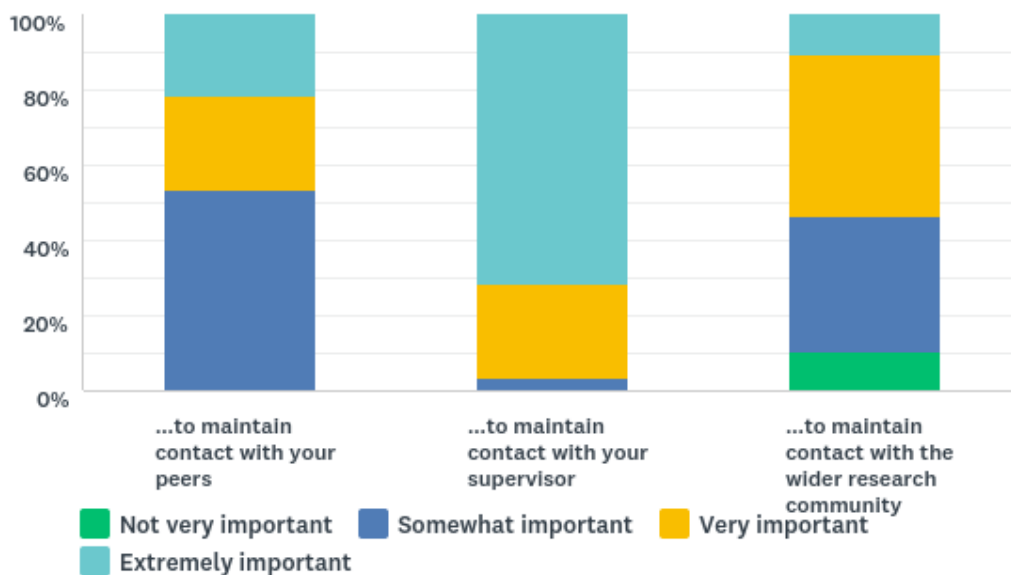


Chart n. 2 While working on your thesis, how important do you think is....?

### 3.3 Why these tools were useful or not?

Interestingly and in alignment with what students have indicated above, they stated that using social media tools helped them to achieve their learning goals. Students commented that : “There was a lot of sharing of experiences which helped the learning” , “Assists me to collaborate with my supervisors periodically” ,“Provides further support in the community of practice”, “Bonding with fellow EdD students made the journey more real.”, “ It makes me feel less alone” and “Its helped me to get quick feedback when I have inquires in mind related to your study and to understand others challenges

which sometimes related to mine so we can advice each other". It appears as though these tools helped them to feel more connected with peers and supervisors during the thesis stage and to get the support needed in real time. However, they complained that not enough social media usage was built into the programme. They suggested that and this should be planned and encouraged. In contrast students were far less positive about AI tools, mainly because of their lack of familiarity with them. Participants, nevertheless reported how they would like to know more about them.

A majority of students were, like those in the Yadav & Vohra's [16] study, concerned about privacy issues related to the use of social media and AI tools.

## 4 CONCLUSIONS

In conclusion the preliminary findings of this study collected via online surveys indicate how social media tools were mainly used among online doctoral thesis students rather than AI tools, of which they had little specific knowledge except Google Intelligent Search Engine. In contrast, Skype, Youtube, GoogleDoc and WatsApp appeared to be the most used social media tools whilst Blog and more esoteric social networks were never used. Students preferred to use tools that helped them communicate with their supervisors and with peers, to share resources and documents, to collaborate with others and to engage in discussion.

Social media tools usage helped students to achieve their learning goals whilst AI tools did not. The former helped students to engage more fully in learning communities, to feel less lonely, to provide and receive reciprocal support when sharing resources and to be helped when required.

There is an overall will to have a better and more diffused use of these tools (both social media and AI) during the thesis stage although concerns about privacy were raised.

We hope to pursue this more deeply as a result of the findings of the semi-structured interviews we are currently undertaking.

Aspects that we might consider to address via interviews and data analysis will be:

- 1 What our doctoral thesis students would consider helpful and useful in terms of using technologies to assist their thesis research, taking into account their characterises?
- 2 The possibility of using mobile technologies/applications to enhance learning during the thesis stage.
- 3 How can we introduce and integrate AI tools appropriately?

It is clear that more researches needed on this topic among graduated and doctoral online students.

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