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# TECHNOLOGY IN THE FIRST YEAR EXPERIENCE - A STUDY ON THE RESOURCES PROVIDED TO AND USED BY STUDENTS

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## Abstract

The introduction of new technologies has increased the amount and type of information resources available to students. Today's student encounters technology in all aspects of life, from social interactions to online purchases. Of particular note are the increased possibilities in the availability of resources to support their studies.

This paper presents a study of the types of resources available to first year students, how they interact with each type and their preferences.

Two surveys were carried out. The first survey was conducted amongst academics delivering first year modules. Its primary aim was to obtain information about the resources students were given, or directed to, by the lecturers.

The second survey was conducted amongst first year students from different technical programmes, including full time and part time programmes and therefore a mix of mature and non-mature students. Students were questioned about their engagement with a range of different types of resource and their use of resources that were additional to those provided by their lecturers.

This study presents the combined results of the surveys. These were used to evaluate the engagement with traditional resources and technological and digital resources in education both from the lecturer and student perspective. The results show a divide between the types of material provided by the lecturers and the materials and usage preferred and actually used by the students.

Keywords: First year experience, technology, resources.

## 1 INTRODUCTION

The motivation behind this paper is to establish the adequacy of the resources provided in the first year of a technical or engineering degree. The students live in a world where technology is not a separate entity but is completely blended into everyday life. However, technology has not been incorporated in the same way in the third level educational environment. The purpose of this paper is to discover the extent and cause of this disconnection and the possible implications for policy and training.

### 1.1 Literature Review

There is an increased drive towards the use of e-learning technologies in education based on its perceived value. Adoption of these technologies is clearly necessary as a result of the radically changed expectations of students belonging to the "Google Generation" [1] with students expecting to consume information in small amounts, as often as necessary and, at a time that suits them.

However, there is also a responsibility to ensure that time and resources are not wasted on ineffective forms of e-learning. The range of e-learning technologies is ever expanding and includes a wide selection of tools from video-recordings of lectures to guided online discussions of course material. These disparate technologies are being used to support both on-site and distance learning. In addition, EU policy makers are committed to "Lifelong Learning" and as a result the age and previous educational attainments of students are becoming more varied.

Prior studies such as those by Morris and Venkatesh [2], or Koohang [3], suggest that there should be a high correlation between age and the perceived usefulness of e-learning with an assumption that the younger the student the higher the perceived usefulness.

However, later empirical data has not borne this assumption out. For example, Mohr et al. [4] have shown that there was no statistical relationship between an individual's age and preferences for a particular form of e-learning.

In her keynote address to the *2005 Student Experience Conference: Good Practice in Practice* in a paper entitled "*The changing student experience: Who's driving it and where is it going?*" Krause [5] outlined how to make ICTs work for both student and lecturer. She noted that "*ICTs provide an excellent vehicle for keeping materials updated, tailoring resources to particular audiences and groups of students, creating online communities, communicating with individuals, and giving students responsibility for their own learning.*"

The question asked by Krause in relation to where changes in the student experience were ultimately leading was relevant to those concerned about the nature of a digital divide that seemed to be developing. In the main, this divide was characterised as being based on discrepancies between populations, usually from different socio-economic backgrounds, in terms of their access to technologies [6] [7]. However, Prensky [8] has suggested that there is also a digital divide that is age related. His divide was between "*Digital Natives*", who had grown up with the Internet and were supposedly able to adapt readily to technological change, and "*Digital Immigrants*" who were older, had less affinity with technology and were supposedly less able to adapt to technological change. This divide would have indicated a gap between students and lecturers [9] and potentially could be "*the biggest single problem facing education today*" [8]. Prensky has latterly moved away from the digital native/immigrant concept [10] but it has taken root and formed the basis of much academic commentary [11].

Waycott et al. [12] examined staff and student perceptions of information and communication technologies. Their findings resulted from focus groups in three Australian universities and question assumptions previously made about the digital native/immigrant divide.

The qualitative investigation presented by them examined the perspectives of students and staff in parallel in order to evaluate the evidence of the supposed divide. Their findings did not support the idea of a "*substantial divide*" between students and staff with many staff and students using the same technologies and a significant overlap in the purpose and context of technology use.

They also found that the differences that existed were quite subtle distinctions in the context where the technology was being used. For example, teaching staff were likely to comment on using the Internet to help a child research an assignment whilst students were more likely to emphasise technology's role in organizing their social lives. It is suggested by Waycott et al. that these differences were connected to the different "*life stages*" of the two groups rather than directly age related. They submitted that further differences may be due to the different roles that students and staff carry out in an academic context. For example, students saw the main benefits of using ICTs in education in terms of the support ICTs offered for communicating with teachers and other students, and the convenience and control ICTs offered in terms of managing their studies. Staff however saw technologies as a means to enhance student learning and manage teaching activities.

Salahan et al. [13] found, in their University of Toronto study, that although there existed a small inter-generational difference at the Faculty in the perceived usefulness and importance of digital technologies for learning and teaching, this difference was "*minimal, with no universal applicability*".

In Thinyane's study [14] of first year students at two South African universities she found that the student population had varied levels of access to, and use of technologies. Prensky [8] had regarded digital natives as interacting keenly with Web 2.0 based technologies but Thinyane found that participants in her study did not appear to use them or regard them as potentially useful tools for study. The results were different for use of mobile phones with 98.1% of respondents having access to one and the mobile phone ranked in the top two positions out of all the uses of technologies surveyed. When asked to rank the different uses of technology for their studies three of the top five uses relied on a mobile phone.

All these studies suggest that Prensky's original distinction [8] is overly simplistic but his claim that "*...our students have changed radically. Today's students are no longer the people our educational system was designed to teach*" is worth further examination. The claim suggests the need to further analyse the use of technologies from both the student and instructor perspective.

## 2 METHODOLOGY

The methodology used in this paper consisted of a set of surveys aimed at both first year students and lecturers who delivered modules on first year programmes. The target courses were engineering and technical programmes. The range of programmes included both full time and part time programmes at level eight (honours degree), level seven (ordinary degree) and level six (higher certificate). In total, 135 students and 16 lecturers completed the survey.

The survey contained questions relating to resources used in education with particular emphasis on technological resources.

TABLE 1: SUMMARY OF COURSES SURVEYED.

Course	Number of students	Level	Part time/ Full time
Mechanical Engineering	36	7	Full time
Common first year	45	8	Full time
Common first year	11	7	Full time
Fire Engineering	7	7	Part time
Civil Engineering	14	7	Full time
Higher Certificate (Information Technology Systems)	18	6	Part time
Construction Management	1	7	Part time
Building services engineering	3	7	Part time

Total: 135

TABLE 2: SUMMARY OF PART TIME/FULL TIME STUDENTS SURVEYED.

Course	Number of students
Total part time	29
Total full time	106

TABLE 3: SUMMARY OF STUDENTS SURVEYED PER COURSE LEVEL.

Course	Number of students
Total level 8	45
Total level 7	72
Total level 6	18

## 3 RESULTS

### 3.1 Lecturers' survey results

#### 3.1.1 Use of technology and other resources in the classroom

TABLE 4 summarises the staff survey which was carried out to ascertain the range of technology used/not used by staff in the classroom.

TABLE 4: TECHNOLOGY USED BY STAFF.

Technology	Percentage of use
Clickers	9%
Online tests/quizzes	9%
Online simulations	0%
Smart board	0%
Mobile apps	0%
Videos	36%
Software	73%

TABLE 5: SUMMARY OF RESOURCES USED BY STAFF.

	Never used	Not Used frequently	Used frequently
Students taking notes in class	0%	36%	64%
Printed handouts	18%	9%	73%
Online handouts	27%	18%	55%
Extra material online	27%	45%	27%
Video	64%	27%	9%
Podcast	100%	0%	0%
Books	36%	64%	0%
Websites	18%	73%	9%

### 3.1.2 Problems and limitations found by staff

Several issues arose in the comments section of the survey. Staff pointed at the impact of technological failures and the potential negative effect they can have on not so technologically savvy members of staff. For example, new and old versions of the same software packages differing substantially, or network failures, course management tools not being “*user friendly*” or unnecessarily complex.

Staff also reported that time limitations are an important factor that prevents lecturers from using technology. A strong institutional support providing appropriate training and time allowances to facilitate the integration of technology in third level education was identified as a key instrument in this process as some tools were perceived as having a steep learning curve.

## 3.2 Students’ survey results

The results obtained from the student survey show, in the first instance, the different levels of access to technology amongst the student cohort. The figures show a significant difference in access to technology that could possibly be attributed to the diverse range of courses used in the study (both full time and part time) and differences in socio-economic background of students.

On a separate question, students were asked to choose the type of materials and resources they would like their lecturers to use. These included traditional note taking and course notes as well as technological resources such as online material, videos and podcasts.

### 3.2.1 Access to technology

Further usage and implementation of technology strategies in third level education can only be developed with knowledge of the technology usage and the level of access that students have to it. The results obtained from the survey show how certain technologies are more widespread than others. For example, more than 80% of the first year students own or have access to a laptop whereas only 40% own or have access to a tablet. Combined results for access to desktop and laptop

computers show that 100% of the students surveyed have access to either one or the other (or both) types of computer.

TABLE 6: ACCESS TO TECHNOLOGY.

Technology	Percentage
Desktop	71%
Laptop	83%
Smart phone	65%
Tablet	40%
Internet	70%

The results show a divide in the students access to smart phones and tablets. A combined total of 29% of the students do not own or have access to either a smart phone or a tablet, with similar results being obtained when the groups are split between part time and full time students.

TABLE 7 shows the values grouped between those students that have outside college Internet access and those who don't have outside Internet access.

TABLE 7: ACCESS TO HIGH END DEVICES DEPENDING ON ACCESS TO INTERNET.

Technology	Internet access outside college	No Internet access outside college
Smart phone	80%	30%
Tablet	47%	23%

These figures have implications for the designer of technological resources or the educator using technological resources. Any use of technology has to be carefully planned to so as to avoid the socio-economic background of the student disadvantaging them and interfering in their learning or their interaction with the course material or their peers.

### 3.2.2 Use of technology Part time vs. Full time students

As well as the level of access to technology the survey asked the students about their usage of technology. The results in TABLE 8 separate the students into part time or full time students.

TABLE 8: USE OF TECHNOLOGY – PART TIME AND FULL TIME STUDENTS.

	Full time	Part time
Social media	76%	66%
Uploaded a video	50%	34%
Read newspaper online	76%	79%
Edited a website	47%	45%
Voice IP	27%	59%
Internet information search school	85%	86%
Internet information search college	82%	90%
College library catalogue	59%	69%

The results show a slightly more active social usage by full time students and a very large (above 80% in all instances) use of the Internet for educational purposes at school and college level.

These figures are significantly larger than the usage of the library catalogue.

### 3.2.3 Preferred resources and technologies

As part of the survey the students identified the type of resources they would like their lecturers to use for the delivery of material. The results are summarised in TABLE 9 for the whole cohort of students and

in TABLE 10 where the results are displayed in two separate groups depending on the course being delivered as a part time or full time course.

TABLE 9: STUDENTS PREFERRED RESOURCES.

Resources	Percentage preferences
Student note taking	82%
Printed handout	92%
Printed handouts online	88%
Extra online material	78%
Video	62%
Podcast	27%
Books	56%
Websites	73%

TABLE 10: STUDENTS PREFERRED RESOURCES – PART TIME AND FULL TIME.

Resources	Full time	Part time
Students notes	85%	72%
Printed handout	93%	86%
Printed handouts online	89%	86%
Extra online material	79%	72%
Video	61%	66%
Podcast	25%	34%
Books	55%	62%
Websites	75%	66%

It is evident from the preceding tables that a small difference in preferences can be found in choice of self-learning materials such as books, websites, videos or podcasts. Part time students' answers show a higher preference for these resources. However, in general terms, the differences between the part time students and the full time students are less than 10% for all the resources discussed.

### 3.2.4 Benefits and limitations

The students commented on the accessibility of electronic resources which provided help and allowed them to study at their own pace and in their own environment. This can be an extra aid in situations where there are different levels of academic ability in the classroom.

The visual aspect of many of the technologies used was found to be beneficial as it can provide different information and the students are used to digital materials and so expect a high level of visual content.

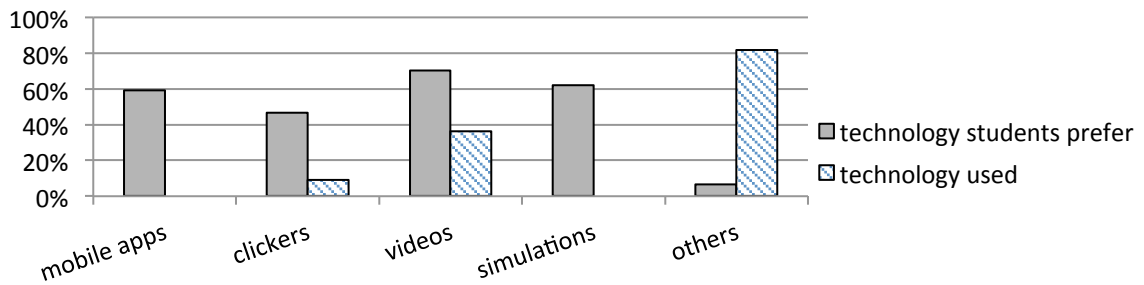
Familiarity with the formats and the novelty factor were reported by the students to be features that can increase the level of engagement and enhance the learning experience.

An interesting observation made by the students was the danger of students from disadvantaged socio economic backgrounds feeling excluded. The values on TABLE 7 show lower levels of ownership of smart phones and tablets for the students that do not have Internet access outside the college compared to those who have access. These values are an indication of the existence of the divide as described by the literature [6] [7].

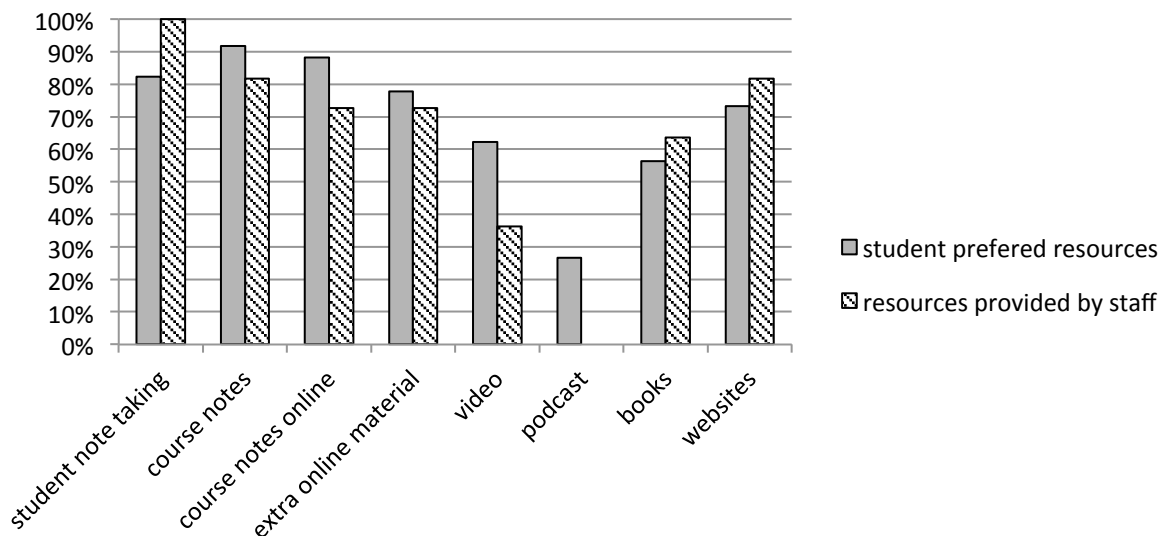
## 3.3 Comparative results

The results from both cohorts (staff and students) are compared in the following charts. The use of technological resources shows the greatest divide with the students showing a strong preference for

videos and simulations. Meanwhile the lecturers provide mainly non technological resources and a large component of the technology they used is in the form of software packages.



**FIGURE 1** COMPARISON OF TECHNOLOGY USED BY STAFF AND TECHNOLOGY PREFERRED BY STUDENTS.



**FIGURE 2** COMPARISON OF RESOURCES USED BY STAFF AND RESOURCES PREFERRED BY STUDENTS.

## 4 DISCUSSION

The results presented in this paper show a difference between the resources used by staff and the resources utilised by students. The results of the surveys conducted amongst first year students and staff gives a snapshot of access and usage of technology showing a large divergence in the use of technologies by staff and students. However, the reasons for these differences as indicated by the staff and student comments are subtle and cannot easily be accounted for by age or generational differences.

Institutional policies and supports were found to be factors that could increase the use of technology.

This small scale study is limited by the number of students and staff surveyed and by geographical location. Although only staff and students from engineering and technical programmes on one campus were surveyed, it provides valuable information about the technologies used and preferred by these students and their technological expectations of their first year experience. It is hoped to use this data to inform the choices made by staff going forward.

Despite the fact that differences in usage of technology between part time (on average older) and full time students were found, the two groups had similar preferences and experiences in terms of technology usage in education. Both groups acknowledge the usefulness of technology as an educational aid. Part time students had stronger preferences for resources such as video, podcast and



books which they can use to study at their own pace and reinforce concepts between classes. This preference may be the result of a high diversity of abilities within the part time courses.

The survey results in terms of access to technology prove that the digital divide exists. Ownership or access to computers, either desktops or laptops is very high, while other types of technology such as smart phones and tablets are not so widespread with 29% of the students surveyed not having access to either of those technologies. These figures have implications in the integration of technology into education, especially in the first year where students are less mature.

A wider study including first year students from other disciplines, colleges and countries could provide more detailed information about the 21<sup>st</sup> century first year students.

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