A qualitative study of Swedish university students' perceptions and experiences of using digital media in informal learning

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Abstract

Background: Emergence of new capacities on information and communication technology have influenced educational activities of learners, in particular University students toward non-formal learning practices by using a various type of tools. A grounded theory approach was undertaken for this research. Purposive sampling and semi structured interviews were carried out with sample of 48 students in various majors in Faculty of Economy and Communication at Karlstad University in Sweden during the period January-June, 2010. Fifty six sessions of interviews were carried out. The data were analyzed using constant comparative analysis. Six main themes emerging from this study included *"Individual interests", "Social motivations"," Professional views", "General tools", "Virtual communities" and "Professional digital tools".* A theoretical model was designed to represent the interrelationships between these six categories. The result of data analysis reveals that the *students enable to address their learning needs via digital media in order to gain a large extent of information easily; they turn to more interactive educational activities based on digital means, such as using virtual and blogging communities, wikis and searching multimedia data on the internet.* Limitations and implications for future research are discussed.

Key words: Informal learning, digital media, virtual communities, ICT, formal learning

1. Introduction

Over the past few decades, evolution of ICT (Information and Communication Technology) has affected on the speed of both formal and non-formal learning actions and "the way people engage with real life learning is changing by ICT technologies" (Weert and Tatnall, 2005, p 192). Computers and other aspects of ICT allow people to engage a wide variety of activities and experiences that can support learning. Emerging high technology in educational systems promote the way of using and getting access to traditional learning means such as publications, printed books, TV and radio. Nowadays, most people around the world would be able to get access to both digital media and new formats of traditional media through virtual spaces on the Internet.

Internet provides a large extent of learning opportunities for its users and interestingly WWW

Virtual communities, E-learning portals and search engines are regarded as some examples of useful means toward phenomenon of informal learning (Steinkuhler, 2004; Rosen, 2009).

Learners who are interested in using such digital tools within informal learning actions enable to get access to a wide range of information in any time. . It seems that the amount of information accessible via the ICT has grown to gigantic proportions (Harriri, 2008). Matulich et.al (2008) entitles today's learner as "Digital Native" & "Digital Millennial Learners". The importance of informal learning in today's international economy took into special account by several countries. For instance, member states of European Union were expected to integrate their general education provision toward informal learning as a critical element due to making the states as one of the leading knowledge-based economies of the world (Edwards and Boreham 2003). Therefore, one

needs to keep learning new technologies due to keep up with the rapid development of the digital world.

The use of the Internet plays an important role in the development and use of ICT (Garces et. al.2004) and in improving communication and information sharing in the world. It allows information to be collected and collated, but it also plays a significant role in maintaining social interaction and supplementing other forms of sociability. It is apparent that educated people such as university students spending much more time on utilizing internet for their activities.

Regarding to this fact, the main aim of the survey is to understanding of why and how university students in Sweden utilize digital media within informal learning actions. The research provided semi-structured interviews among sampling students at Karlstad University in Sweden.

This study aimed to highlight students' perceptions of their own experiences and factors affecting usage of digital media within informal learning actions. The study attempted to address questions, such as:
 "What are students' perceptions of using digital media within learning activities"?

 "Which factors affect using digital media tools in learning and studying disciplines "?

A qualitative approach was employed as an important and essential first step in understanding the participants' outlook and their perceptions. This method resulted in a set of themes and categories about the viewpoints of university students.

Although there is a considerable amount of research carried out into usage of digital media in fostering non-formal learning (Drotner, Jensen and Schorder, 2008; Mutka & Kirsti, 2009; Buckingham, 2001; Kafai & Resnick, 1996; Sloman & Reynolds, 2003; Masters & Nykvist, 2006; Lohman, 2009), but still there are few studies to determining the effect of digital media in various aspects of informal learning actions among university students.

The paper begins by reviewing some related literatures in the area of informal learning and digital media. Next, a short description on qualitative research survey based on grounded theory has regarded as methodology of the survey, followed by analysis and discussion of the results. Last, author discusses the implications and limitations of this research and some suggestions for future researches.

2.   Literature review

It seems that formal learning is a kind of learning process that takes place within a teacher-student interaction, such as in a school system, in an academic environment and so on. Within formal learning process, knowledge is associated solely to the intellectual capabilities and processed as from the teacher to the student (learner) to learn in a one-way direction. In converse, informal learning practices can be viewed as learning practices developed in two-way interactive process in-between individuals, and in-between individuals and the surrounding context.

More or less explicitly, the term non-formal learning encompasses informal learning, which it can be described as unplanned learning in elsewhere, but also involves planned and explicit approaches to learning, not recognized within the formal education climate. Sometimes, informal learning also occurs in more formal settings such as science centers and museums (Borun, Chambers, & Cleghorn, 1996, Paris, 2000).

 Not only informal learning regarded as learning that is not structured like a pedagogical activity by an educational institution (Schugurensky, 2006), but also it occurs as the result of individuals' making sense of experiences they encounter *during* their daily life (Marsick & Volpe, 1999). Leslie et.al (2003) state informal learning is a conceptual framework for which the process is neither determined nor specified, and which may take place inside or outside of the classroom. Thus, learning informally can be regarded as resulting from daily activities related to work, family or even leisure (Tissot, 2004) and also it is predominantly a social process (Enos et.al,2003) and collaborative activity(Selwyn,2005).

Kafai and Peppler (2007) add to this argument that one of the benefits of informal learning spaces is that youth can explore their interests in a lengthy, uninterrupted span of time. It means informal learning does not take place in special educational

establishments standing out from normal life and professional practice (Rogers, 1996). Ashton and Sung (2002) argued that informal learning plays an important role in facilitating the effective use of high performance practices such as self-managed work teams, team working and continuous improvement. Notwithstanding the traditional role of formal learning in many academic and non-academic environments, emerging new technologies such as Internet and digital media enhanced the importance of non-formal learning in today's global village. By getting access to the technologies, people enter into a new step in the evolution of technology-based learning, characterized by 'seamless learning spaces" (Looi et. al, 2010). Therefore, use of technologies such as digital media in informal learning settings is of substantial interest to educational researches.

According to Sloman and Reynolds (2003), emergence of the Internet has been recognized as a significant change which will have an effect on many facets of business and social interactions and the change have given rise to the concept of e-learning community. Virtual communities are learning communities because their members learn while taking part in their activity (Henri and Pudelko, 2003). The communities are regarded under a wide range of signs such as Virtual communities, Chat rooms, online forums; Social Networking sites (SNSs), digital academic environments and so on. Bente et.al (2008) argue that shared workspaces and collaborative virtual environments allow for real-time information exchange and the synchronization of distributed working efforts over large distances.

In fact, using an online virtual world may increase student engagement, particularly for online classes, by providing opportunities to foster informal interaction between students and faculty (Childress & Braswell, 2006). Today's schools seem to be a significant place for connecting community resources with students' educational requirements. Furthermore, students are often interested in learning and utilizing computer-based technologies because it is fun to them (Xiao and Carroll, 2007). To an extent however, people in today's information society, especially young people show a high attitude to utilize digital media within learning process. According to Willett (2007), young people experience various ways of learning through their consumption and production of digital cultures within

informal learning. In brief, what was gleaned from a review of the literature is that the role of digital media in informal learning practices have raised inevitably and future students can be viewed as alumnus of ICT driven academic environments

3. Research questions

Regarding to subject of the survey, two research questions took into account. Why do Swedish University students utilize digital media for educational practices? According to this question, the author wants to consider the importance of informal learning among Swedish students and then to realize the main reasons of the students in using nontraditional tools in learning activities.

As second question, the research decides to understand over different types of digital media used among the students. As it has pointed out before, there are a variety of digital media which are utilized with respect to user's perceptions and requirements. Which kinds of digital media are they interested in? The second question enables the survey to find the approach and experience of students in using a variety of tools in self-regulated education.

4. Method: Qualitative research and Grounded theory

4.1 Methodology

In order to gain comprehensive overview on the research area, the author used qualitative research rather than quantitative research. Because regarding to the concept of research questions, the research need to figure out different experiences of university students in utilizing digital media within informal learning. Qualitative methods are typically more flexible and rigorous than quantitative methods (Punch, 2005). Qualitative method allows greater spontaneity and adaptation of the interaction between the researcher and the participants.

For example, qualitative methods ask mostly "open-ended" questions that are not necessarily worded in exactly the same way with each participant. With open-ended survey questions, participants are free to respond in their own words, and these responses tend to be more complex than simply "yes" or "no." By

qualitative research we seek to understand why/how do people do the things they do, why/how do they think the things they think.

Mayers (2000) notes that those who are not familiar with qualitative methodology may be surprised by the sheer volume of data and the detailed level of analysis that results even when research is confined to a small number of subjects. In order to be able to interpret and analyze data collected by undertaking semi structures interviews, grounded theory (GT) method was used. GT recognized as a methodology of improving inductive theories that are scientifically grounded in gathered data (Bitsch, 2005) and set of systematic procedures for analyzing data. The theory was written by Barney Glaser and Anselm Strauss (Strauss and Corbin, 1990) in the late 1950s in USA.

In addition, this approach was selected due to realize students' perceptions on digital media. Their outlook are conducted to a large extent of multidisciplinary concepts such as ICT and media and it seems that GT focuses on identification, description, and explanation of interaction processes between and among individuals or groups within a given social context (Happ and Kagan,2001).

4.2 Participants and Data collection

Regarding to consider the research questions, one Swedish university was selected. Karlstad University has more than 10,000 students in different majors with various number of under graduate and graduate students. An academic environment at Karlstad University is focused more on business and economics courses/programs and because of this fact; the University is well-known as Karlstad Business School.

Karlstad University was selected to take into account attitudes and interests of possessing digital means in the scope of informal learning among University students. The students enable to connect to high speed internet at the University and many courses are provided with digital tools such as video clips, PowerPoint files, Internet and local portal of Karlstad University due to enhance effectiveness of learning among students.

The researches' approach was associated to data collection by interviews and without strong prior assumptions and do not impose their own views on the words and actions of the research participants.

As Hoepfl (1997) demonstrated, research problems tend to be framed as open-ended questions that will support discovery of new information. The students were asked to express their answers to the given open-ended questions clearly and in simple language. Participants were informed that they could refuse to answer any question at any time.

All responses hold in the strictest confidence. No individual respondent identified and all data were reported in summary format, or in the case of direct quotes with a false name. All data stored in a secured place and only the researcher had access to the identity of the research participants.

Participants comprised of 48 Students who were studying in both undergraduate and master's degrees in the Faculty of Economy, Communication and IT at Karlstad University in Sweden. The researcher used purposive sampling at first and continued with theoretical sampling according to the codes and categories as they emerged.

Data collection began with under graduate students. After interviewing ten students and coding the transcripts, the codes, and categories related to different aspects of using digital means and factors affect the usage of the tool, the researchers interviewed some of the other under graduate and master's students.

Finally, a total of frothy eight students were interviewed. All participants had studied for more than one year and age ranged between 20 and 31 years. Individual participants' characteristics are presented in Table 1.

4.3 Interviews and analytical process

Each of the participants was contacted to explain the objectives and the research questions. If the participant agreed to join in the research, a taped interview was scheduled. Participants were interviewed in a private rooms in library of the university using an individual, semi structured interview format. The participants red and signed an agreement of taking part to the research voluntarily and accepting audio taped interviews. Ethical issues in this study involved the assurance of confidentiality and anonymity for the respondents.

The interview guide consisted of open-ended questions to allow respondents to fully describe their own opinions, outlooks and experiences about applying digital means within learning actions. At the beginning of each interview, the participants were asked to describe their educational and learning behaviors and explain one of their own experience in using digital media and then to add their own perceptions and experiences of learning outcomes.

For instance, they were asked:
- Which factors affect your informal learning activities?
- Are you able to get access to high speed internet during the week days easily?
- How often do you use mobile phone to learn something?
- Which factors enhanced your perceptions of using digital media as university student?
- Let me know that, from your point of view, how students can use digital media within learning actions?

Brief notes were provided about the issues emerged during the interview. The researchers provided

further questions if these issues had not been automatically clarified. In order to implement analytical process, the author followed Glaser and Strauss's (1968) interpretive, three-step comparison approach to working with the data: discovery, coding, and discounting.

During initial analysis, the researchers worked together to identify emergent themes, concepts, and patterns inherent to the data after carefully reading through participants' answers several times.

All interviews took one session according to participants' requests, except seven cases that included two sessions because of challenges in recording system. Each session lasted between 45–60 minutes. Data were collected and analyzed over a six-month period in 2010.

4.4 Data analysis

The process of conducting English language based interviews, transcribing the recordings, and analyzing data occurred simultaneously. Three PhD students at the university were employed to undertake the procedure of transcribing the recorded interviews during one month on March.2010. After transcribing the interviews, full transcripts were typed and then returned to each student due to realize any possible mistakes within the process of transcribing. No incorrect manuscripts had been reported during the process. The students were given coded interviews with a brief of achieved themes to address the codes and categories to participants' experiences about the subject of the research by e-mail during April 2010.

In fact, each interview provided direction for the next one. Open, axial and selective coding was applied to data. Codes and categories from each interview were compared with codes and categories which have been achieved from other interviews to highlight any relationships.

Analysis begins with identification of the themes emerging from the raw data, a process sometimes referred to as "open coding" (Strauss and Corbin, 1990). Open coding is the process of breaking down the data into distinct units of meaning. As a rule, this starts with a full transcription of an interview, after which the text is analyzed line by line in an attempt to identify key words or phrases which connect the

informant's account to the experience under investigation. During open coding, the transcript of each interview was reviewed multiple times and the data reduced to codes. Then, the codes that were found to be conceptually similar in nature or related in meaning were grouped in categories.

Table 2. Emerged main categories and subcategories

Main categories	Subcategories
Individual interests	Electronic learning / Entertainment / Life style
Social motivations	University's facilities / Friends' motivations / Teacher's guides
Professional views	Digital consulting / Mutual interactions / Data analyzing / Data sharing
General tools	Search engines / Archived programs / Chat / Internet forums/Software
Virtual communities	Facebook™/ Myspace™/ Youtube™ / Wikis / Blogging communities
Professional tools	Mobile phones / Scientific databases / E-leaning portals/ Video-conference /Avatars

Addressing collected codes to subcategories which have been devoted to main categories seems to be a next step of data analyzing. Axial coding concentrated on the conditions and situations that cause a phenomenon to take place and the strategies applied to control the phenomenon.

Each category reflects the meaning of several concepts to become a higher level concept. After concept coding, the researcher use hierarchical axial coding (main codes and sub codes) to sort collected data into some sort of groups (categories and sub-categories). Categorized concepts by reading the transcripts and their concepts lists to find interrelationship among concepts and to name phenomenon with interrelated concepts is the next step in data analyzing. Illuminative quotations were highlighted and coded using the some categories that had been identified.

In order to get more validity checking, four experts of qualitative research methodology at the university considered 48 full manuscripts due to peer checking. In extent, however, 85 % of the transcripts were checked it up exactly and more than 80 % agreements acquired between the experts and they

followed the same way as researchers' analysis to come up with main categories .

As Backman and Kyngas(1999) noted, maximum variation sampling and checking also helped to meet credibility and confirm ability of data. Regarding to this argument, two Faculty members at the university who did not take part to the research were asked to check the transferability of the acquired results finally. They accepted the process of transferability as well.

Although a variety of different levels of students in different majors were interviewed, the themes that arose were consistent across interviews. During the last five interviews, no new data identified; therefore, data gathering was stopped. Data were considered "saturated" when no more codes could be identified and the category was "coherent" or made sense.

5. Results

The core categories "Individual interests", "Social motivations"," Professional views", "General tools", "Virtual communities" and "Professional tools" were identified from the data analysis. Emerged main

categories and sub-categories are presented in Table number 2.

A theory emerged that describes the perceptions and experiences of Swedish university students on utilizing digital media within learning actions on informal disciplines.
As a result of the theory development process, the authors devised following hypothesizes:

- Digital media can facilitate and foster learning procedures.
- Social networking can be viewed as the powerful tool to foster informal learning actions.
- Informal learning actions can be improved by digital media.

6. Discussion

The study used qualitative research methodology based on grounded theory to identify digital media's implications on developing and promoting informal learning among University students in Sweden. It should be noted that what are found in a qualitative study are always 'findings' and not 'results' (Burnard, 2004). A survey was conducted to describe *the interests, attitudes and tools influencing the involvement of Swedish University students* in informal learning practices.

Therefore, the overall interpretation of the findings, as previously delineated with greater detail, was that the University students rely seriously on utilizing digital media, especially internet-based tools and activities such virtual communities, wikis *and searching multimedia data on the internet. The digital tools can be seen as strongly motivators of the students to learn more informally than traditional systems of learning and training.*

The findings are similar to the other studies done using qualitative methods, despite the vast differences in samples and geographic location. Tough (1971) found that 80% of adult learning is informal, while Livingstone (1999) noted later on that 95% of adults participate in informal learning activities. As Cofer(2000) and Lohman(2000) state, informal learning can be considered as developer of professional knowledge and skills , thus the

importance of using different tools in fostering informal learning should take into special account. As it has been illustrated in table 3, data sharing and participating to virtual communities and communities on the Internet are regarded as one the most significant attitudes among the students in using digital media.

Studies of Watkins et.al (2007) support our result that four types of participation (Rapid publication, Personalization, Content sharing and Co-creation) young people may be involved in when utilizing online digital media. According to Jin et.al (2010) social virtual worlds (SVWs) are able to facilitate more social interaction, efficient visual communication, and integration of rich media and sharing of student-generated content within virtual learning environments (VLE).

Mobile phones and especially Handheld devices such as PDA (Personal Digital Assistant) have been used in teaching (DiGiano et al, 2003) and the devices have been deployed as learning tools in both formal and informal learning contexts, with learners of all age groups (Clough et.al, 2008).

Our findings within the theme of "Virtual communities" show an importance of virtual communities such as Facebook, Youtube and other portals of the internet for learning process within informal nature.

It seems that using digital media are not conducted to only online tools. But it is obvious that creating virtual learning communities by a variety of tools can be recognized as a potential means of building commonalties and connections essential to education and society (Luppicini, 2003). Social media technologies have broadened learning options, shifting the focus from individual/institutional custodianship to participatory relationships (Russo et.al, 2009).

Social media provides a mechanism through which young people can organize ideas, interpretations and assemblages, to create meaningful associations between their own and others' experiences. If we take a general look to around, it is possible to claim that there are a lot of digital tools that they are designed in virtual world to enable learners to get access to a wide range of information.

Some respondents within the survey demonstrated the usage of video sharing sites. Youtube.com as one of the most popular web sites in the Internet for sharing video files can be viewed as an important online University in the Internet while numerous video files in different scientific and non scientific issues are uploaded on the site. Today's Internet users are able to learn via variety of subjects and however, they can improve their knowledge with non-formal learning communities. In an informal learning community, learners are self-selected and gather together for informal learning purposes (Romiszowski and Mason 2003, p. 408).Facebook as another social networking site on the Internet can be viewed as a multinational country on the World Wide Web.

Interestingly, collected data revealed that sharing information in this site enable users to connect to a lot of users around the world and sharing information help them to learn as much as possible. *Baker et. al (2009) claim that s*ocial networking sites(SNSs) such as MySpace and Facebook are used by large numbers of college students. One of the most important characteristics of SNSs are conducted to information sharing. Bruckman(1999) states that information sharing can be seen as an educational use of the Internet.

Some participants revealed that their professional usages in digital tools were related to avatars and video games. It can be viewed that a long with social networking sites, avatars play a significant role in raising conductive informal learning by digital capabilities. As Drotner et.al (2008) argued online games, social networking websites and community-generated encyclopedias such as Wikipedia.com all offer new means of communication, collaboration and creation for their users. By using wikis, users can get access to a wide range of information in different languages. It is an important part of wikis that users can learn diverse and complex posted issues over the wikis by clicking on different URLs and it seems that wikis can be views as an online informal University on the Internet.

The research findings have shown that that today's students use Wikis with respect to their different preferences and learning attitudes. But it should be noted that although Wikipedia as a free and web-based encyclopedia on the Internet are criticized on

reliability and accuracy of its contents, but Giles (2005) examined a range of scientific entries in both the Encyclopedia Britannica and Wikipedia and he revealed that there is a few differences in accuracy. The importance of wikis in informal learning processes on the Internet should be considered effectively.

In addition to the phenomenon of online media, some researchers believe that video games and avatars play a significant role in fostering informal learning activities. According to Tapscott (1998), video games are an integral feature of life in our *generation.* Playing video games enable players in different ages and educations to realize numerous concepts by playing games within virtual worlds. Duque et. al(2008) argue that those students who are interested in using video games, providing an appropriate opportunity with a fun and structured practice that have an effect in their learning (Duque et. al, 2008).

Not only video games are utilized as an entertainment tool for their users, but they also have considerable potential to be an informal learning tool. Video games illustrate a lot of avatars in which they play your role in the virtual world. Peterson (2005) defined avatars as 'online manifestations of self in a virtual world, and are designed to enhance interaction in a virtual space' (p. 30) and they are able to promote online object-oriented environments for supporting student learning (Falloon, 2010).

The avatar can be used within virtual worlds in a variety of purposes such as education and learning (Antonacci et.al, 2008). Shaffer (2006) concluded in his study on the role of video games in fostering learning that the games can be viewed as an effective tool for students, while studies of Prensky (2003) revealed enormous potential for learning in video gaming.

The informal learning tools are growing exponentially every day and our traditional learning technologies are not as effective as they once were. We need to take our known instructional design techniques and adapt them to these informal learning tools that are invading the workplace and which are becoming the new tools of learning.

7. Implications for Practice and Future Research

7.1 Role of new generation of digital media

The first major area of future research is to develop a greater understanding the role and competitive advantages of digital media regarding to traditional ones in self-directed learning and not just as a phenomenon in today's global village. For instance, it is not so hard today to learn Spanish or Japanese language with huge number of video-clips which have been posted on Youtube by ordinary and professional users. If someone does not have enough time to go to school or institutes for learning international languages, just finding some virtual communities for connecting to native speakers and downloading different levels of educational audio/video clips can be a well opportunity toward self-study. Future research should consider the role of digital media, in particular web 2.0 on enhancing self-learning activities by the facilities at academic environments.

7.2 Role of digital media in learning engineering contents

The second recommendation of the study for future research is to take into considers the role of digital media in learning engineering and technical contents. For instance, if someone wants to learn some courses within the area of Mechanical Engineering such as Mechanics of Material or Fluid Mechanics, how it is possible to get access to multimedia contents within such research area. It means how engineering students will be able to get involved into technical courses/contents. It seems that virtual communities cannot be regarded as recommended places for learning engineering issues than non engineering matters. Therefore, self-studying in the area of engineering issues by digital media need more attempts of the academic environments due to provide an appropriate facility in teaching the issues.

7.3 Motivating students toward informal learning

 Another implication of the findings from this study is the inference that the University students like to spend much more time on learning via digital media instead of traditional systems of learning. In spite of the fact that today's students are interested in applying digital media to acquire wide range of information, however, administrators of the academic environments and educational policy makers and planners play a main role to motivate the students toward non-formal learning. Thus, motivating

University students to spend efficient time on using digital media should be considered as further research area. Moreover, exploring on personal characteristics enhancing motivation to engage in informal learning should be focused on the research area as well.

7.4 Business approaches to informal learning

Our qualitative survey implicates that University students like to get access to distance learning opportunities on the Internet. So, providing distance learning resources over the web sites of higher education institutes seems to be an essential task of the existing institutions and an implication for future studies. Not only multimedia and Open Educational Resources (OER) [1] on the internet develop and distribute teaching and learning activities (Yuan et.al, 2008) due to enable students to get more access to data, but also "sharing educational resources over the Internet provides multiple benefits, from academic collaboration to economic development" (Johnstone, 2005, p.15).

As a good example, the Massachusetts Institute of Technology's (MIT) course materials have been available to the world through its Open CourseWare (OCW) initiative since September 2002(Wilson,2008). In addition, future studies should be able to evaluate the role of OER in enhancing business approaches into informal learning market.

7. Conclusion

This study revealed viewpoints of university students of utilizing digital means within informal learning actions. The survey provides relatively strong evidence that non-formal learning by utilizing online learning capabilities and technologies have been involved among University students as a significant change in their social and individual activities. Not surprisingly, however, today's learners prefer to engage over the digital media in both developed and developing countries.

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[1] Open educational resources are educational materials offered freely and openly for anyone to use and under some licenses.

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Table 1. Participants' demographic data

Degree	Number of students	Range of age	Sex	
			Male	Female
Undergraduate	*32*	20-27	14	18
Graduate	*16*	22-31	11	5