

# THE HIGHS AND LOWS OF UBIQUITOUS CONNECTIVITY: INVESTIGATING UNIVERSITY STUDENTS' EXPERIENCES AND CONNECTIONS WITH WELL-BEING

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## **Abstract**

Higher Education has seen a dramatic increase in the use of Information and Communication Technologies in recent years. Universities around the world have built complex Information System infrastructures implementing local networks, wireless networks, cloud services and Virtual Learning Environments (VLE). These technological changes have stretched and expanded the boundaries of traditional campus universities in space and time allowing easy and ubiquitous access to people, information and services. The term "ubiquitous connectivity" identifies this enhanced accessibility to resources due to the development of infrastructures and devices.

The main goal of this qualitative research is to investigate how new technologies and ubiquitous connectivity affect university students' experiences and consequent well-being. The methodology adopted was constructivist grounded theory to enable an emergent theory to be built through data collected from on-campus students using a qualitative survey, semi-structured interviews and focus groups.

The data analysis shows that new technologies and ubiquitous connectivity can play a positive role in enhancing students' well-being by providing them: 1. A sense of ease and freedom in managing their daily learning duties 2. A sense of improved workflow by using mobile devices to retrieve information and to take notes anytime and anywhere during the day 3. Flexibility in managing everyday life and in balancing study, work and leisure. 4. A sense of connectedness with other students and lecturers 5. A sense of reassurance by knowing that peer and lecturer support is always at hand.

However, in some cases new technologies and ubiquitous connectivity seem to have a negative impact on learners' well-being. The data analysis shows that students can experience: 1. High levels of stress when technology failures occur or when online information is not accessible due to the lack of alternatives in performing their learning duties 2. Difficulties in managing information overload and the constant stream of information arriving to their devices 3. Stress and irritation when dealing with complicated website layouts and disorganized online materials 4. Lack of motivation in attending lectures due to the ease with which materials and information can be retrieved from the VLE and from peers using social media and networks. 5. Difficulties in developing relationships with lecturers and peers due to the lack of face-to-face communication.

These findings can be utilized to provide pedagogical suggestions to university stakeholders to minimize the negative impacts of new technologies and ubiquitous connectivity on learners' well-being and to improve the quality of students' experiences.

Keywords: ubiquitous connectivity, new technologies, student experiences, well-being, social media, virtual learning environment, qualitative methods.

## **1 INTRODUCTION**

The relationship between well-being and new technologies among university students is a complex topic to investigate. The first element of complexity depends on multiple interpretations and definitions that experts use to define the concept of well-being [1]. Regarding specifically new technologies, depending on the approach adopted, the term well-being has been used in research to refer to mental health related issues, physical health or psychosocial wellness [2]. With reference to this first element, this research utilizes a psychosocial perspective with the term well-being used here to indicate and investigate factors that can affect students' socio-psychological and emotional wellness. The second element of complexity is determined by the different focus that researchers can take when investigating students' use of new technologies at university. Many studies concentrate specifically on the learning aspect of students' experiences with new technologies [3,4,5]. Terms such as e-learning, online learning, blended learning, technology enhanced learning or hybrid learning are usually

adopted in research that investigates how new technologies are changing teaching and learning practices. However, very few studies explored more generally how the potential time- and space-independent access to online resources provided by new technologies (here named “ubiquitous connectivity”) impact learners’ experiences and consequent well-being.

The latest Survey of Technology Enhanced Learning for Higher Education in the UK [6] reports that 100% of UK universities have implemented a Virtual Learning Environment (VLE) and are committed to further improve their technological infrastructures and services. Universities often use these platforms along with other software tools to provide a wide range of services to students and staff members such as content management, online communication and collaboration, access to electronic reading resources, access to course information and timetables, online submissions, plagiarism detection, online assessment, e-portfolios, blogs and wikis.

The availability of these tools in combination with the utilization of web resources and social media provides a great opportunity for students for ubiquitous and constant access to information, people and services. At the same time, the large development of virtual resources, services and communication oblige students to depend on new technologies on a daily basis independently of their level of expertise, confidence or commitment in using them.

This research aims to address the gap in the literature by examining how ubiquitous connectivity affects the quality of students’ daily life.

The results presented in this paper are part of a more extensive research project that collected qualitative data from on-campus and online students and staff members in a British university. This work will focus on reporting the results emerging from the first stage of analysis of on-campus students’ data.

The rationale for the use of a qualitative bottom-up approach was to explore the topic by letting concepts and views emerging from the data without applying preconceived well-being theories or models to the research. This allowed collecting a wide range of data from students regarding positive and negative experiences with new technologies and ubiquitous connectivity and their impact in learners’ psychological and emotional daily life.

## **2 APPROACHES INVESTIGATING STUDENTS’ USE OF NEW TECHNOLOGIES AND WELL-BEING**

A limited number of studies available in the literature have investigated the possible connections between students’ use of new technologies and psychosocial well-being.

For example, research focused on students’ use of social media and the consequences on their well-being. These studies found that social networks play an important role in building social connections [7] and that social media could have different impacts on learners’ well-being depending on the use that students make of these resources [8].

Other studies explored the relationship between the use of mobile devices among students and their well-being and suggested that the use of smartphones for the purpose of supportive communications and caring contributes to improve students’ self-esteem and psychological well-being [9]. However, students’ mobile phone use could also contribute to increase anxiety and to diminish their overall sense of life satisfaction [10].

Another area of research regards the connection between students’ internet and mobile phones addiction and well-being. These studies suggest that an intense use of the internet could be associated with diminished psychological well-being, increased sense of loneliness and distraction [11] and that cell phone use can become addictive when is driven by a desire to connect socially [12].

Other research focused specifically on the emotional aspects of well-being, investigating students’ emotions and stress in online learning settings. These studies found that the quality of student-tutor and student-student communication has an important impact on emotional well-being [13] and that negative emotions (such as anger, frustration, boredom or isolation) and positive emotions (like excitement and engagement) play an essential role in hindering or facilitating the learning process [14,15].

Although not strictly related to well-being, an important contribution to the investigation of students’ experiences with new technologies is provided by studies that utilize the Technology Acceptance Model [16]. According to this model, the basic factors that help users to have positive experiences with

new technologies are perceived usefulness and perceived ease of use. Recent research [17] confirmed that these two factors are the main elements that facilitate students' positive attitudes toward technology.

Regarding the potential positive impact of new technologies and ubiquitous connectivity on peoples' lives, it is also useful for the purpose of this research to cite the work of Katz [18]. Although quite dated and not specifically related to students, this study identifies several positive impacts of mobile devices on well-being that can be related to today's learners' experiences: uncertainty reduction, security, efficiency, information access, contactability, social interaction, and social control.

It is important to highlight that most of the cited studies utilize a quantitative approach and apply a specific well-being framework by submitting surveys with closed-end questions to participants. In addition, most of these studies explored learners' use of technologies outside the learning environment.

The present work aims to contribute to research by adopting a new approach that differs significantly from most of the studies in this area. Firstly, this research investigated learners' use of new technologies and ubiquitous connectivity for all type of activities that have a connection with their learning environment and university life. Secondly, this study used a qualitative methodology that allowed the collection of rich data from students. Finally, no specific well-being framework was adopted for data collection; students were asked to describe positive and negative experiences with new technologies and ubiquitous connectivity and to recognize which ones they consider having an impact on their own well-being.

### **3 RESEARCH DESIGN**

#### **3.1 Methodology**

The research adopted Constructivist Grounded Theory (CGT) [19] a qualitative methodology where the researcher's main goal is to build a theory about issues of importance in people's lives [20]. One of the main features of grounded theory is the idea that researchers enter into data collection by endeavoring to set aside specific preconceptions to prove or disprove in relation to the field of study. In grounded theory, data collection and analysis are indissolubly linked since each round of data collection is influenced by the findings of the previous round of data analysis. The final theory is built through an iterative inductive and deductive cycle of analysis [21] where a constant comparison of data continues until the theory is refined and until saturation point is reached, that is when the collection of new data does not bring any additional contribution to the main categories of meaning identified by the researcher.

CGT shows clear epistemological differences compared with more classical approaches of grounded theory [22,23]. The main element of difference in CGT is that the final theory is considered a co-construction of the participants' and the researcher's narratives. During data analysis, experts aim to identify how participants construct their own reality but at the same time they are aware that the final theory is in turn their own construction of participants' views.

In this context, the results presented are part of the data analysis contributing to the development of the final theory. The findings illustrate how students construct their experiences and how these constructions reflect positive or negative impacts on their sense of well-being.

#### **3.2 Data collection**

Data were collected from on-campus students through four different phases. In the first phase, a survey containing open-ended questions to collect qualitative data was submitted to 35 undergraduate and postgraduate students. The aim was to obtain a first broad indication of the main positive and negative aspects of learners' university daily life related to the use of new technologies and ubiquitous connectivity. The analysis of this first set of data helped to structure the next phase.

In the second phase, eleven semi-structured interviews with undergraduate students were conducted to investigate in depth all the aspects identified in the first phase and to collect rich qualitative data from students' narratives regarding their daily experiences with ubiquitous connectivity.

After these two phases, 70 students' quotes describing experiences with new technologies and ubiquitous connectivity were selected from the data collected. These quotes represented underlying

themes identified by the researcher and believed showing connections between learners' experiences and their well-being. In the third phase, these quotes were submitted for member checking to a group of eight students that were asked to select the extracts considered by them as best representing connections with students' well-being. Member checking can be used in CGT [6] (p.210) to elaborate themes and categories and to understand to what extent these fit participants' experiences. At the end of the process, 35 quotes were identified.

In the fourth phase, three focus groups involving 24 undergraduate students were conducted. Each focus group was divided into two sessions. During the first session, students were asked to share their positive and negative experiences with new technologies and ubiquitous connectivity and to discuss the emotional impact of these experiences in their university day-to-day life. The goal was to generate additional reflections on the topic and to verify the reach of saturation in the data. In the second session, 35 cards each one containing one of the quotes identified in the third phase were presented to the students. Learners were asked to read each card and to discuss if they were all describing experiences affecting students' sense of well-being. Only two quotes were excluded during this process. The goal of this second session was to obtain a further member checking of the underlying themes that connect the use of new technologies and ubiquitous connectivity to students' well-being in order to further elaborate and refine the results of the data analysis.

This final two phases were important for the co-construction of meaning between the researcher and the participants according to CGT guidelines. As a result, all the themes presented in the next section represent positive and negative elements of learners' experiences that both the researcher and the students consider relevant for learners' well-being.

## **4 PRESENTATION OF PRELIMINARY RESULTS**

The first stage of data analysis identified ten main themes showing connections between on-campus students' experiences with new technologies and ubiquitous connectivity and well-being. The quotes included in this section are partially taken from the 35 cards used with the students and partially from additional data collected during the focus groups.

### **4.1 Positive experiences and enhanced sense of well-being**

#### *4.1.1 Sense of ease and freedom*

Students described how use of technology and ubiquitous connectivity provided an increased sense of ease and freedom in conducting their daily university activities:

*"Technology changes lives, it has given me ample opportunity to "google" any queries I may have. A mobile phone has given me freedom, and helps with social lives and heaps of other things. A laptop to help with uni work. And much more. I learn a lot, have more freedom, more control, easy access to all information"* (Student 2 – qualitative survey)

*"Access to the information whenever it's needed is the best possible outcome, easy to access easy to learn from anywhere. Better, I have access to everything I need whenever I need it"* (Student 10 – qualitative survey)

These excerpts show how students appreciate having easy access to all kind of information free from time or place constraints together with the effortlessness and quickness that new technologies and ubiquitous connectivity provide in performing some daily tasks and duties.

In terms of well-being, students also reported feeling more in control of their daily life and an improved sense of efficiency and organization "...you can organize your life a bit better, you can plan...if things change...you can plan it better" (Student 7 – focus group 1).

#### *4.1.2 Improved workflow*

The ubiquitous and easy access to resources appeared also to increase learners' sense of confidence and self-efficacy by improving their workflow:

*"It makes you feel good because you don't immediately forget what you just thought of...because if you think about something when you are out, by the time you are at home...if you didn't write it down...you won't remember it again...so it is good and it helps you to work and you feel more*

*confident... about what you are doing...because you got a lot more of ideas, they are coming more (inaudible)...you can record down ..."* (Student 2 – Focus group 1)

*"You can answer your questions... if you have a question in your head, you can answer it rather than just disappearing from your head and you think "I asked myself a question... what was it?" and you can't bring it back... instead you can answer to your question there from your phone..."* (Student 7 – focus group 1).

The quotes show that students seem to appreciate in particular the possibility to record their thoughts and ideas during the day and to receive an immediate answer to their questions. These elements appear also to make them feel more creative and productive.

#### **4.1.3 Flexibility**

A third element valued by students and connected with the first two described above is the enhanced flexibility given by ubiquitous connectivity to organize their life as learners according to their preferences and needs.

*"...if I'm ill, I can work from home...I can access lecture materials and revision materials from home instead of up and moving all my work from one place to another"* (Student 5 – interview)

*"Can access materials and complete work at odd times of the day. Chat with interesting people who also want to learn"* (Student 22 - qualitative survey)

#### **4.1.4 Connectedness**

Another important aspect is the sense of connectedness provided especially by the use of social media.

*"Interacting with new students helped to build friendships and helped to complete assignments"* (Student 13 – qualitative survey)

*"Could still get in touch with students or lecturers even if you go home on a weekend away from the university environment"* (student 3 – Qualitative survey)

Peer-to peer interactions through social media can play a key role in helping to build and maintain friendships. Moreover, the idea that assistance is always one click away at any time of the day and the week appeared to be amongst the most valued consequences of ubiquitous connectivity.

#### **4.1.5 Security and reassurance**

Linked to connectedness is the sense of security and reassurance that learners gain from the use of new technologies and ubiquitous connectivity.

*"I usually check it like three, four times, just it makes me feel confident that I'm definitely right, I'm not gonna get timing wrong, like, even if I've checked my timetable the night before, and I'm on to uni, say a ten o'clock lecture, I will still check the timetable again, make sure I've got the room right, make sure it's the right time"* (student 10 – interview)

*"If you are somewhere, if you don't know an information you can always message someone asking "hey where is it?" or "what do I have to do? Is there any work that we had?" It is like a safety-net, you can find your information"* (Student 5 – Focus group 2)

*"You get a lot of comments back of like reassuring that everyone is having the same problem as you"* (Student 9 – interview)

*"Because like he said you feel safe, the information is there, so I can go away for a couple of days it is not gonna really fall down because of that"* (Student 3 – Focus group 2)

Students reported feeling reassured by sharing their difficulties and doubts with other students and by knowing that help can easily be reached in few seconds especially with the use of social media. In addition, the ubiquitous availability of information through the VLE seems give learners a general sense of security and safety by knowing that the information needed are always at hand.

## **4.2 Negative experiences and diminished sense of well-being**

Despite the benefits provided by new technologies and ubiquitous connectivity on students' daily lives and sense of well-being, the data clearly showed the downside that these innovations can bring to

learners' experiences. Five elements were identified in students' accounts that appeared to have a negative impact on their quality of life and well-being.

#### 4.2.1 Stress due to excessive reliance on technology

The excessive reliance on new technologies and ubiquitous connectivity can be a major issue for students. In terms of well-being, they reported experiencing high levels of stress when technology failures occur or when online information is not accessible due to the lack of alternatives in performing their learning activities.

*"I am quite reliant on technology and when it doesn't work I don't have a clue where to go from there I just call off and cry..."* (Student 2 – Focus group 2)

*"We rely so much on technology and these things to function well, that when they become unavailable, even temporarily, it is very difficult to function"* (Student 21 – qualitative survey)

*"People have the expectation, people have the resource to connect to the internet all the time and if you don't...this is a major downfall in your university life..."* (Student 8 – focus group 1)

*"I don't have a plan B, my plan is to go online on (the VLE) and doing my lecture, but when it is shut down I don't know what to do..."* (Student 3 – Focus group 3)

Learners seem to have high expectations regarding the reliability of online contents and services and they appear to be completely unprepared when technical problems prevent them accessing online resources. For this reason, they report increased levels of stress especially when technical issues occur close to submission or exam deadlines.

#### 4.2.2 Stress due to information overload

The constant stream of information arriving on students' devices can be a source of continuous distraction for learners negatively affecting their focus and concentration.

*"I think that because it is all quicker and because it is all there...there are also a lot of distraction...so it is like...if you are reading a book every page is like what you meant to read but if you read online...you read a page and then your phone does something...there are so much distractions, it is a lot easier...so often it takes longer because you can't concentrate fully..."* (Student 7 – Focus group 2)

*"I think it is also difficult to focus on one thing as well, because say that (...) you go to do one task...I often find myself going into my emails and I have an email from like a placement or something else...so then you start to search the company and you go on the tangent staring to doing something completely different...and you end up finding different things at once, you are not really focused on one thing..."* (Student 1 – Focus group 2)

Moreover, students reported difficulties in staying away from technology and experiencing a feeling of addiction that prevents them from switching-off. This seem to cause difficulties in time management and it takes time away from relax and rest.

*"Switching off and have a time-out from technology is really hard... it is always around you..."* (Student 3 – Focus group 1)

*"It is just frustrating because it makes you tired and you know you shouldn't be doing it and you continue to do it...so it is your ability to stop doing something you know you really shouldn't and that what's hard..."* (Student 6 – Focus group 3)

#### 4.2.3 Stress due to complicated navigation and disorganized online materials

Students reported experiencing stress and irritation when dealing with complicate website layouts and disorganized online materials. Part of this stress seems to be related to learners' expectations regarding the supposed easiness of navigating and finding information on the web.

*"Using certain journal websites for research. Some of them are laid out in the most awful manner or have terrible, unnecessarily complex navigation systems. They never fail to irritate me because they could make it so much simpler"* (Student 6 – qualitative survey)

In addition, in few cases the difficulty finding information due for example to disorganized materials on the VLE appeared to reflect negatively on students' learning process as well:

*“Some things weren’t even in folders they were just kind of out, so you had to kind of guess by the title to which sub-unit it belonged to and it, it was just really difficult to organize your thoughts”* (Student 10 – interview)

#### 4.2.4 Diminished motivation in attending lectures

One of the important downsides of ubiquitous connectivity is connected to the ease with which materials and information can be retrieved from the VLE and from peers using social apps and networks. In fact, students appear to experience diminished motivation in attending lectures and a general sense of “laziness” since they find easy to obtain all the necessary information without the need to be physically present.

*“I put laziness... you can miss lectures and just look at the power points online and even if you don’t get as much information (...) you would have if you turned up... so it can make you like... “oh I missed this one it is online already”... or it can make you like...”what I need to do...” ...you can message your friends about it and if they have gone they pretty much do it for you, so you can be quite lazy...”* (Student 3 – focus group 1)

#### 4.2.5 Difficulties in developing relationships

Finally, students’ narratives show how new technologies can play a key role in the difficulties experienced by students in developing relationships with lecturers and peers.

*“It doesn’t really get to know each other when you first start and stuff and you try to speak with these and they are all on their phones... the other person, you’ll never going to talk to, because they are never looking around...they are not engaging and you won’t make as many friends because you would be like “I just talk to my friends that I already know” you are not going to meet new people”* (Student 4 - focus group 2)

*“Because technology is normally so successful you can spend a lot of your degree with no contact with lecturers which can be difficult, especially in first year I felt very unsupported”* (Student 25 – qualitative survey).

In some cases, online communication and social networks seem to hinder the development of personal relationships as they act as a barrier to face-to-face interactions.

## 5 CONCLUSIONS

In summary, the data show that new technologies and ubiquitous connectivity play a central role in shaping students’ university life and sense of well-being. One of the most important elements that emerged from data collection was that the use of new technologies and ubiquitous connectivity has become a necessary part of their university experience. The data showed that dealing with online resources and services is not an option for students. The university environment has become a hybrid world containing both physical and virtual components that students need to learn how to manage. Therefore, as the utilization of new technologies has brought new opportunities for students in simplifying their life and in enhancing their sense of well-being, at the same time it has brought new issues and challenges that learners do not seem completely prepared to face and handle. As a consequence, it appears essential that Higher Education Institutions should not only invest resources in upgrading and reinforcing their technological infrastructures but also in supporting and educating students to the use of these technologies and in monitoring and discussing how to face the potential impacts of these technological developments.

Some additional reflections can be made concerning the impact of new technologies and ubiquitous connectivity on learners’ well-being. Firstly, the use of technological devices and online services seems to have a strong utilitarian component for students. The use of technologies appears to be primarily directed towards reaching short term goals and solving daily issues. Utilitarian usefulness has already been identified in literature as a key component for users’ adoption and acceptance of new technologies [24]. Even the element of connectivity seems to be mainly appreciated for the possibility to obtain key information regarding lectures and assignments.

A second reflection regards the dependency of students on new technologies. Learners indicated that the easy access to information and resources provided by ubiquitous connectivity has a positive impact on their well-being as it gives them a sense of security in their university life. However, although this opportunity can provide them short term benefits in terms of stress and anxiety

reduction, it is unclear what the long term consequences could be for students' well-being. As indicated by many well-being theories [24,25] developing autonomy and resilience in solving daily problems is considered an important element of peoples' wellness. Therefore, the ease that students' have in retrieving information and receiving quick help from peers and staff members could bring short term advantages but hinder the development of their ability to face challenges and to become autonomous learners.

## 6 RESEARCH PROGRESSION

Using CGT methodology, the intention is for this research to progress to the development of a substantive theory of ubiquitous connectivity and well-being grounded in the data. This model will illustrate the researcher's view of the complex relationship between students' experiences with new technologies and ubiquitous connectivity and their sense of well-being. Two main steps will lead to the completion of the theory.

The first step will consist in integrating online students' data to the analysis. Qualitative data were collected from 16 online students using the same survey utilized with on-campus students and semi-structured interviews. The incorporation of online students' data will allow the identification of similarities and differences between on-campus and online learners' experiences and to stimulate further reflections regarding the relation between students' use of new technologies and well-being.

In the second step, students' and staff members' data will be compared. Fifteen academic (on-campus lecturers and online tutors) and non-academic (librarians, program administrators, IT support, learning technologists) staff members were involved using semi-structures interviews. This will contribute to understanding the impact that ubiquitous connectivity has on the dynamics between students and staff and how different habits, beliefs and levels of expertise of staff members in using new technologies can affect learners' well-being.

Finally, after the completion of the theory, the positive and negative elements of students' experiences identified by the researcher as linked to their sense of well-being will be compared to the elements described by the main well-being theories in literature. To facilitate the task, a meta-model representing the elements common to the most important well-being theories was constructed. This comparison will allow to identifying similarities and differences between the findings of this research and the existing theories in the field.

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