

Students go click, flick and cheat: E-cheating, technologies and more

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ABSTRACT

The UAE is a major hub for most trades and tourism in the Middle East. Attracting diverse populations from around the globe, the country has opened its markets to local and international academic bodies to cater to the growing need for tertiary education within the nation. All or most of these colleges and universities are caught up in the need to introduce or increase the dependence of classroom teaching on two aspects of new era education: e-sources and e-technology.

World-wide increase in publishing documents in electronic formats so as to reach more readers has surpassed the millions. Publicly accessible sites and academic library database memberships make these publications readily available to students at their finger tips. Where traditional methods involved slow processes of physically finding information, now students need simply type in key words and their screens spit out hundreds of articles, book chapters and journal articles that could give them related information. Add to this, various types of e-technology, inside and out of classrooms that make it easy for students to share information and complete assessments successfully.

However, little or no research exists on the possible implications of the increased e-sources and readily-available e-technology on students' attitudes toward e-cheating. This study looks into the two factors and if at all there are any affects on the alarmingly rising cases of e-cheating in the UAE.

Keywords: Ethics, e-cheating, cheating, cyber-ethics, technology, Internet

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INTRODUCTION

(Adapted from Khan, Z. R. And Samuel, S. D. (2009). E-cheating, online sources and technologies – a critical review of existing literature. Proceedings from 9th Global Conference of Business and Economics. Cambridge University, UK. October 16 – 17)

At the turn of the twenty-first century, there was a tremendous frenzy to move towards incorporating technology into every aspect of man's life. With the information age merging with the tech-boom, the world saw a rapid convergence towards technology usage across borders at a global scale. Education was no different. In undertaking this research, authors have reviewed existing literature to pinpoint what has been written about technology, cheating and solutions put forward by emerging studies, but also highlighted the limitations of the literature to raise questions on the issue of possible implications of increased technology and effects of vast amounts of continuously increasing databases of sources on virtually all topics made readily available to students via the publicly accessible sites and academic libraries towards students' attitude on e-cheating. This research has proceeded to study the impacts, if any, of the two recognized factors on students' attitude towards e-cheating and some possible limitations of the study.

TECHNOLOGY IN EDUCATION

According to an extensive literature review conducted by Khan and Samuel (2010), in the last few decades, technology usability has evolved and spread to all sectors of day-to-day activities at lighting speed. Education is no different. From the World Wide Web to over-head projectors, technology is seen now-a-days as a necessary teaching and learning tool. The ease and diversity technology offers to enhance the teaching and learning experience for both the educator and the student is unparalleled.

'Several organizations like Edutopia, the North Central Educational Lab (NCREL) and the Center for Applied Research in Educational Technology (CARET) are documenting research studies that link technology to increases in academic achievement' (Foltos, 2002). Another study, carried out by European Schoolnet, showed 'that digital content on interactive whiteboards is engaging and motivating, students pay more attention during lessons, and interactive whiteboard use encourages greater student participation in the classroom' (Independent Online, 2007). Further, Nancy Knowlton, CEO of SMART, the company that pioneered in interactive white-board and other tools adds, 'many studies around the world show that the use of [information and communication technology], and specifically interactive whiteboards, is effective in engaging and motivating students' (Independent Online, 2007)

Technology has been used in its earliest form since the 70s at schools. Simple technologies from copying to calculators, academic institutions round the globe had already begun their dependencies on technology. As the decades bore on, technology began to become more advanced. 'Over the last fifteen years [alone]...schools have dramatically increased spending on classroom technology to more than \$5 billion annually' (Foltos, 2002). And why not?

Where previously, teachers had to simply stand in front of the classrooms and teach while students listened and learned, ‘now teachers’ presentations have to compete with the expectations raised by the technology children have at home – iPods, Play stations and home computers’ (Goff, 2007). Technology outside the classroom is morphing at a lightning speed capturing students’ mind and time, creating a world that seems to only revolve around technology. From face-to-face contacts to telephones to emails and now to Facebook, students view technology as a need than a want which has surrounded their lifestyle. ‘If you look at how students learn outside of school, it’s all about computers. These are the tools we need to get them engaged in their learning in the classroom,” says Tim Yates, director of technology at Pueblo district, Colorado (Royster, 2009). Christian Dickinson, an instructional leader in St. John’s County, Florida adds, ‘the kids are savvy, and we have to meet their needs’ (Weil, 2009).

As students graduate to join the workforce, they have to be prepared with all the knowledge and skills to make a place for themselves in the competitive job market. Mississippi State University’s Center for Science, Mathematics, and Technology believes it is important to ‘build a well-educated and trainable work force that is capable of competing in the world economy’ (Harpole, Kerley, 2007). This can only be accomplished if students are taught their lessons and alongside ensuring they have the ability to become tech-savvy (Royster, 2009).

Academic Institutions are also branching out to introduce or advance their technology in classrooms to gain competitive advantage over others in the market (Royster, 2009). Daniel A. Reed, current Chair of Computing Research Association stated that ‘competitive advantage, driven by innovation, has never been more important’ (Harsha, 2009). E-learning using Blackboards, WebCT, access to the Internet, using laptops, and interactive white boards are just a few of the technologies being implemented at various schools and colleges across countries (Khan, 2006). ‘Educators are looking well beyond traditional computers and trying to give their students an edge no others have.’ (Petrie, 2008) This promise, in turn, is increasing the academic institutes’ popularity in recruiting students (Khan, 2006).

IT’S ‘E’-LECTRONIC ALL THE WAY

As technology virtually takes over the world, the concept of converting or having some sort of electronic presence, or including some aspect of technology-based service has become quite rampant. This became a rage in the dot com era where most organizations, including academic institutions that could afford it, began to introduce a variety of technology-based services and programs, and have some sort of presence on the Internet to increase their client base. ‘The number of undergraduate students majoring in computer science significantly increased ... since the dot com boom...’ (Harsha, 2009). Invariably, distant learning morphed to e-learning, attracting greater number of schools and universities to offer such services, especially when in 2002 the global market for e-learning reached US\$90 billion (Yong, 2003). This was further motivated by the ‘ever increasing [trend where] the Internet and computer technology became widespread as a daily necessity of the younger generation’ (Wong, 2007).

In the twenty first century, any and every computer or electronic device can and is being used as a tool of e-learning in and out of classrooms around the globe. Because learning is a social process, it is easy to see why e-learning tools have gained the popularity (Wenger, 1998). Tools such as Blackboard, WebCT and so on ‘encourage student collaboration; improve team working skill and independent thinking’ (Border, Stoudt, and Warnock, 2006).

It is this rise in technology-based services within academic institutions that has encouraged libraries ‘to adapt to the changing needs of users and meet the challenge of supplying information in the most suitable way’ (Culture24, 2009). More and more libraries around the globe are trying to offer online services that ‘combine the benefits of a traditional library and the Internet’ (iconn.org, 2002). Students are keen on using the online services because they can use the ‘new electronic resource to tap into a rich array of databases -- from newspaper archives to state and world online library catalogs – that put information at the tips of their fingers [around the clock]’ (icon.org, 2002). Across the globe, libraries are experiencing a surge in the usage of these new services. Croydon College University in the ‘U.K. has experienced an astonishing 472% increase in online usage of the library service’ (Bowker, 2007). Overall, ‘20 per cent increase in online usage [across the U.K.] shows that library users are now renewing books, searching through the catalogues, using the world class reference resources and keeping up to date with current event listings in the comfort of their own home’ (Culture24, 2009). This paper intends to formulate and test the hypothesis ‘increased online resources and their possible impact on e-cheating’.

TECHNOLOGY IN EDUCATION – OR CHEATING MADE EASY?

While there is extensive literature on the benefits of technology, a few have been written on its cons. Technology by itself is neither good nor bad. How people choose to make use of technology defines its character. One such example is cheating. Cheating is not a new academic problem. It existed even before technology had become so popular in the classrooms. ‘On National Public Radio’s “Diane Rehm Show”, Howard Gardner of Harvard University observed that 75% of high school students admitted to having cheated on a test’ (Bracey, 2005). Further, literature states ‘three-quarters of all high-school and college students admit to cheating on tests and papers. Not only do they cheat, but they justify their behavior as business as usual’ (Goode, 2007). Kidwell, Wozniak, and Laurel (2003) and Chapman, Davis, Toy, and Wright (2004) also found that 75 percent of students reported cheating [which is] similar to the 63 percent found by Nonis and Swift (1998). According to Mullens, McCabe found that ‘68 per cent of students admitted to one or more incidents of serious cheating, such as plagiarizing or submitting work done by somebody else ...’ (Mullens, 2000).

It is no surprise then that technology used in academic institutions is giving rise to more cases of cheating. ‘For students and academics alike, the Internet has become a valuable resource because of its potential to enhance the educational experience’ (Jones, Reid, Bartlett, 2006). Gaining momentum in the 90’s and early twenty-first century, Internet usage reached feverish heights in the academic world. ‘71 percent of [teenagers studied] relied mostly on Internet sources for the ... project they did for school and 34

percent of ... young people ages 12-17 download study aides from the Internet' (Lenhart, Rainie, & Lewis, 2001).

However, 'academics who once praised the Internet for giving students more access to information are now worried it is providing students with easy access to pre-written essays' (Connors, 1996). St. Omer reported 'the majority of students, having accessed information and music regularly, failed to understand that they had appropriated the work of another individual' (St. Omer, 2001). This is further researched by Khan who says 'the various tools used for e-learning seem to somehow cloud the judgment of students and as there seems to be a lack of prior knowledge (education) that can clearly distinguish between e-learning and e-cheating; this has caused students' perception of ethics to be distorted in certain areas' (Khan, 2006).

'The Internet and other forms of electronic technology definitely increase opportunities for cheating and dishonesty' (Bracey, 2005; Goode, 2007). Furthermore, 'the Internet...presents students with a world of unethical techniques and ideas' (Renard, 2000) and this in turn is giving rise to a 'generation of students who think anything that's on the Internet is free' (Clayton, 1997). 'E-cheating is quick and simple for students' (Renard, 2000) and that is why 'cheating can be employed by students in multiple ways with sincerity or foolishness' (Supon, 2008). As categorized by Lisa Renard, who is a language arts teacher, cheaters can be the unintentional type who never learned the correct way to cite and reference, the sneaky cheater who knows it is wrong and finds ways to get around it, or the all-or-nothing cheater who is last minute worker on assignments and looking for a quick fix (Renard, 2000). '...a quarter of college students surveyed have plagiarized from the Internet, but students perceive that significantly more students than that are doing so (Scanlon, 2004). Additionally, term paper mills have always existed around the globe and for years, however, the ease of getting the papers has increased with various web sites, making them more accessible (Born, 2003; Park, 2003). 'When students are using technology as a tool or a support for communicating with others, they are in an active role rather than the passive role of recipient of information transmitted by a teacher, textbook, or broadcast' (Means and Olson, 1997). Most often than not, adults in disciplinary/educator roles such as teachers and parents fail to understand this. 'The perceptions and attitudes of students must be considered in the use of instructional technology, if we hope to use technology to enhance the educational experience of our students.' (Smith, 2002). But, studies clearly show this is not so. Furthermore, 'academics and institutions should understand how students 'see', read' and 'use' e-learning' (Khan, Samuel, 2007).

Studies have been carried out extensively to highlight the importance of technology in the field of education around the globe. There has also been research carried out to demonstrate the negative impacts of some technology. However, in the process of reviewing existing literature, no body of research has been found that provide clear and consistent proof that readily-available technology and increased online sources have any kind of impact on students' attitude towards e-cheating.

Calculators, for instance, are very much a part of technology that have upgraded over the last decades to become part of e-learning. Calculators were a breakthrough way before computers had become common place at every home. It was definitely a technology above the use of booklets with pre-calculated tables and slide rulers (Calculator.org, 2009). In 1965, the first pocket calculator was introduced to the market; by 1974 it had

achieved providing four functions with LED screen, and although it was well over a decade before school children had their own pocket calculators, the technology advanced rapidly (Calculator.org, 2009). Now-a-days, calculators range from simple scientific to graphic to programmable with large amounts of memory space, data wires to allow sharing of information, formulas and so on among friends.

However, where calculators make it easy for students and adults to make quick calculations, they are 'becoming a mental crutch for students, rather than a tool that promotes higher order learning' (bsmarte, 2006). Often enough, academic institutions ban the use of certain types of calculators in examinations to ensure students are able to work out problems upon their ability rather than with the aid of technology. Such technology in the classroom is feared to 'result in an over-reliance on technology to provide solutions, thereby stifling a student's educational and creative growth' (bsmarte, 2006). There has been no literature to show the actual effects of allowing calculators in the classroom. In many schools and universities, teachers are on high alert in examination halls, keeping an eye out for programmable calculators that students can bring in with uploaded formulas and pre-sketched graphs that would constitute cheating. But, at the time of the literature review, there was no proof of study to actually register if there is any relationship between allowing high-end calculators that are affordable and readily available in stationary shops, on students' attitude towards cheating.

In fact, literature has been uncovered that talk extensively on how to curb problems rising from over-indulgence in technology (Bugeja, 2007; Clayton and Watkins, 2002; Drogemuller, 1997; Guiliano, 2000). A lot more have been written on how to detect cheating, tools available in the market and such (Anderson, 1999; Carnevale, 1999; Trotter, 2000). Literature has been studied that explain why plagiarism and cheating are unethical and the possible benefits of citing sources and giving references (Harris, 2001). Some literature even covers how teachers should be educated in detecting such acts and what they can do to curb them (Whiteman and Gordon, 2001). But there seems very little, if any, literature on why students do it. What factors drive them to it. 'The student is actively making choices about how to generate, obtain, manipulate, or display information' (Means and Olson, 1997) Academic institutions need to understand what is affecting students' attitude towards e-cheating. And how?

SIGNIFICANCE OF RESEARCH TO UAE

(Adapted from Khan, Z. R. (2010). E-cheating in the UAE – a critical review of existing literature. Proceedings from 9th International Conference on e-Learning, e-Business, Enterprise Information Systems, and e-Government. July 12-14, 2010, USA)

The United Arab Emirates (UAE) is a federation of seven emirates that gained its independence in 1971. It houses a population of over 2.95 million people, of whom 80% are non-local Arabs, Asians, Europeans, Africans and Americans (The Emirates Network, 2005). Education sector in the country is a growing industry with students flocking in from all over the globe to study in many different schools and colleges offering syllabus and degrees from various countries (Khan, 2010). According to a study done by State University, 'the total number of students at primary and secondary level in public and private schools in the UAE has steadily grown each year and reached 563,461 in 1998, up

from 480,973 in 1995, an increase of 4 percent per annum' (Education Encyclopedia, 2010).

The UAE is believed to be the leading industrial, commercial and trading center in the Middle East (Rosenthal, 2009). According to Rosenthal's research into the information technology environment in the UAE, the country's 'plan to economically diversify into the non-oil sectors has been successful in large part due to a combination of an open, liberal, pro-business environment coupled with a strong telecommunications/information technology infrastructure (Rosenthal, 2009). Where the UAE's imports cost over \$141 billion as of 2009, a lot of the items imported are technology and communication based (CIA (2010), Rosenthal (2009)).

The UAE is excellent when comes to the supply side of technology as well, and it provides excellent IT enabled services across the country. United Nations Department of Economic and Social Affairs (UNDESA) ranked UAE 32nd in the E-readiness index out of 192 countries (United Nations, 2008). As per the study, the country was also ranked second in E-readiness in the MENA (Middle East) region and a regional leader in the Web Measurement Index (United Nations, 2008). These awards have demonstrated UAE government's robustness in implementing the information and telecommunication technologies (ICT) frame work. The ICT advancement has invariably penetrated the education sector in the UAE with universities and their students using latest technologies in and out of classrooms (Khan, 2010). 'Most tertiary institutions have allocated ICT resources to provide alternatives to the previously used teacher-centered "chalk and talk" approach to learning and teaching.' (Behl, Fitzgerald & Vrazalic, 2007). Research has shown that e-learning tools in fact have affected students' attitude towards cyber ethics (Khan, 2006) negatively. Khan's study into e-learning tools and cyber-ethics in the UAE showed that:

students 'are not very clear on the actual definition of e-learning or the tools. When asked if 'E-learning is only online applications used to teach and learn in a classroom', majority of the students 'strongly agreed' bringing the weighted average down to a 1.42. On the other hand, 'Mobile phones and chat programs are tools of E-learning' scored only a 2.17 as only 2 students 'strongly agreed' demonstrating the students' lack in knowledge as far as e-learning and its tools are concerned' (Khan, 2006)

Other categories tested the students' perceptions of e-learning to what is allowed and ethically correct and what is not. Where students thought it was okay to download lectures from online classroom folders, they also thought it was okay to download music and movies (Khan, 2006). According to Khan's study,

'the various tools used for e-learning seem to somehow cloud the judgment of students and as there seems to be a lack of prior knowledge (education) that can clearly distinguish between e-learning and e-cheating, this has caused students' perception of ethics to be distorted in certain areas' (Khan, 2006)

Further background study and review has also shown that there is a considerable gap in the literature on factors that affect students' attitude towards e-cheating in the

UAE (Khan, 2010). One study by Donald McCabe at three local UAE universities in 2009 revealed 'slightly more than 40 per cent of UAE students consider 'cut and paste'-type plagiarism from the Internet as either not cheating or only trivial cheating' (Khaleej Times, 2009). However, the in-depth study carried out by McCabe in 2008 focused on Lebanon (McCabe, Feghali, Abdallah, 2008) and has not been transmitted to include the UAE.

As a result, it has been established that this research is of vital importance to the UAE and its education sector, given the country's statistics on e-cheating.

OBJECTIVE OF THE STUDY

The objective of the study is to explore factors such as increased online sources and technology, academic integrity, ethical values, competition and demographics on e-cheating and their impact on student attitude towards e-cheating

ESTABLISHING GROUNDS FOR STUDY

(Adapted from Khan, Z. R. (2009). E-cheating and calculator technology – a preliminary study into casual implications of calculator-technology usage on students' attitude towards e-cheating. Proceedings from 5th International Joint Conferences on Computer, Information, and Systems Sciences, and Engineering. [Online]. December 4 – 12)

As a subsequent study to the literature review, research was conducted (Khan, 2009), that looked into the possible impacts of calculator usage on students' attitude towards e-cheating to try and establish whether there was actual need to look into such factors as effects of readily-available technology.

The study confirmed that almost any and every technology is now used as a part of e-learning in order to enhance the overall experience for students and teachers (Khan, 2006). Calculators are one such technology that users have taken for granted as a part of daily life, yet a technology that has increased student ability in all science fields, in and out of classrooms, and into offices (Khan, 2009). The study also highlighted previous studies that have shown that where calculators make it easy for students and adults to make quick calculations, they are 'becoming a mental crutch for students, rather than a tool that promotes higher order learning' (Bsmarte, 2006). Such technology in the classroom is feared to 'result in an over-reliance on technology to provide solutions, thereby stifling a student's educational and creative growth' (Bsmarte, 2006). In the course of this study, the author found little or no studies that showed any correlation between calculator technology usage and e-cheating instances; but the study revealed many websites that enticed students to use calculators to achieve high marks in exams (Khan, 2009). The author conducted a study on over 100 students, and concurrently on various schools to record the usage of calculators in classrooms and particularly for cheating purposes. Research showed that 13.8% of the students used calculators to cheat on exams because they were cheap and fast ways of carrying large sums of information into exam halls (Khan, 2009). The study also confirmed an average of 25% increase in various subjects over three years. It highlighted the possible effects of increased usage of calculators in the classroom by students: where calculators saved students precious time in solving complicated calculations quickly and easily, they added to the ever-growing

list of technologies that students used in order to destroy academic integrity (Khan, 2009), thus laying the ground work for further studies to study the implications in greater details.

METHODOLOGY, LAY OUT AND STRUCTURE OF STUDY

In order to identify the factors influencing E-cheating, a survey tool was developed. The questionnaire was divided into four parts. Throughout the survey, the question layout varied. This was done in order to accurately collect data. The first type of question layout was Likert items. Likert items were used for a variety of questions pertaining to ethics definitions and theory concepts. The Likert items gave the respondents an option to categorize how they viewed ethics attributes and various definitions of ethics and professionalism. Each Likert item provided a value from 1-5, categorized from strongly agree to strongly disagree. Each item explained how the participants rated the ethics attribute and presented the respondent with a range of options to respond. It also structured the choices that could be made. Ten statements on ethics definitions and perceptions were presented to the respondents. The participants were asked to indicate how strongly they agreed or disagreed with the statement on a 5 point Likert scale. For example, they were given a Likert item that "Ethics is a collection of values". They had the option to check "strongly agree," "agree," "neither agree nor disagree," "disagree," or "strongly disagree." All ten statements were positively worded to minimize the respondent's confusion. Each scale point was coded as "strongly agree," "agree", "neither agree nor disagree", "disagree" and "strongly disagree". Later a numeric value for statistical analysis will be allocated such that a value of 5 is given to "strongly agree" and 1 to "strongly disagree."

The next section had six statements on applications of concepts that were meant to test students' understanding of ethics and cheating with statements such as "It is okay to install a copy write software given to me by a friend" or "It is cool to buy pirated movies from vendors on the streets for AED 5/- instead of the original for more than AED40/-" and students were expected to answer on the 5-point Likert scale. All ten statements were positively worded to minimize the respondent's confusion. Each scale point was coded as "strongly agree," "agree", "neither agree nor disagree", "disagree" and "strongly disagree". Later a numeric value for statistical analysis will be allocated such that a value of 5 is given to "strongly agree" and 1 to "strongly disagree."

The third section was adapted from King and Case (2007) to investigate student activities in and out of classrooms with questions such as "Cheated on exams", "cheated on exams using (examples of technologies)", "let others copy" or "bought papers from net". For these statements, students were expected to write either "yes" or "no" and the number of times they indulged in any of the actions.

The last section was in a qualitative format designed to collect data on student usage of library resources in terms of traditional print media and online sources with questions such as "Does your University Library have online sources/databases" and "Do you access publications from online databases" where respondents were expected to answer either as 'yes' or 'no. This section was developed in order to help understand whether increased online resources had any impact on student attitude towards e-cheating.

This study was conducted using survey methodology and follows the pre/post no control group format. The survey, which was conducted by the authors, was intended to examine student attitude towards e-cheating. 250 students filled out paper questionnaires; 26 questionnaires from the student depot were rejected as incomplete.

DATA COLLECTION PROCESS

The study was carried out over a year, funded by the University of Wollongong in Dubai's Research Committee, as part of the first author's dissertation. It looked at a sample population of over 250 students from varying ethnic and educational backgrounds. As the United Arab Emirates is a multicultural nation, with more than 80% of the population constituting expatriates, the authors believe the data collected provided an unbiased result grid that may be mapped by a follow-up study in other countries to tally the findings.

Upon an individual respondent's completion of a survey, their answers were collected through the use of an Excel file. Manual encoding was avoided in order to minimize error. 250 students filled out a paper questionnaire. The questionnaire itself was built using Word processor. Data was collected manually. The data entered into the questionnaire were captured and ultimately exported into SPSS (a statistical software package for the social sciences) for analysis. The data entered was rechecked by the authors that minimized error as the respondents' exact answers were transferred directly two times by two persons in two separate occasions and then correlated.

SAMPLE POPULATION DEMOGRAPHICS

The survey looked at 250 undergraduate students from different universities in UAE, and the final student sample of 224 completed surveys included nationalities from different countries. Respondents were classified based on the gender and year of study. The classification is given in the Tables 1 and 2 respectively (please see Appendix). Among the respondents were 94 male students and 130 female students. The students were majority mostly from second year, followed by third year and lowest population sample of first year respondents.

RESEARCH MODEL

Although the study was meant to look at increased online sources and readily available technology as the primary factors, authors found other factors such as

- “attitude towards ethics”,
- “attitude towards academic integrity”,
- “attitude towards piracy”,
- “previously cheated in exams”,
- “desire to success”,
- “year of study” and
- “gender”

as promising factors that were highlighted after the survey model was designed. The authors realized the survey tool design would capture data that highlighted the factors mentioned above, and therefore the authors felt it necessary to test the factors as well.

The various factors and student attitudes that influence e-cheating were formulated and are illustrated in the Figure 1 (please see Appendix). Assumptions were made on the influence of each factor on e-cheating and is indicated by either '+' or '-'.

- It is assumed that increased online sources and advancement in readily-available technology will increase or positively influence e-cheating.
- Students who have a positive attitude towards piracy are assumed to favor e-cheating.
- Students who have previously cheated in a traditional way like sharing among friends during exams, using printed materials in the exams are more likely to use the advancement in technology and resources to increase cheating.
- Desire and need for academic success will also act as drivers for e-cheating.
- However students having high ethical values and academic integrity are less likely to e-cheat than students with less ethical values and academic integrity.
- It is assumed that e-cheating is independent of demographics like gender and year of study.

DATA ANALYSIS

In order to analyze the data, factor analysis was conducted on the questions for ethics and academic integrity to validate the factors and eliminate the questions which did not measure the underlying variable. Reliability analysis was also performed to validate the reliability of the data set. Based on this, the 'overall attitude towards ethics' and 'overall attitude towards academic integrity' were calculated.

Factor analysis was once again performed on the sample observations of 'Is it Okay' questionnaire consisting of 8 questions on traditional cheating, piracy and referencing. The Kaiser-Meyer-Olkin (KMO) measure verified the sampling adequacy with $KMO=0.775$ and Bartlett's test of sphericity $B(215)=575.5$ standing at significant $p<.005$. This indicates correlation between variables were significantly large for factor analysis. The variables cluster on cheating, piracy and referencing are recorded in Table 3 (please see Appendix) validating the questionnaire (for detailed results of factor analysis, please see Appendix B)

Overall weighted average score was obtained for traditional cheating and piracy. For each Likert item, there was a 'weight' placed depending on how close the choice was to being right. For instance, for the question "Ethics is a collection of values", the weights start from 5 to 1 for each of the Likert items 'strongly agree', 'agree', 'neither agree nor disagree', 'disagree', 'strongly disagree' respectively. This is because if a respondent chooses 'strongly disagree', he/she demonstrates vague knowledge of what e-learning really is. For another question, "It is okay to install a copyright software given to me by a friend", the scale is reversed such that if a respondent chooses 'strongly agree', the response receives 1 point on the scale thus showing he/she has chosen the wrong answer. Once the weights have been placed on each response, the average is calculated by

totaling response for each question and dividing by the total number of respondents for each question in each case.

Identifying the influence of increased online sources and readily available technology in E-cheating on student attitude towards e-cheating

Based on the assumptions made on the research model, the following hypothesis was formulated:

Hypothesis 1: Increased online sources and readily available technology will be positively related to students' attitude towards e-cheating.

A comparative study was performed on the student attitude towards traditional cheating and e-cheating.

The results from Table 4 (please see Appendix) indicate there has been a considerable increase in the attitude of students to cheating as a result of advancement in technology. Surveys show traditional cheating, which include cheating among friends during exams, using printed material in the exams etc, are only 37.5% while E-cheating is 78%. This result supports the previous studies on student cheating in colleges mentioned in the literature. Hence it supports and validates part of the Hypothesis 1 on readily available technology.

(For the first part of the hypothesis 1, 'increased online sources will be positively related to students' attitude towards e-cheating, please refer to Section 13: Limitations of the study)

Table 5a (please see Appendix) shows the various devices and methods used for e-cheating. Electronic gadgets like mobile phones, programmable calculators, i-pods, memory sticks, PDA's etc are leading the way for technology enabled e-cheating. Advancement in technology and increased online resources have contributed almost equally (56% and 44% respectively) towards e-cheating as per the findings (details of calculation in Table 5b, Appendix).

Identifying the gender difference in e-cheating

Authors found it important to identify the gender difference in e-cheating. Using the above constructs and variables the authors formulated a hypothesis to identify the gender difference in E-cheating. The objective was to identify any significant difference in the above for male and female students.

Hypothesis 2: E-cheating is same for both male and female students

The above hypothesis is tested and the results are summarized in Table 11 (please see Appendix). The t-test is not significant and hence the hypothesis is rejected. There is a significant difference in e-cheating between male and female students. Male students are more involved in e-cheating than female students as per the findings. Additionally female students are more keen on referencing and citation than male students

Identifying factors - year of study and previous record of cheating

Like gender, authors found it important to identify demographic factors like year of study and previous record of cheating. Here the authors classified students based on year of study (1st year, 2nd year and 3rd year) and students who had previously cheated in exams. The objective was to identify any significant difference in E-cheating related to the mentioned factors.

Hypothesis 3: E-cheating is same irrespective of year of study

ANOVA is performed and the results are summarized in Table 11 which support the hypothesis and it is seen that there is no significant difference to e-cheating with respect to year of study.

Hypothesis 4: Students who feel Ok to cheat among friends during exam, assignment (Traditional cheating) are more inclined to E-cheating

Correlation analysis was performed to test the hypothesis and the correlation is significant with $r=.316$ and hence indicates a positive correlation between traditional cheating and e-cheating. Therefore, the hypothesis is validated as seen in Table 6 (please see Appendix)

Identifying attitudes and motivation towards E-cheating

Authors believe every student has his/her own attitude towards ethics, academic integrity, and piracy; and that this attitude is part of his/her character. Similarly, today's competitive world requires academic success when it comes to securing good jobs. So it is believed that students may be motivated by academic success. Authors also tried to identify how these attitudes and motivations were correlated to E-cheating among students, if at all. Authors formulated a hypothesis to identify and test the above factors and E-cheating as described below.

Hypothesis 5: Students with high Academic Integrity have negative attitude towards E-cheating

Table 7 (please see Appendix) highlights the results of correlation and shows academic integrity and e-cheating are negatively correlated and hence supports the hypothesis. The correlation is significant with $r= -.339$ and the hypothesis is validated.

Hypothesis 6: Students with high ethics have negative attitude towards E-cheating

Table 8 (please see Appendix) shows the results of correlation and highlights how ethics and e-cheating are negatively correlated and hence supports the hypothesis. The correlation is significant with $r= -.307$ and the hypothesis is validated.

Hypothesis 7: Students with positive attitude towards piracy are more inclined towards E-cheating

Table 9 (please see Appendix) gives the results of correlation between attitude towards piracy and e-cheating and is found to be positively correlated and hence supports the hypothesis. The correlation is significant with $r = .218$ and the hypothesis is validated.

Hypothesis 8: Need/Desire for academic success contributes to E-cheating

Table 10 (please see Appendix) illustrates the results of correlation between desire for academic success and e-cheating and the correlation is found to be not significant with $r = .117$. Therefore, the hypothesis is rejected. Results show academic success or increased competition have not increased e-cheating.

HYPOTHESIS RESULTS

Independent sample t-test, ANOVA and correlation were conducted to test and validate the hypotheses. Based on the results the hypotheses were either validated or rejected. The Table 11 summarizes the test results (please see Appendix):

DISCUSSION AND LIMITATION OF STUDY

Although the study was supposed to focus primarily on the effects of increased-online sources and readily available technology, authors found some limitations in the study.

While revisiting the survey model and after collecting data, Part IV of the questionnaire was meant to collect data on respondent usage of library resources, especially traditional versus online resources. When the questionnaire was designed, it was assumed that a conclusion could be drawn based on students' response to Parts I, II and III and Part IV, thereby helping to study possible relationship between students who demonstrated high tendency to cheat to those students who chose to research online. However, during the analysis process, authors realized the design of the survey tool was not appropriate to help with the study. Firstly, students were not accommodating in their responses to this section or were perhaps not informed themselves to be able to answer some of the questions such as "ease of use of online resources to traditional" perhaps because the online resources are the most common sources for research in the twenty-first century (Tanopir, 2003, Arora, 2001). Secondly, the data collected was in a format that was not Likert-scaled, so could not be compared to the other sections that illustrated student attitude towards e-cheating. Therefore, the study into this factor remained incomplete. It is suggested that the survey tool be revisited and restructured in order to capture student feedback in a meaningful manner that will enable authors to collect data in order to test the hypothesis.

Looking closely at the results and statistical analysis carried out by various tools in SPSS, it is seen that the primary hypothesis that readily available technology does in fact impact student attitude towards e-cheating has been established. The results showed 37.5% students agreed that they indulged in some form of traditional ways of cheating

such as cheating among friends during exams, using text books or other print materials in exams and so on. This is lower than the percentage of between 65% - 75% as mentioned in literature (Kidwell, Wozniak, and Laurel, 2003; Chapman, Davis, Toy, and Wright, 2004; and Mullens, 2000). It is believed that while this may have been true for classrooms without technology or before the onset of the technology-era, the findings of this study support the claim that due to readily available technology, students are more inclined to cheat using such technology because next set of results in the section show 78% of the students agreed that they indulged in some form of e-cheating using technology in or out of classrooms. Where the traditional 'looking over the shoulder' cheaters may have reduced, it is worthy to note that in fact that may be attributed to the fact that they are possibly communicating through various other media to get the answers. This is further supported by the results from Table 5 that show the student dependence on various technologies that they used to indulge in e-cheating. 35% of the respondents accepted they either downloaded or copied information from the Internet without referencing, 19% agreed that they used programmable calculators during exams, 10% used mobile phones, 10% used i-pods, 9% used memory sticks for online exams, 9% purchased materials online for the fulfillment of assignments and projects and 8% used other devices such as PDAs, e-dictionaries and so on. Clearly the largest segment of abusive usage still hovers around the Internet (35% + 9%) which could be attributed to an increase in online sources that may have resulted in increased downloads, greater sources of information and hence increased e-cheating. Literature has already shown that there are many websites that exist that allow students to purchase academic reports online (Lenhart, Rainie, & Lewis, 2001; Bracey, 2005; Goode, 2007; Born, 2003; and Park, 2003) which could also be attributed to the increase in e-cheating using the Internet. At this point, it is recommended that a study into the increase in online resources and subsequent study to test it as a factor be carried out that will help understand student tendencies to e-cheat better.

Furthermore, a positive correlation test proved that students who indulge in traditional form of cheating are more inclined to indulge in e-cheating, establishing the Hypothesis 4. This could also explain the greater percentage of students e-cheating than traditional cheating.

It is important to also note at this point that as per the analysis carried out on Hypothesis 7, students who have a positive attitude towards piracy are more inclined towards e-cheating is positively correlated with a significance value $r = -0.307$, thus establishing the hypothesis. It is important to note it at this stage of the discussion because according to existing literature, enough studies have been provided that show an already strong and high trend of piracy among users in the region (BSA, 2007). If piracy is on the rise and students who do indulge in piracy are inclined to e-cheat, then it can be observed that this may be yet another factor that has contributed to the high percentage of e-cheating than cheating in the region (UAE).

Looking closely at the factors in Hypothesis 5 and 6, it is established that students who either have high academic integrity or possess high ethics have negative attitude towards e-cheating. Both the hypotheses are established by the correlation test with $r = -.339$ and $r = -.307$ respectively. As e-cheating is giving up of ethics or academic integrity, this is an expected results by the authors.

According to the analysis, where gender is considered, it seems that the hypothesis proposed is disapproved as the t-test is not significant for the given hypothesis. The analysis has shown that there does seem to be a difference between male and female respondents in that more male respondents indulge in e-cheating than female respondents. This is supportive of the literature that females generally tend to follow rules and regulations than male students and therefore more inclined to not cheat (Crown and Spiller, 1998; Whitley, 1998; Al-Qaisy, 2008).

With year-of-study, the ANOVA results seem to show that there is no significant difference in students' act of e-cheating whether they are in the first, second or third year of their degree programs as the value is 0.139. This could be due to the fact that students, regardless of which year of study they are in, are inclined to indulge in e-cheating. It would be assumed that as students gained more experience, they would indulge in more e-cheating as they would acquire more skills. However, these results prove otherwise.

It is important to note here that the results for Hypothesis 8 that the need or desire for academic success contributes to e-cheating has been rejected due to the correlation being insignificant. This is a marked contrast from existing literature that suggests "those students who have already attained high grades are less compelled to undertake dishonest acts to maintain or improve their academic record" (Grimes and Rezek, 2005) or that high achieving students are inclined to further indulge in cheating to maintain high scores (Callahan, 2011; Pope, 2001).

Like the results of hypothesis on year of study, the findings for the academic success as motivator continue to perplex the authors. At this stage of the research, it is assumed that other societal factors such as peer pressure or even parents' or teachers' attitude towards e-cheating may be playing a role to motivate students to e-cheat regardless of their level of study or their need for academic success. Authors suggest further study to look into other societal factors that may help understand the results of the tested factors better.

CONCLUSION

Drawing on the set of data collected from the surveys of tertiary students in the UAE, this study examined the possible impacts of various actors on e-cheating. Tabulation of various statistical analysis results revealed that cheating among students is a common behavior, however e-cheating among students is even more common, almost double the instances of cheating.

To recognize the factors that influence student's attitude towards e-cheating, a research model was developed. Among the factors found to influence students' attitude towards e-cheating were students' gender, previous instances of traditional cheating, students' indulgence in piracy and the availability and usage of technology. Factors that were found to influence students otherwise were students' sense of academic integrity and ethics. The correlation results also indicated that students' year of study or their need/desire to academically succeed did not have any influence over students' attitude towards e-cheating.

For researchers, students, educators and academic institutions, the implications of these findings are very clear – e-cheating is a real problem that exists within classrooms and out of classrooms. There are various factors that seem to impact students' attitude

towards e-cheating, while some that help to hinder. In order to help curb e-cheating, it is important to understand these factors. However, further research is also needed to find out the true impact of factors such as year of study and need/desire for academic success. Where existing literature show these factors to influence students' attitude towards e-cheating, perhaps researchers will need to explore how students' attitude towards e-cheating is related to peer pressure, parents' and teachers' attitude towards e-cheating and other societal factors. Finally additional research is needed to determine the empirical effects of increased online sources (if they have increased at a significant rate to be considered 'increased') on students' attitude towards e-cheating. Such research can then lead to possible understanding of student behavior where e-cheating is concerned and how best to curb such behavior.

APPENDIX: TABLES AND FIGURES

Gender	Samples
Male	94
Female	130
Total	224

Table 1: Student respondent classified by gender

Year of study	Samples
1st year	44
2 nd year	114
3 rd year	66
Total	224

Table 2: Student respondent classified by year of study

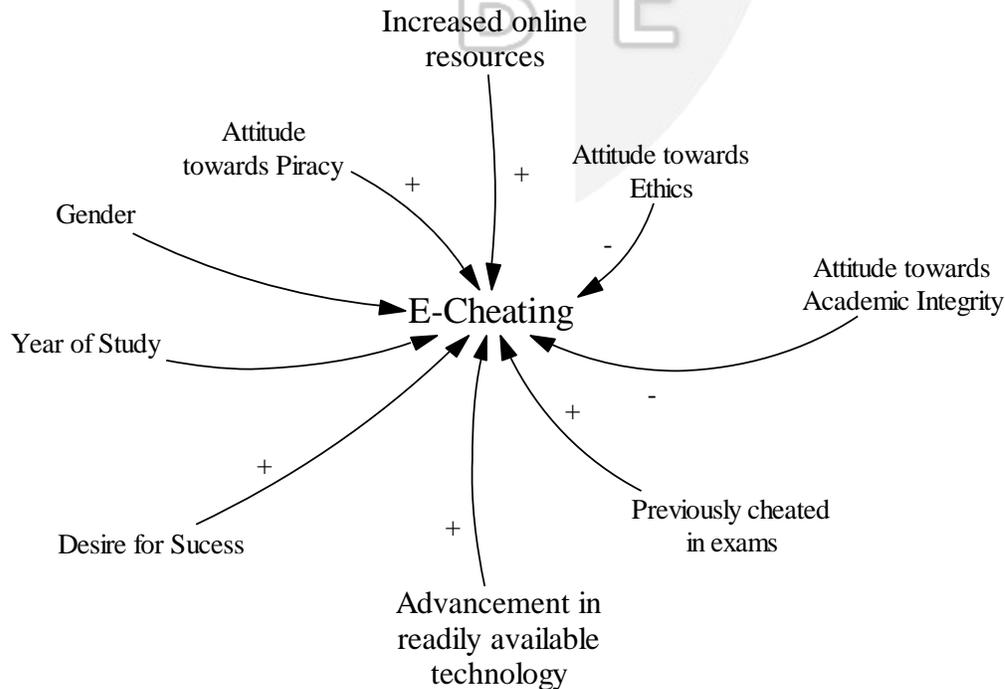


Figure 1: Research Model representing focus and possible contributing factors

Constructs	Variable
Cheating among friends during exam/assignment(Traditional cheating)	to share information among friends during tests or exams
	to copy from the website that has the required information for an assignment
	to copy from a text book that has the required information for an assignment
	to write in the information from what someone else says for an assignment
	to copy from another friend who has the information for an assignment
Piracy	It is okay to install a copy write software given to me by a friend
	It is okay to download MP3 or movies from peer-to-peer websites
	It is cool to buy pirated movies from vendors on the streets for AED 5/- instead of the original for more than AED40/-
Referencing	Provide due citation and reference

Table 3: Constructs and Variables

Samples	Yes	No	Total	Percentage
Cheated among friends during exams(Traditional cheating)	84	140	224	37.5%
Cheating on exams and assignment using technology E-cheating	174	50	224	78%

Table 4: Results on student cheating

Table 5a: Student cheating using technology

Technology and online resources used in E-cheating	Percentage
Mobile phones	10%
Programmable calculator	19%
I-Pods	10%
Memory sticks for online exams	9%
Downloaded/Copied from the internet without referencing for assignments	35%
Purchased materials online for the fulfillment for assignments and projects	9%
Others(such as PDA,Pager, E-dictionary, hacking etc)	8%
Total	100%

Table 5b Calculating advance in technology and increased online resources

<p>Calculating (i) Advancement in technology: Mobile phones (10%) + Programmable Calculator (19%) + I-pods (10%) +Memory sticks (9%) + Others (8%) = 56%</p> <p>(ii) Increased Online resources: Downloaded/copied from Internet without reference (35%) + Purchased materials online (8%) = 44%</p>
--

Correlation table	E-cheating
Traditional Cheating	r= .316**

Table 6

**Correlation significant at .01 level

Correlation table	E-cheating
Academic Integrity	r= -.339

Table 7

**Correlation significant at .01 level

Correlation table	E-cheating
Academic Integrity	r= -.307

Table 8

**Correlation significant at .01 level

Correlation table	E-cheating
Attitude towards Piracy	r= -.218

Table 9

*Correlation significant at .05 level

Correlation table	E-cheating
Desire for Academic success	r= .117

Table 10

Correlation is not significant at .05 level

Hypothesis	Variable	Significance	Supported	Test performed
H1	Increased online resources and e-cheating	-	No	None
	Technology and e-cheating	-	Yes	Weighted average
H2	E-cheating & Gender	.015	No	t-test
H3	E-cheating & Year of study	.139	Yes	ANOVA
H4	Traditional cheating & E-cheating	.006	Yes	Correlation
H5	Academic Integrity & E-cheating	.005	No	Correlation
H6	Ethics & E-cheating	.000	Yes	Correlation
H7	Piracy & E-cheating	.032	Yes	Correlation
H8	Desire for Academic success & E-cheating	.215	No	Correlation

Table 11

Appendix B: Detailed results

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
Share information among friends during exams	3.3349	1.1759	215
Copy information from website for assignment	3.0326	1.1454	215
Copy from text book for Assignment	2.7674	1.0465	215
Information from someone else for assignment	3.2791	1.1175	215
Copy from another friend for assignment	3.4930	.9994	215
With due citation for all copying	2.2512	1.0731	215
Install copy write software	2.6791	1.0609	215
Download MP3 from website	2.1023	1.0316	215
Buy pirated CD instead of original	2.6977	1.2330	215

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.775
Bartlett's Test of Sphericity	Approx. Chi-Square	575.551
	df	36
	Sig.	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	3.572	39.690	39.690	3.572	39.690	39.690	3.095
2	1.143	12.702	52.393	1.143	12.702	52.393	2.420
3	1.060	11.778	64.170	1.060	11.778	64.170	1.221
4	.862	9.576	73.746				
5	.729	8.102	81.848				
6	.572	6.359	88.206				
7	.452	5.027	93.233				
8	.335	3.717	96.950				
9	.274	3.050	100.000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Pattern Matrix^a

	Component		
	1	2	3
Share information among friends during exams	.662		
Copy information from website for assignment	.745		
Copy from text book for Assignment	.632		
Information from someone else for assignment	.712		
Copy from another friend for assignment	.809		
With due citation for all copying			.932
Install copy write software		.536	
Download MP3 from website		.815	
Buy pirated CD instead of original		.809	

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 10 iterations.

REFERENCES

- Anderson, G. L. (1999). 'Cyberplagiarism: A Look at the Web Term Paper Sites. *College & Research Libraries News* 60. p 371–73.
- Arora, J. (2001). Building Digital Libraries – an overview. *DESIDOC Bulletin of Information Techmy*, Vol. 21. No. 6, 3-24pp.
- Behl, D., Fitzgerald, J. & Vrazalic, L. (2007). Barriers to e-learning for students in the United Arab Emirates and Oman. In T. Bastiaens & S. Carliner (Eds.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2007* (pp. 2334-2338). Chesapeake, VA: AACE.
- Border, J., Stoudt, K. and Warnock, M. (2006). E-Learning Concepts and Techniques. Ch4. Institute for Interactive Technologies , Bloomsburg University of Pennsylvania, SA. [Online] Available URL: http://iit.bloomu.edu/Spring2006_eBook_files/index.htm
- Born, A.D.: 2003, "How To Reduce Plagiarism, *Journal of Information Systems Education* 14, 223.
- Bowker. (2007). Croydon College Library in U.K. reports 472% increase in online use of Library since implementation of AquaBrowser service. R.R.Bowker LLC. [Online] Available URL: <http://www.bowker.com/index.php/press-releases/458-croydon-college-library-in-uk-reports-472-increase-in-online-use-of-library-since-implementation-of-aquabrowser-service>
- Bracey, G. W. (2005). Research: A Nation of Cheats. *Phi Delta Kappa Inc.* 86(5), 412-413. Gale Group, Farmington Hills, Michigan.
- BSA. (2007). Software piracy increasing in UAE. ITP.net. Resrached by IDC cited by Business Software Alliance. [Online] Available URL: <http://www.itp.net/495645>
- Bsmarte. (2006). Managing Technology: Is technology in the classroom good or bad?. Bsmarte.com [Online] Available URL: <http://www.bsmarte.com/issues/managingtechnology.pdf>
- Bugeja, M. (2007). Busting the New Breed of Plagiarist. *Writer's Chronicle* (Associated Writing Programs), The Association of Writers and Writing Programs. [Online] Available URL: www.awpwriter.org/magazine/writers/mbugeja.htm.
- Calculator.org (2009). A First Calculator. Flow Simulation Ltd. [Online] Available URL: <http://www.calculator.org/firstcalc.html>
- Callahan, D. (2011). Cheating Honor Students: more common than people think. *Cheating Culture*. [Online] Available URL: <http://www.cheatingculture.com/academic-dishonesty/>
- Carnevale, D. (1999). Web Services Help Professors Detect Plagiarism. *Chronicle of Higher Education* 46. p A49.
- Central Intelligence Agency, (2010). United Arab Emirates. *World Factbook Publications*. March 20, 2010. Available URL: <https://www.cia.gov/library/publications/the-world-factbook/geos/ae.htm>
- Chapman, K.J., R. Davis, D. Toy, and L. Wright: 2004, "Academic Integrity in the Business School Environment: I Get by With a Little Help From My Friends," *Journal of Marketing Education* 26, 236-249.

- Clayton, M. (1997). Term papers at the click of a mouse. *The Christian Science Monitor* [Online]. Available URL: www.csmonitor.com/durable/1997/10/27/feat/learning.1.html
- Clayton, M. and Watkins, A. (2002). Assessment in the Digital Arts. *Syllabus* 15. p31–34. [Online] Available URL: <http://www.syllabus.com/mag.asp?month=4&year=2002>.
- Connors, M. (1996). Cybercheating: the Internet could become the newest battleground in academic fraud. *The Muse*. [Online] Available URL: ursa.uregina.ca/~carillon/Sept12.96/feature/feature1.html.
- Culture24 (2009). Library services see a 20 per cent increase in online resources. *Culture24/Spliced*. [Online] Available URL: www.culture24.org.uk
- Drogemuller, R. (1997). Designing Cyber-Assignments. *Australian Science Teachers Journal* 43. p 42–4.
- Education Encyclopedia. United Arab Emirates - Educational System—overview. State University. March 20, 2010. Available URL: <http://education.stateuniversity.com/pages/1607/United-Arab-Emirates-EDUCATIONAL-SYSTEM-OVERVIEW.html#ixzz0ir9TocZF>
- Ercegovac, Z. and Richardson Jr. J. V. (2004). Academic Dishonesty, Plagiarism Included, in the Digital Age: A Literature Review. *College & Research Libraries*. P 301-318.
- Foltos, L. (2002). Technology and Academic Achievement. *New Horizons for Learning*. [Online] Available URL: www.newhorizons.oeg
- Goff, H. (2007). Too much technology in the classroom? *BBC News*. [Online] Available URL: <http://news.bbc.co.uk/1/hi/education/6241517.stm>
- Goode, S. (2007). Students get A+ for easy cheating. [Online]. Available URL: www.questia.com/
- Grimes, P. W. and Rexek, J. P. (2005). The Determinants of Cheating by High School Economics Students: a comparative study of academic dishonesty in the transitional economies. *International Review of Economics Education*. Vol 4. Iss 2. [Online] Available URL: <http://www.economicnetwork.ac.uk/iree/v4n2/grimes.htm>
- Guiliano, E. (2000). Deterring Plagiarism in the Age of the Internet. *Inquiry* 5. p 22–31.
- Harpole, S. H. and Kerley, L. H. (2007). Getting SMART with Technology Integration in the Classroom. *Meridian Middle School Computer Technologies Journal*. Iss 2, Vol 10. [Online] Available URL: <http://www.ncsu.edu/meridian/sum2007/smart/print.html>
- Harris, R. A. (2001). *The Plagiarism Handbook: Strategies for Preventing, Detecting, and Dealing With Plagiarism*. Pyczak Publishing. Los Angeles. Ch 2.
- Harsha, P. (2009). Computer Science Majors increase at most significant rate since Dot Com boom. *Computing Research Policy Blog*. Computing Research Association. [Online] Available URL: <http://www.cra.org/govaffairs/blog/archives/000729.html>
- Icon.org (2002). Online library service helping students and teachers become more cyber-savvy. *CEA Advisor*. Connecticut Education Association. [Online] Available URL: <http://www.iconn.org/documents/whpsarticle.pdf>

- Independent Online. (2007). Interactive Whiteboards Help Students – study. IOL Technology.co.za. [Online] Available URL: http://www.ioltechnology.co.za/article_page.php?iArticleId=3796186&iSectionId=2890
- Jones, K. O., Reid, J. and Bartlett, R. (2006). E-learning and E-cheating. Paper presented at 3rd e-learning Conference at Coimbra, Portugal. ACM. September 7-8 2006.
- Khan, Z. R. (2006). E-learning techniques in IT programs – are they helping my sense of cyber ethics?. Proceedings from the IEEE Second International Joint Conferences on Computer, Information, and Systems Sciences, and Engineering. December 4-14.
- Khan, Z. R. (2009). E-cheating and calculator technology – a preliminary study into casual implications of calculator-technology usage on students’ attitude towards e-cheating. Proceedings from 5th International Joint Conferences on Computer, Information, and Systems Sciences, and Engineering. [Online]. December 4 – 12.
- Khan, Z. R. (2010). E-cheating in the UAE – a critical review of existing literature. Proceedings from 9th International Conference on e-Learning, e-Business, Enterprise Information Systems, and e-Government. July 12-14, 2010, USA.
- Khan, Z. R. and Samuel, S. D. (2007). e-learning and e-cheating – drawing a balance. Proceedings from the 7th Global Conference on Business and Economics. October 13-14 2007. Rome. Italy.
- Khan, Z. R. and Samuel, S. D. (2009). E-cheating, online sources and technology – a critical review of existing literature. Conference Proceedings. 9th Global Conference on Business and Economics. Cambridge University.
- Kidwell, L.A., K. Wozniak, and J.P. Laurel. (2003). Student Reports and Faculty Perceptions of Academic Dishonesty. *Teaching Business Ethics* 7. p 205-214.
- King, D. L. and Case, C. J. (2007). E-Cheating: Are students misusing it?. *Information Technology Ethics: A Research Framework. Issues in Information System. Vol 8, No 1.* [Online] Available URL: http://www.iacis.org/iis/2007_iis/PDFs/King_Case.pdf
- Lenhart, A., Rainie, L., & Lewis, O. (2001). *Teenage Life Online: The Rise of the Instant-Message Generation and the Internet's Impact on Friendships and Family Relationships.* Washington, DC: Pew Internet & American Life Project.
- Means, B., & Olson, K. (1997). *Technology and education reform.* Washington, DC: U.S. Department of Education.
- Mullens, A. (2000). Cheating to win. *University Affairs.* Vol 41, Iss 10, p 22-28.
- Nonis, S.A. and C.O. Swift. (1998). “Deterring Cheating Behavior In The Marketing Classroom: An Analysis Of The Effects Of Demographics, Attitudes, and In-Class Deterrent Strategies,” *Journal of Marketing Education* 20. p 88-199.
- Office of Educational Research and Improvement. *Effects of Technology on Classrooms and Students.* Research conducted by SRI International for U.S. Department of Education.
- Park, C.: 2003, “In Other (People’s) Words: Plagiarism by University Students – Literature and Lessons,” *Assessment & Evaluation in Higher Education* 28. p 471-488.

- Petrie, J. (2008). Classrooms revolutionized by multimedia advances in technology. *gmtoday*. [Online] Available URL: http://www.gmtoday.com/news/local_stories/2008/April_08/04022008_09.asp
- Pope, D. C.(2001) Doing School: how we are creating a generations of stressed out, materialistic, and miseducated students. Integrated Publishing Solutions. USA.
- Renard, L (2000). Cut and Paste 101: Plagiarism and the Net. *Educational Leadership*. 57(4). EBSCO Publishing. [Online] Available URL: <http://nhs.needham.k12.ma.us/pages/stress-r/Docs/Website%20Articles/Cheating/Renard%20-%20Cheating.pdf>
- Royster, K. (2009). District's new technology Initiative Creates Competitive Edge. *Journal Communications Inc. Colorado Technical University*. [Online] Available URL: http://imagespueblo.com/index.php/site/articles/education/districts_new_technology_initiative_creates_competitive_edge
- Scanlon, P.M.: 2004, "Student Online Plagiarism: How Do We Respond," *College Teaching* 51, 161-165.
- Smith, G. E. (2002). Student perceptions of technology in the classroom: the good, the bad, and the ugly. *ATLAS. McKendree University*. [Online] Available URL: http://faculty.mckendree.edu/ATLAS/student_perceptions.htm
- St. Omer, I. (2001). Potholes in the Information Highway: The Internet and Plagiarism. Paper presented at ASEE/IEEE Frontiers in Education Conference, Reno, USA. pp. F4F-7 – F4F-8.
- Supon, V. (2008). Teachers: recognize important steps to reduce cheating. *Journal of Instructional Psychology*. George Uhlig Publisher. Accessed at The Free Library. [Online] Available URL: <http://www.thefreelibrary.com/Teachers:+recognize+important+steps+to+reduce+cheating.-a0193791689>
- Tanopir, C. (2003). Use and Users of Electronic Library Resources: An Overview and Analysis of Recent Research Studies. *Council on Library and Information Resources*. [Online] Available URL: <http://www.clir.org/pubs/reports/pub120/pub120.pdf>
- Trotter, A. (2000). Educators Turn to Anti-Plagiarism Web Programs to Detect Cheating. *Education Week* 20, p 14.
- United Nations. (2008). UN e-government survey 2008: From e-government to connected governance. Department of Economic and Social Affairs and Division for Public Administration and Development Management, Editor, UN Publication, 1-142.
- Weil, M. (2009). The Blended Classroom Revolution: Virtual Technology Goes to School. *Tech & Learning. K-12 Blueprint Digital Learning Environments*. [Online] Available URL: <http://www.techlearning.com/article/16210>
- Wenger, E. (1998) 'Communities of Practice. Learning as a social system', *Systems Thinker*. [Online] Available URL: <http://www.co-i-l.com/coil/knowledge-garden/cop/lss.shtml>.
- Whiteman, S. and Gordon, J. (2001). The price of an A: An educator's responsibility to academic honesty. *English Journal*, Vol 91, Iss 2, p 25-30.

- Wong, D. (2007). A Critical Literature Review on e-Learning Limitations. Journal of the Advancement of Science & Arts. p 55-62.
- Yong, A., (2003), 'Success factors in e-learning implementation', The Star In.Tech, May Ed, p.19.

