

M-Learning: Analysis and Interpretation of Technical Texts

Searched and Downloaded from OAI Archives

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Abstract: From the reading and the interpretation of technical text arise some possibilities so that the student generates hypothesis and constituted in the first step in the construction of researches scenes. In order to analyze the degree of difficulty in the technical text interpretation was shown at students of the Regional Center of Veraguas of the Universidad Tecnológica de Panamá, without previous warning, a group of a two different technical texts searched for on the Internet and downloaded from Open Archives Initiative-Protocol for Metadata Harvesting-OAI-PMH-with the objective to know the degree of the difficulty in his understanding. Taking as it bases the presented texts, a test, constituted of seven (7) reagents, each one was applied to them, of multiple selection in where it was asked for to select to them, between the alternatives raised, the one that better responded, according to criterion of the student, to the statement. Software SPSS for the analysis of the results was used; which indicated that the student presents serious deficiencies in the interpretation of read text.

Key words: m-learning, lifelong learning, smart phone, lectural

1. Introduction

The students choose technical-engineering education because a variety of reasons, among these we can mention: intrinsic motivation, numerical skills, and the opportunities that higher teaching centers bring in researching and extension academic way (C. Leow, S. Marcus, E. Zanutto & R. Boruch, 2004, pp. 461–478). In fact one important dimension of the higher education is the quality of targets and goals reached for this education (J. Warn & P. Tranter, 2001, pp. 191–198).

The lack of proper preparation for teaching and formation of new researches in the engineering higher education context, is a big challenge, we can get this preparation many times through the experience and sometimes through supervised activities very provided these days, by access to scientist quality information on Internet. Inside this area some centers developing programs with focus in “how teaching” (D. C. Roush, 1983, p. 165; J. Walkington, H. P. Christensen & H. Kock, 2001, pp. 343–350; P. Craton & E. Carusetta, 2002, pp. 167–176; A. Clarke & S. Jarvis-Selinger, 2005, pp. 65–78; J. G. Berger, K. C. Boles & V. Troen, 2005, pp. 93–105), but without giving concepts like “how become and motivate university students to the searching, researching, tracking, impression, reading and interpretation of discharged information”.

Nevertheless in this context, in some centers of higher education these activities are considerate as “secrets

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activities” where some classrooms looks like private spaces which are rarely used for teachers colleges to share their methods and motivation strategies and to do university researches, in this way the students are in disadvantage (R. M. Shia, B. C. Howard & S. McGee, 2012, pp. 1–7).

Most of the environments where is debating the way that it has to being follow the higher education it’s really clear the research as base of universities for generation and production of new knowledge.

In this way is how the statement of the Worldwide Higher education Conference (...), “it’s manifest that the universities has to promote, generate and spread the knowledge by the research”.

To add, as part of services that have to bring to the community, the higher education centers has to provide proper technical contests to help the cultural, social and economic developing, increasing the scientist and technological researching, including research in social scientist, humanity and creative art areas.

Actually the access to Internet in educational ambit has to be a searching process for value information a full meaning to the construction of thought also for the theoretical foundation of academic research carried out in universities campuses. It is clear from the foregoing that access to the Internet is not a difficulty in itself, but rather the difficulty lies in the handling, distribution, use and interpretation of downloaded information

In Internet the students find an attractive environment, interactive and catchy, also an environment very distractive where the student could get lose in a world without importance or relevance that doesn’t give teaching quality and doesn’t justified the Internet use in classroom (J. Adan, 2003, pp. 189–193).

The contents that have being published, in especial those that have being published by professionals, are the reflect of knowledge and new information and how answer of this didactic situations, we can find the Web Quests; defined as learning and teaching activities based on Internet (W. Leon & I. M. Gómez-Chacón, 2007, pp. 17–34).

Because of that, in the actuality Internet makes possible innovative mechanism to do new teaching practices and university researches, mainly about getting high quality scientist information in Internet for example the information that appear in electric in journals indexed (G. Henríquez, 2002, pp. 1–16), a lot of them under the transmission protocol of contents in Internet call it OAI-PMH (Open Archives Initiative-Protocol for Metadata Harvesting) (J. M. Barrueco & I. S. Coll, 2003, pp. 99–106).

Nevertheless, it’s about have clear that it is in transmission to radical changes with deep social, psychological, politics, economic, philosophical and other implications, that the Internet, as a technologic widget and even more than that as a cultural device, is guessing an authentic sedition for the knowledge, because it offers a fountain of unlimited possibilities of researches about the context of the communication information (O. W. Turpo Gebera, 2008, pp. 81–93).

By today it doesn’t exist any laboratory or university even in most poorly countries that doesn’t has Internet access, in the same way there is not researcher that doesn’t being involved in Internet use or doesn’t check e mails.

In this way, the real and geographic space, created by real distance and physical places, it looks like duplicated by another virtual space without geography or distance, which interchanges are practically instantaneous.

For researchers that for more than 10 years have being taken this way to work with Internet the virtual communication and real communication mixed that it’s hard to see which it’s the percentage of each of these virtual spaces are created by scientist production (P. Renaud, 2009, pp. 205–219).

The actually university students, Internet users, for their academic works they need to have some minimum and essential characteristics in this way they are able to search and download relevant scientist information important to reach the knowledge of a beginner researcher: know how search, know how read, know how write.

Access to Internet either by mobile devices or by the interconnection, creates opportunities for communication, learning and edu-entertainment.

But without enough capacity or proper capacity the users cannot get what they need; on the contrary, they may find themselves lost as a result of information overload and not know what to do with the information.

As teachers of the Veraguas Regional center of the Universidad Tecnológica de Panamá, we build some scenarios of research, giving interaction teacher-learner, increasing in this way skills to university researching over the prospects mentioned before.

After that it came the idea to perform some trials to know the comprehension and capacity to analyze technical texts searched, tracking, printed and discharged of on line data, discharged by a group of students of this higher education center, with the objective to know the strengths and difficulties in this essential area to star any research.

We understand that in this context, this study is a general case elaborated not just in a previously research, also it's with our experience as professors and researchers (A. Tejedor, 1997, pp. 60–65; A. Tejedor De León, A. D. Córdoba, 2005).

2. Materials and Methods

2.1 Participants

The methodology of this research followed a case study, where it was explored the nature in reading and interpretation of technical texts searched in Internet and downloaded of OAI archives, inside a limited context.

The study it was developing in two parts. The unity of analysis it was the Regional Center of the Universidad Tecnológica de Panamá, where they used the phenomenological perspective, because this research it was about 16 students, they had the opportunity of take, search, read and interpreted one text that was gave to then. The students were regularly singed at the last year of their technological careers.

2.2 Procedure

The first part of the study was about the tracking, discharging and printed of two technical texts for reading, after that each line of the texts was listed with the objective to easy identify, in this way the first text was 7 lines and the other one was 20 lines, after that each reading was testing with 7 reagents of multiply selection.

The second part of this study was about the statistical analysis of the alternatives showed by the students, where they used applications of SPSS software ("Statistical Package for Social Science") to analyze the items (difficulty and homogeneity index, grown options analyze and checking of random effects).

For each one of the 14 reagents that were in the two tests, they found a number and a percentage of individuals that choose each one of the options, including the eventual omissions, also was showed graphically the distribution of the frequency of the students for each option selected. Also we could see the index of difficulty and the variety of each one of 14 reagents.

For each one of 16 students we got a directly score and the correctly score with the reagent analyzed and we did a representation to the distribution of the correctly score frequency, relation between directly and correctly scores by a dispersion graphic, with the object to see the level of difficulty of each student.

3. Results and Discussion

3.1 Internet and Accessibility

The beginner of the interconnection in the Republic of Panamá with the international digital network of telecommunications was with BITNET network and that was in the beginner of nineteen's by a node call it UTPVM1 installed in the Universidad Tecnológica de Panamá (UTP). This network interconnected more than 1000 researcher organization and education institutions of United States of America, Canada and Europa.

By that time UTP just had with one IBM 4361 computer, which was connected with the microwaves station of INTEL (National Telecommunication Institution) in David (which is a city in Panamá) and through this one connected to ICE in Tabarca, where the interconnection extended to University of Costa Rica (node UCRVM2), which was used as connection BITNET network. For November of 1992, was inaugurated the academic network for national researches (PANNet) and with this one the interconnection with the international network BITNET.

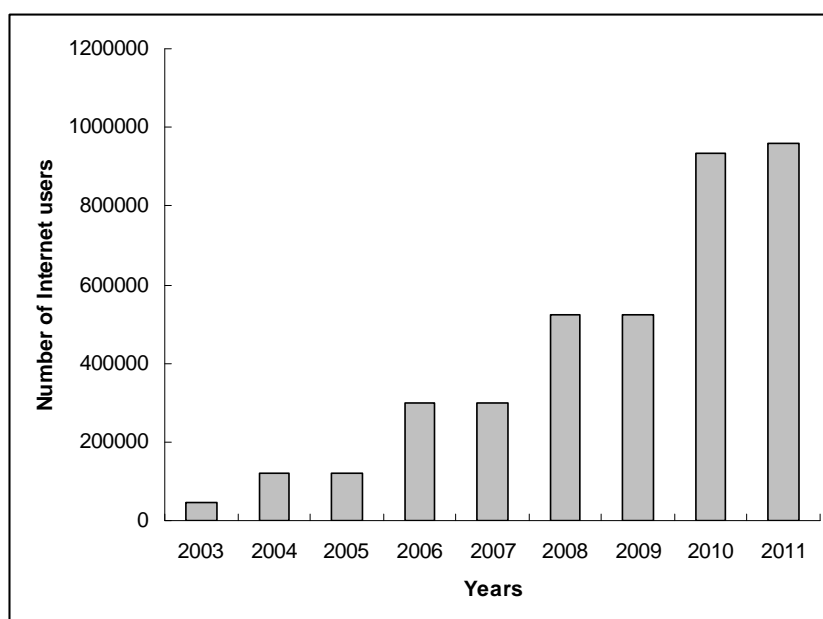


Figure 1 Graphic Bars about Quantity of Internet Users, Last Years in Republic of Panamá

For that time neither the government nor big companies were involved in the developing that Internet will reach. In Panamá the UTP established their first link with the national science foundation network (NFSNET) today Internet, in 1994 and the administration of domain “pa” was passed to the higher education institution.

The Universidad Tecnológica de Panamá got an important role in the Internet developing of the country with the fact that established the firsts dedicated links also was one of the first suppliers to Internet access in the middle of 1990.

Since that time the level of Internet accessibility has been increasing strongly in the last five years — see picture 1 — for 2012 the index of Internet user was 42.7% according with the public service authority guessing in Panamá. The registers of Asep say that in Panamá there are one million five hundred twenty thousand internet users in January of 2012; about 15% of this one have access to broadband, the quantity of hours that Panamanian people are on line is about 5.6 daily hours.

Various studies show a directly relation between the connectivity of persons and productivity also the competitively of the country. That it could see in the education and the competitive learning, in the international and globalized marketing also in services that the citizen are involved, in the developing of smaller and bigger companies and in the agricultural area.

The levels of utilization and penetration of the Internet in Panamá are lower comparing with other nations with an advantage economic position. All thought in relation with the accessibility to Internet over the education centers, is one of the higher in the Central America Region.

Inside this context and according that was established by according to the stamen by Evans (2008), the development of the Internet has created new ways for educators to communicated with learners. Many Higher-Education institutions have adopted the use of virtual learning environments and incorporate e-learning into their traditional teaching mechanism as part of a b-learning (blended-learning) approach, as was the case of the Universidad Tecnológica de Panamá.

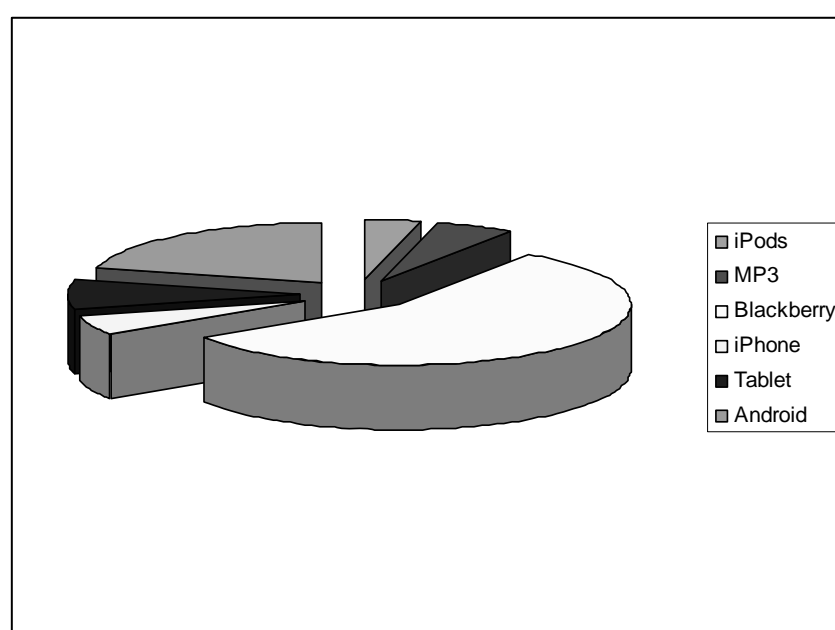


Figure 2 Graph Cake on the Different Types of Wireless Technology Devices to the Internet Access to University Students

Furthermore the e-learning has the advantage, compared with traditional lectures of allowing learners to choose when, where, and how they study. It also allows learners to review material again feedback.

But today the mobile learning (m-learning) inherits this advantages from e-learning, but extends their reach by making use of portable (handheld) wireless technologies. Suitable devices include digital media players (i.e., iPods, MP3 players), smartphones (i.e., BlackBerrys, iPhone), and Personal Digital Assistants or PDAs (i.e., Palm, Pocket PC). This situation is not a privilege only the most technologically advances countries, but today is seen reflected in the economically disadvantage, as is the case of Panamá.

For example to know the percentage of university students that have digital portable units (67%) say that has one of them, they were respondent and they with the question, what kind of device they usually use, and the results are showed in the next figure where we can find the smart phones as the most useful device by university students.

Furthermore over the university campus or properties the user can have access to Internet either by mobile devices or by the interconnection, that's why it offer to who are connect with the network to have opportunities of communication, learning and edu-entertainment. But without enough capacity or proper capacity the users cannot get that they need; on the contrary, they may find themselves lost as a result of information overload and if they get that they need not know what to do with it.

3.2 Options Percentage Choices

That is the reason why the levels of interpretability of technical texts downloaded from databases OAI, a statistical analysis was made using the criteria for the application of the SPSS software for the analysis of the 14 items that formed the interpretation test.

For each of the 14 items are obtained: (i) the number (and percentage) of students who chose each one of the options, including the omission and the graphical representation of the distribution of frequencies of students for each selected option and (ii) for each of the texts are found the index of difficulty and its variance. Similarly, for each of the 16 subjects (students) who participated in the study was obtained direct their score and their score corrected in the item analyzed and represented, by means of a graph, the distribution and frequency of scores corrected and the relationship between the scores corrected and direct through a scatter graph. The implementation, that we are dealing, it concerns to a test consisting of 14 items or related reagents with the reading and interpretation of two texts downloaded from the Internet. The items from 1 to 7 measured at the same text (No. 1), while the items from 8 to 14 measured the other separate text (No. 2), each item has 5 answer options.

The subjects are the rows and the items or questions the columns or variables, in such a way that each row contains the responses of a student to all items. Therefore, the file was as many rows as students responded to the test. The column for each item must reflect the responses of all subjects to that item.

The first thing to analyze, was to obtain the frequency (and percentage) of students who have selected the options for each item. Table 1 summarizes the results obtained for the 14 reagents.

In the table below, it means that for the reagent 1 (R1), both option 4 and option 5, 33.3% of students are considered as correct; in counterpart, none of the students considered for option 2 as the correct question.

Then for the reagent 2, 41.7% of the students felt that the best answer to this question is the option 1: however, equal amount of student replied that the best option as a response to that question is the number 4 and none of them have considered as a response to option 3.

For the reagent 3, 8.3% of the students not replied; however the 66.7% of the students believed that the best answer to this question is option 5 and so on; up to analyze the item 14.

In this reagent, the responses were more dispersed the 41.7% of the students considered to option 3 as the correct answer, 25% indicated to the option 2 and the same percentage of students (25%) considered the option 5 as the correct answer.

3.3 Obtaining the Index of Difficulty and the Variation

For the obtaining of the indices of difficulty and the variation for each one of the reagents formulated, it proceeds to the creation of new variables that have not been recorded the answers to the questions, by assigning 1 the wisdom and 0 to the fault or omission. This recoding was also required for all tests carried out.

The above process was repeated for each of the 14 reagents and the results indicate whether the student had been successful or failed to the respective item. The results are presented in Table 1.

Table 1 Descriptive Statistics of the Indices of Difficulty Sorted Increasingly on Average and in order of Difficulty

Reagents	Minimum	Maximum	Average	Stad. Dev.	Variante
R11	0.00	0.00	0.0000	0.00000	0.000
R14	0.00	0.00	0.0000	0.00000	0.000
R1	0.00	1.00	0.1667	0.38925	0.152
R4	0.00	1.00	0.3333	0.49237	0.242
R6	0.00	1.00	0.3333	0.49237	0.242
R9	0.00	1.00	0.3333	0.49237	0.242
R2	0.00	1.00	0.4167	0.51493	0.265
R8	0.00	1.00	0.5000	0.52223	0.273
R10	0.00	1.00	0.5833	0.51493	0.265
R13	0.00	1.00	0.6667	0.49237	0.242
R3	0.00	1.00	0.7273	0.46710	0.218
R12	0.00	1.00	0.7500	0.45227	0.205
R5	0.00	1.00	0.8333	0.38925	0.152
R7	0.00	1.00	0.8333	0.38925	0.152

Note that the Average is the index of difficulty of the item and coincides with the percentage of students who have selected the correct option divided between 100; when more under the value of the mean, higher index of difficulty. For example, for item 10, $p = 0.5833$ that numerically corresponds to the relation $58.33/100$).

Also appears in the table the standard deviation and the variance of each item (i.e., for the item 10 variance is 0.2650). In such a way, that following the same criteria, has to be the item of greatest difficulty correspond to the reagents and some 11 and 14 which are questioning related to texts No. 2 downloaded from the Internet, for which there was no success whatsoever (all the students were wrong in their answers).

The descending order of difficulty of the 14 corresponding reagents of the two texts studied was as follows.

$$R11 = R14 > R1 > R4 = R6 = R9 > R2 > R8 > R10 > R13 > R3 > R12 > R5 = R7$$

3.4 Calculation of the Scores Corrected

In the previous section were calculated the direct scores or the number of hits to the students to the reagents. To calculate the corrected score was created a new variable to count the number of omissions of each student in the 14 reagents. The number of errors of a student was calculated by subtracting the number of items the number of hits and the number of omissions which could have had. On the other hand the corrected score was calculated by subtracting the number of hits (text) the number of errors that had each student divided by the number of options of the items minus 1.

In the formula described above, in general, the denominator defined as $k-1$, the variable k corresponds to the number of options for the items, which is the same for all the items in the present study, which indicated that in global terms the students gained an average of 4.5 hit a total of 14 (32% of reader interpretation).

For it is clear from the foregoing that the access to the Internet is not a difficulty in itself, but rather the difficulty lies in the handling, distribution, use and in the interpretation of the downloaded information.

If it is clear that with the Internet is facing an evolution in the learning and education are taking root and spreading new concepts that involve radical changes in the attitudes and in the incorporation of new research on how learning takes place and on strategies to make education more efficient and in particular, there is a need to restructure the entire educational system and to stimulate continuous learning throughout life (Life Long Learning-LLL).

4. Conclusion

The results in the present study, allow you to make the following contributions:

Access to scientific information relevant and quality for the realization of academic activities and research is greatly facilitated by the Internet.

The university student internet user with wireless access or conventional, encounter difficulties with the management, distribution, use and interpretation of the downloaded information.

In regard to the interpretation of two technical texts downloaded from OAI files of the Internet, the text No. 2 was the most difficult to interpret by the students.

The questions of higher index of difficulty of interpretation were the numbers 11 and 14, both of which are related to the text No. 2.

In relation to the average score in the interpretation of the texts, this was 4.5 of a total of 14, with a typical offset of 2.53, which allows us to conclude that students interpreted poorly, the texts downloaded and read.

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