

A critical look on the student's Internet use – an empirical study

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Abstract: The exponential development of the Internet has impacted the socio-economical, political life and individuals' life and will continue to significantly impact the society in all its aspects. Internet has changed the business environment, the socio-political domains and peoples' behavior and cultural values. In this contexts, the authors' survey aimed at identify and understand the Internet users' profile of the students in one of the Romanian faculty. The survey revealed the students' Internet use and time spending on Internet. The research emphasized that the survey's respondents could be considered "extensive" Internet users for personal needs and less effective users for professional purposes. The study's findings provided important insights regarding Internet access and use preferences of our students and emphasized how the teaching process can exploit, in an effective way, the students' skills and appetite for Internet use. The findings pointed out the needed updates in the academic curriculum aiming at providing skills and knowledge in regard with Internet effective use for learning and professional purposes. The research on this area is scarce in Romania, and the authors' research results provide an useful insight on how Internet use can be improved in the academic institutions.

Keywords: Internet, user, Internet learning, information resources, higher education.

JEL codes: A22, A23, M15

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1. Introduction

The Internet is registering a huge and rapid growth, and this growth is expected to continue at significant rates at a global scale. The expansion is explained by the tremendous impact of the Internet on the economic, financial, social, political systems as well as at the individuals' level. Practically, the Internet has become part of billions of peoples' daily life.

The statistic data emphasize the Internet growth and the Internet phenomena main characteristics, and provide also the main trends in the Internet expansion in the future. In March 2013, Internet registered 2,748 millions of users worldwide (Internetworldstat, 2013), the year-by-year increase being of 8% and the population penetration rate of 34% (Meeker & Wu, 2013). The mobile devices, offering Internet access connections, determined a huge increase of the global mobile traffic, 15% in 2013 (Meeker & Wu, 2013), and has facilitated, in our opinion, the increase of the population penetration rate. The tremendous increase of the Internet was facilitated by technological aspects, which have created new ways of running business and communications channels. The Internet expansion has potentiated business globalization, the communication channels use - by the huge number of users, very divers in their type and communication scope, the information society construct in many states and various other social and individuals' aspects. Internet is a "world" in a continuous expansion and change. In their survey Meeker and Wu have emphasized the companies' perception in regard with the external factors that would have the biggest impact. In 2010 the main external factors assumed by the companies were: market factors, technological factors, macroeconomic factors, people skills, regulatory concern (Meeker & Wu, 2013). This new perspective reflects a change comparing with 2008 when market factors were viewed as the most important ones, but on the second place were nominated people skills, followed by technical factors and globalization (the regulatory concern being on the same 5th position). In the authors' opinion the change of the companies' perception over the external factors influence reveals that globalization has been understood, in time, as a normal process and the Internet users skills have become "natural" for many people. This trend is further emphasized by the rise of Generation Y (born between 1977 and 1994), a generation which is large, technologically savvy and whose purchasing power continues to increase (Norum, 2008).

Having so much impact on a social and individual scale, the Internet offers a huge potential study field from various perspectives: technology, applications, individuals and their behavior, society as a whole and, not finally, ethical and legal aspects. As Tuncer *et al.* emphasized in their study "the unprecedented and significant technological advancements could not be foreseen during the initial design of Internet" but it ensured the basis for the diverse application fields offering new capabilities and functions (Tuncer *et al.*, 2012:1).

Step by step, the users became dependent on the applications they use and integrate Internet in their professional and personal life. In this regard, the authors' research aimed to investigate the accounting students' behavior as Internet users. Our subjects were students of the Bucharest University of Economic Studies, faculty of Accounting and Management Information Systems. The study results provided important insights regarding Internet access and use preferences of our students, and emphasized how the teaching process can capitalize, in an effective way, on the students' skills and appetite for Internet use. Starting from the students' preferences on Internet use, the authors continued their research by investigating the quality of the electronic source citations used by the students in their research papers. It is the first study on the topic performed in the University of Economic Studies in Bucharest and is one of the few performed in Romania. The study's results provide important insights in regard with Romanian students preferences and habits as Internet users. The study's conclusions are important for the academic teaching process, being useful in the effort to extent and improve e-learning platforms.

2. Literature review

The researches' interest regarding the Internet impact upon its users is not new and focused on multiple plans: Internet users' behavior and addiction, Internet users' preferences etc. Many studies are aimed at identifying links between users characteristics (as for example gender, age, education) and their preferences manifested as Internet users. The studies performed on Internet use topic revealed the positive and negative aspects of Internet use. As positive aspects of the Internet use, the authors retained the facilitation of communication, easiness of information retrieval and sharing, the Internet being appreciated as an excellent medium for knowledge transfer, new effective way of running business, cultural and social gains etc. Grover *et al.* emphasize that the adverse consequence of Internet use "can affect interpersonal, social, occupational, psychological and physical domains of individuals' life" (Grover *et al.*, 2010:1). Chittaro et Vianello (2013:2) emphasize that problematic Internet use grows in importance, and "involves preoccupation with using the Internet, compulsive Internet use, subjective feelings of inability to limit use and using the Internet to escape". In the same line, Derbyshire *et al.* (2013:2) reveal that "problems associated with frequent Internet use include an inability to control the time spent on Internet" and poor academic performance. Lyu points out on unethical behavior and illegal behavior on the Internet and that "Internet has had a substantial impact on our moral, legal and social system" (Lyu, 2012:2).

Tan and Yang (2014:1) focused their research on the Internet application use and their impact on the users' personality, emphasizing that applications like online search, e-entertainment, online social networking and games "have changed individual behavior and the ways individuals interact with others".

The Oxford Internet Institute provided its research results based on the 2013 survey. The survey identifies five cultures of Britain Internet uses, defined based on the users' beliefs and attitudes (Dutton & Blank, 2013:4): the e-mersives ("immersed in the Internet as part of their everyday life and work"), the techno-pragmatists (they are using Internet for their work and life but, unlike the e-mersives, they do not view the Internet as an escape), the cyber-savvy (enjoy to be online and make use of the Internet applications but are in the same time aware that, in a certain degree, Internet is taking control of their lives, makes them wasting time and invading their privacy), the cyber-moderates, 37% of the Internet users in Britain (moderate in their attitudes, enjoying the Internet benefits but being aware of the risks like wasting time, the threat to their privacy etc.) and the adigitals which cannot accommodate with the technological contexts.

Expanding an earlier model, Tomos *et al.* (2013: 7) use a questionnaire to study the relationship between Internet usage, technology satisfaction, student performance and technology resistance among students in a higher education institution in Wales. They conclude that there is positive correlation between Internet usage and academic performance, but that students benefit from additional training necessary to improve their Internet usage skills and to overcome the 'resistance'. However, excessive Internet use is found to be detrimental to academic performance and social well-being. Chen and Peng (2008) find out that students who use the Internet excessively have significantly lower university grades, social relations and learning satisfaction, compared with students with normal Internet usage. Also, students who use the Internet excessively are more likely to be depressed, physically ill, lonely and introverted. Niculovic *et al.* (2012) conclude that excessive Internet usage among students is correlated with "lack of self-control", weak academic performance and impaired social life; the authors propose that early detection and education is an important factor in countering excessive Internet usage.

Many studies focused on students' population. Suhail and Bargee retained in their study the students' opinion that Internet use had benefic influence on their learning on three aspects: improved their grades, "expanding their reading, writing and information-processing skills, and had proved a helpful tool in their learning" (Cheng & Fu, 2009: 2). In the same time, the students recognized that their academic performance was impaired when they used too much time for recreational Internet use (*idem*). Stanciu *et al.* (2012) emphasized the "appetite" of Romanian accounting students for social networking. The authors concluded in their paper that social networking, next to other web-based technologies, might be considered as valuable tools for education. Gomez *et al.* (2012) also find that social network usage is a preferred communication medium for students, and that professors should strongly consider using social networks for educational activities. This is further emphasized by Valerio-Urena and Valenzuela-Gonzalez (2011), who state that professors should adapt their teaching to social network use, rather than block student access to social networks.

Hu *et al.* (2011) also acknowledge the difficulty in accurately measuring students' Internet use for academic purposes, separately from social networking and other hedonistic activities. In their paper, they consider factors associated with Internet usage such as efficiency, information overload and usage experience. They conclude that there are differences among perceptions among genders, with males generally having higher perceptions of experience and usefulness than females regarding Internet usage. Explaining these differences, the authors also emphasize that when the Internet is used at home, it might become a detrimental feature to academic performance. Indeed, in our research, students regarded addiction to on-line social interaction as a major concern.

Tsitsika *et al.* (2008) also find that the location and purpose of Internet use was a strong predictor for excessive use. In their study they surveyed 897 adolescents in Greece, and found out that usage via home portal (as opposed to school or internet cafe), as well as usage for socialization and games may lead to excessive use (defined more than 20 hours per week). The study finds that other factors such as age and academic performance have little influence on the total numbers of hours spent on-line. Tsitsika *et al.* (2008), note that the female gender is negatively associated with excessive Internet usage.

A study performed by Andreassen *et al.* (2012) attempts to gauge excessive use of social networks, with an instrument based on an earlier questionnaire used to gauge addiction to gambling. They conclude that females are more likely to be excessive users of social networks, while males tend to over-use on-line games and other solitary behaviors. Overall, the study finds that excessive social networking is detrimental to fulfilling other obligations and interferes with sleeping hours, resulting in a postponement of bedtimes and rising times.

The Internet provides rapid and easy access to the information of all kind, and as a result has become an important search information tool for the students. Chen and Fu (2009:3) emphasized that "surfing on Internet for course material has positive net effect on intellectual development and vocational preparation, in addition to personal development". Other studies focused on the quality of the electronic source citations used by the students in their research papers. In this regard, Robinson and Schlegl (2005) emphasized the need to train the students so that to acquire the useful skills to perform a critically information search on Internet. Gaytan (2008) underlines that most materials retrieved on Internet were not produced for teaching purposes. In this respect, Gaytan recommends that students' Internet-based learning experiences have to be developed by their teachers.

Internet use in high education institutions as a teaching and learning tool implies large-scale involvement from all the areas of an academic community: institution management, professors, students and staff. Eynon (2005:1) underlines the importance of the institutional strategy that reflects "the diversity of ways ICTs may be used in different context across the institution".

On-line teaching tools are beneficial for distance learners, and are also accessible around the clock. Spennemann (2007) looks at the assumption of 24/7 web usage by analyzing the log files of nine university servers in Australia, and concludes that the majority of traffic (81%) happens between the work hours (08:00 – 18:00) with another peak taking place around 21:00. The study also finds out that distance students tend to be older than on-campus students, but that gap is closing, with young students increasingly using on-line resources to study for particular topics.

The researches interest focused also on the Internet-supported learning (ISL). Bekele and Menchaca (2008) consider that ISL provides more interaction opportunities than the traditional teaching, increasing students' motivation and satisfaction.

Gaytan (2008) makes a review of the literature on teaching with Internet topic retained the five levels of Internet use, recognized as best practices:

- Level one: using Internet aiming to gather information;
- Level two: share the information retrieved on Internet with the students aiming at engaging them in additional learning activities;
- Level three: students are working on the Internet as part of the lesson plan;
- Level four: the curriculum prepared by the teacher includes projects and activities that can be accomplished just by using the Internet;
- Level five: students are designing their projects based on Internet activities, following a self-directed learning.

The Internet is one of the IT&C items that define the accountants' skills and competences stressed by international accounting professional organizations. IFAC (2003) has issued an important educational standard IEG-11 (International Educational Guide on "IT and Accounting Curriculum" stating the imperative nature of information technology for the Accounting Profession" (IFAC, 2003). IFAC (2009: 10) nominates universities, employers and other stakeholders as important actors in "the design, delivery, or assessment of educational programs for accountants". Diaconu *et al.* (2011: 10) consider that "the development of technology, particularly of the technologies regarding the information transfer and communication" are important elements to ensure the companies' competitiveness. In respect with all above-mentioned points of view, we conclude that the academic curriculum has to include deeper IT&C components and help accounting students acquire specific competences.

3. Methodology

The objective of our research was to identify the students' Internet use skills, preferences and habits, and to understand how they are using Internet in order to support and improve their learning. The authors considered that this information would help them in designing the Internet-supported learning instruments they are developing for the academic teaching activities.

The study was designed to perform an experimental research based on a questionnaire survey. In this respect, the survey participants were invited to complete a questionnaire. The respondents were bachelor and master students of the Faculty of Accounting and Management Information Systems in the University of Economic Studies in Bucharest. The survey was administered to 119 students, out of which 84 were bachelor students and 35 master students. All respondents had prior experience in using Internet. The data analysis was conducted starting from the following hypotheses:

H1: The most part of the respondents have at least, medium Internet use skills. The argumentation stays in the fact that the students started to use computers and implicitly the Internet in their early teen age.

H2: The Internet is used preponderant for communication purposes. This hypothesis is based on the statistic data and on the authors' conclusions retained in the work with the students.

H3: Daily Internet use.

H4: The Internet is most frequently used from home, the university's library resources being not preferred by the students. This is the result of the Internet facilities provided in the university campus and the preponderant Internet usage purposes (personal issues as for example communication, news search, entertainment etc.).

H5: The Internet is the main tool for searching information resources in learning activities performed by the students.

H6: The students are using searching engines to identify new sites (it is a more effective search and the students posses skills in this area).

H7: The Internet is preferred to other activities.

H8: The students have information and knowledge on computer security and the dangers associated with web usage.

Our research aimed to explore the quality of the electronic sources used by the students in their research papers. In this area, the Romanian research is scarce and the information is important for the teaching process improvement. The survey focused on the bachelor respondents of the questionnaire whose research papers were analyzed in order to evaluate the quality of the Internet resources used. The students were not pointed out in regard with this evaluation. For the analysis purposes the information resources used by the students were classified in scholarly and non-scholarly electronic sources. We considered the following as e-scholarly sources: electronic books, electronic research journals (articles selected using the university library's databases), e-documents as for example laws or documents provided by governmental entities or professional bodies. Low quality e-resources were considered web pages as for example journals, magazines, and other e-documents.

The findings of the survey have to be considered taking into consideration the survey's limitations: the size of the sample (even if the sample is representative for the existing population is not covering all the faculties in the university and bachelor years of study) and there were not face-to-face interviews conducted with the respondents. Even so, the results helped the authors to understand the students' profile of Internet users and helped them to identify how to improve the students' Internet skills and develop Internet-supported learning instruments.

4. Results and discussion

For our study, we issued a self-administered survey to students in our university. We collected a number of 119 questionnaires, coming from the Accounting and Management Information Systems faculty of our university. This justifies the large percentage of females (88%), as they are predominant in faculty. Of the total, 71% were undergraduate students, and 29% were graduate students; and while we did not explicitly ask for age, we expect the mean age to be 20 years, based on the demographics of the sample's population.

From the respondents, 73% rated their Internet usage abilities as "advanced" and "very advanced", and 25% rated their abilities as "average". Regarding the frequency of Internet usage, 99% of our respondents use the Internet several times every day, and 92% spend more than two hours on the Internet.

The most favored activities while on-line were E-mail, downloads, chat, social media and news, making up 60% of the total time spent on-line. E-mail is used daily by more than 89% of the sample, and chat is used daily by 75% of the sample. At the other end, games and blogs are used daily only by 16% and 14% of our respondents.

In regard to the access methods and place, 82% use a mobile phone to get on-line (in addition to desktops). Most of the students spend access the Internet in several locations: at home (97%), at school (62%) and at friends (33%)—reflecting the focus of their student life (students were asked to declare the preferred three facilities for Internet use).

Overall, according to the time spent on-line, the most important activities are social interactions (39%), personal interests (25%), research for school (25%) and using the Internet for the job purposes (11%). The total number of hours calculated this way agrees with a previous question, which asks the respondents to rate the overall number of hours.

Communication with friends is still done by SMS (29%) and voice calls (23%), with chat coming third at 20%. The last is VoIP (Skype) with 4%. When asked to quote three reasons why the Internet is useful, the majority mentioned quick access to vast amounts of information, communication with friends, and facilities such as e-banking. The most disliked items were: spending excess time and becoming addicted to Internet usage, the amount of advertisement and false information, the loss of privacy and security. A significant part of the students (41%) appreciate that every week, they spend time on-line instead of doing other activities, which agrees with the other rates. Finally, 58% of the respondents appreciate that they have received training to use the computer in a secure way.

Table 1. Sample characteristics

Measure	Categories	Frequency	%	Cumulative (%)
Cycle	Undergraduate	84	71	71
	Graduate	35	29	100
Sex	Female	105	88	88
	Male	14	12	100
Usage abilities	Beginner	0	0	0
	Basic	2	2	2
	Average	30	25	27
	Advanced	60	50	77
	Very advanced	27	23	100
Use frequency	Daily	118	99	99
	Once per day	1	1	100
	Once per moth	0	0	100
	Less than once/month	0	0	100
Usage hours/day	<1	0	0	0
	1-2	9	8	8
	2-3	18	15	23
	3-4	29	24	47
	>4	63	53	100
Chat usage	Several times daily	89	75	75
	Once per day	14	12	87
	Once per month	10	8	95
	Less than once per month	6	5	100
E-mail usage	Several times daily	106	89	89
	Once per day	11	9	98
	Once per month	2	2	100
	Less than once per month	0	0	100
Blog usage	Several times daily	23	19	19
	Once per day	32	27	46
	Once per month	40	34	80
	Less than once per month	24	20	100

Measure	Categories	Frequency	%	Cumulative (%)
School research	Several times daily	65	55	55
	Once per day	35	29	84
	Once per month	14	12	96
Music/movies	Less than once per month	5	4	100
	Several times daily	70	59	59
	Once per day	28	24	83
	Once per month	17	14	97
News	Less than once per month	4	3	100
	Several times daily	67	56	56
	Once per day	33	28	84
	Once per month	12	10	94
Instant Messaging	Less than once per month	7	6	100
	Several times daily	62	52	21
	Once per day	28	24	76
	Once per month	17	14	90
Web browsing	Less than once per month	12	10	100
	Several times daily	86	72	72
	Once per day	17	14	86
	Once per month	8	7	93
Games	Less than once per month	8	7	100
	Several times daily	26	22	22
	Once per day	20	17	39
	Once per month	25	21	60
	Less than once per month	48	40	100

In order to test H1 we look at our users' skills, and conclude that 98% of the respondents have asserted their skills to be above average or better, thus validating H1. Using SPSS V20 we ran an independent sample t-test to test whether males perceived their skills to be better than females, but we found no statistically significant difference between the two groups. We conclude that the two groups are homogenous in respect to their perceived skills. The same holds for usage length, with males having a marginally smaller usage times than females.

Next, we looked at usage purpose. We grouped the variables in our study in two categories: *communications* (including chat, e-mail, blogs and instant messaging) and *others* (including documentation for school, music, films, new web browsing and games). In the questionnaire, we used a qualitative scale to evaluate usage; for analysis purposes we re-coded the data with the following values: several times per day: 4, once per day: 3, once per month 2, less than once per month: 1. The mean value for *communications* was 3.23, with a standard deviation of .978, and the mean value for *others* was 3.39, with a standard deviation of .857. The difference was not statistically significant, with $p = .239$, and we conclude that there is no difference between the two categories, thus rejecting H2. However, we wanted to see whether students use the Internet for academic purposes ("school

documentation”). Our analysis revealed that students have a strong preference for chat and email in the detriment of academic purposes, with the differences being statistically significant, as illustrated in Table 2.

Table 2. Comparison of web usage purposes

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 FreqChat - FreqDocSchool	.267	1.003	.098	.073	.461	2.726	104	.008
Pair 2 FreqEmail - FreqDocSchool	.527	.939	.089	.351	.703	5.936	111	.000
Pair 3 FreqBlog - FreqDocSchool	-.922	1.265	.133	-1.187	-.657	-6.915	89	.000
Pair 4 FreqMusicFilms - FreqDocSchool	.057	1.194	.116	-.173	.287	.488	105	.626
Pair 5 FreqNews - FreqDocSchool	.028	1.027	.099	-.168	.224	.281	107	.779
Pair 6 FreqInstMess - FreqDocSchool	-.160	1.289	.133	-.424	.105	-1.200	93	.233
Pair 7 FreqWeb - FreqDocSchool	.247	1.274	.132	-.015	.510	1.872	92	.064
Pair 8 FreqGames - FreqDocSchool	-1.133	1.352	.137	-1.404	-.862	-8.294	97	.000

Hypothesis H3 asserted that the students use the Internet daily. The variable “Usage Frequency” shows that 99% of our respondents use the Internet daily, thus validating the hypothesis. Usage time is very high as well, with the majority (53%) logging in for more than 4 hours daily. The average daily usage stood at 3.72 hours/day.

Regarding access place/methods, only 6% use the Internet in the University library, and 16% of the respondents use other University access facilities. This compares unfavorably with home use (30%) and mobile use (25%), which are strong predictors of leisure activities, as shown by Tsitsika *et al.* (2008). Thus hypothesis H4 is validated, showing that the Internet is mainly accessed using personal devices, leading to leisure activities.

The study included an analysis of the quality of the Internet resources used by the master students for their projects. Even if the students opine that they use daily Internet for the learning purposes and Internet is an important source of information, the Internet resources used in preparing their projects are scarce, reveal insufficient Internet retrieval information skills and even superficiality in the information search. No e-books or e-articles from scientific journals were used in the projects. These information resources are available just from the university library, so none opted for this resource. 13% of the graduate students used documents available on professional (accounting and auditing) sites, 12% used e-documents (laws and regulations), and 40% used printed books. This validates hypothesis H5.

We conclude that there is a strong need to improve the students Internet information retrieval skills and the awareness regarding the quality of the citations used in their projects and final papers.

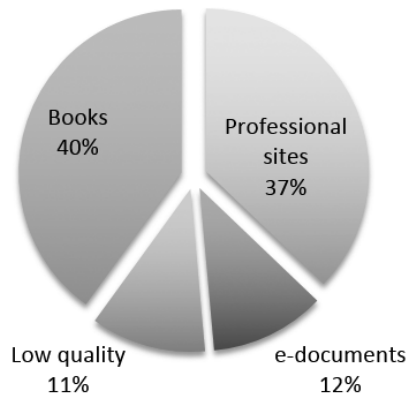


Figure 1. Student research sources

The results of study revealed that 43% of the respondents find new information on the web by using search engines, compared with 32% who stated they use information from friends, 19% by following hyperlinks and 7% from other sources. This validates hypothesis H6 and points to the fact that the students need better training in using the on-line research databases available to them through the University.

We asked the students how often they stay on-line at the expense of other activities, in an attempt to gauge if they perceive that they spend too much time on-line. 5% answered that every day, they stay on-line instead of doing other activities, while 36% answered that it happens weekly and 15% monthly. We conclude that H7 is validated. Taking note of the average daily time of 3.72 on-line hours leads us to the conclusion that a large percentage of the students over-use the web, mainly for leisure activities.

We have included a free-text question, asking our respondents what they saw as the biggest threats to using the web. Among the highest rated were addiction, loss of privacy and questionable security. 58% of the respondents stated that they have received security training; and we conclude that H8 is validated. However, the students stated that they use the web for social networking for an average of 14 hours/week, compared with 9 hours for documentation, 8.5 for school, and 9 hours for the office. We theorize that the concerns regarding addiction and privacy are strongly connected with intense use of social networks, which has been shown to cause addiction and by its nature leads users to “share” private data.

5. Conclusions

The Internet is recognized as a valuable tool for learning, teaching and research. The best practice recommends Internet-supported learning for student-centered learning and is recognized as effective in distance learning and lifelong learning. Both students and professors recognize the benefits of Internet use. The study emphasized that students recognize that Internet is a very important source of information and they used it for learning purposes. They also emphasized the risk to access incorrect or unreliable information. The students expressed their appetite for communication using the Internet, being also aware of the exposure to different risks. In this respect, the authors believe that in the training process (mainly in informatics courses) should be more time dedicated to the improving the students' knowledge on ethics and communication in Internet, information and computers' security, privacy and Internet information searching. Students are "social networking" dependent and they are not truly aware of the risk generated by the "openness" in the information disclosure in this environment. Today's students will be the future employees using Internet and social networking, inclusively, in their professional life. In this respect, students need dedicated communication and risk information dissemination training included in the academic curriculum. Many academicians and accountants professionals recognize the importance of IT&C training for accountants' students. Tudor *et al.* (2013: 7) consider that "as technology continues to have a major impact onto the way to lead a business, the inclusion of IT&C in the education and in the training of the accounting profession ...have a critical importance". Aiming at emphasizing the accounting educational role of academia, Albu and Toader (2012: 2) retain from the literature that the accounting education "should still contribute to the development of accountants, but in line with the future needs of the business model". As long as the business models are increasingly IT based, the IT&C competences for accountants become compulsory.

As instructors, we must be aware that our students are increasingly apt at using the Internet from an early age. This creates a case for a transformation of the teaching methods, in which instructor-led classes are more interactive, with the "static" content being available on-line. There is a clear downward trend in the use of "traditional" resources, such as printed textbooks and libraries, as we are transiting to on-line media and text libraries (Tsvere *et al.*, 2013).

The authors' research conclusions support the development of Internet-based learning tools, and confirm the students' expectations in regard with the successful development and implementation of technological developments in the field. The research findings are also valuable information for the academic curriculum improvements on the computing and security information area.

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