

## Medical Training and Web Based E-Learning: Comparative Study of Medical Students' Training by Distant Learning System

<sup>1</sup>Kazem Ashjaei, <sup>1</sup>Alireza Rahimi e Mamagani, <sup>1</sup>Nazila Tajaddini and <sup>2</sup>Seyyed Ahmade Tahami

<sup>1</sup>National Public Health Management Center, Tabriz University of Medical Sciences, Tabriz, Iran

<sup>2</sup>University of Medical Science, Iran

**Abstract:** Nowadays in every field related with information and learning, the discussion of change and transformation based on modern technologies like computer is underway. Using virtual training tools is one of the modern opportunities by which the information technology development has empowered medical training. It has been years that valid universities of the world, besides their current training, have been using electronic training courses in the form of distant learning for training their students. Then educational offices and designers have urgent need to the result of those researches that can reveal useful information regarding the function of these systems. In this base the present research intended to do some part of the training credits of physiopathology course by the way of distant e-learning and do functional analysis and examination by comparing its results in comparison with the present classical and attended system. This study was done in the way of randomized clinical trial in the study society of medical students, physiopathology section at Medical Sciences University by choosing 120 students in the way of clustral-randomized in two groups, control group and study group. The control group used the classical methods of attending class and the study group used web based learning facilities for one month. The educational subject of both groups was physiopathology of heart. The professors and students of both groups in this study were Double blind. At the end of one-month period, the students' scores were compared and the polling questioner with Alfa Korenbakh par 65% was filled out. The obtained average score from credit of physiopathology course in control group was  $13.05 \pm 1.7$  and the average score of the study group was  $14.08 \pm 1.8$  that with the performance of Independent sample t-test and with  $t = 2.1$  there was a significant difference between two groups regarding the grade of credit of heart physiopathology course,  $P-V = 0.033$ . The examination of the results from students given polling questioner concerning e-learning method showed that the average general satisfaction from the learning period was 3.07 out of 5. Regarding the novelty of this learning system, the obtained results indicated its good effects on the advancement of learning level of medical students. The obtained results from this study and other studies show that web based learning in addition to its specific benefits, causes the advancement of learning level quality and also students' grades. So this method can be used in learning courses and theoretical credits of medical field. But it should be borne in mind that this method is not the complete substitution for all learning courses at university.

**Key words:** Distant learning, medical education, web based learning, medical training, e-learning

### INTRODUCTION

Nowadays in every field related with information and learning, the discussion of change and transformation based on modern technologies like computer is underway. Using virtual training tools is one of the modern opportunities by which the information technology development has empowered medical training. It has been years that valid universities of the world, besides their

current training, have been using electronical training courses in the form of distant learning for training their students. In a general view the internal factors like change in motivation and interest of professors for teaching better and external factors like the increase of students' number especially in upper age groups, the increase of expectations from educational staff and the advancement of learning technologies have settled the way for the promotion of learning methods. Based on the available

statistics, today the number of students has had a significant increase and this is while the existent facilities for holding the attended learning courses and presenting subjects to students have not had the proportional speed. For example from 1980-1990 in the United States of America there was 3% increase in the number of students with age under 25, though this increase for students above 25 age was 34%. The students' emigration for gaining upper levels and using the existent facilities in different areas is also one of the other learning challenges in recent years (Casebeer *et al.*, 2003). The ever-increasing of students' number on the one hand and the limitation of present potentialities and facilities or their gathering in especial areas resulted in the decrease of students' access to the scientific resources at universities and to the other learning facilities and this is while that because of the increase of students' number at attended classes there is no possibility of all of their participation at lesson and scientific discussions. So to confront these kind of problems distant learning appeared in 19th century and bore fruit in 20th century and developed from 1970-2000 and caused great advancements in both quality and quantity fields as a principal tool at universities. At the beginning of 90s IBM factory established its International Satellite E Learning Network (ISEN) and by that presented learning services to its all employees all over America. At the middle of 90s the German factory Telecom established and set up it especial video conference for training its employees all over Germany. At the end of 90s most of the factories put their learning plans on the network and established virtual universities or learning centers on the network. Regarding these kind of developments in the field of electronic interactions, there is no doubt that after so long years today the World Wide Web has been changed into a successful and powerful learning tool. Actually is should be said that learning by the way of network is a new way of distant learning which is the electronic form of distant learning.

Distant learning is mostly considered as a pioneering method of new era and contains especial characteristics that the subject of globalization is one of them. Distant learning institutes have the potentiality of presenting their learning programs universally (Discenz *et al.*, 2002). The advancement of E-mail has broadly increased these facilities and the student's contact with institute by E-mail and the institute's contact with the student by bulletin board and the contact of the student with another student by the conference packages pave the way more for purposes of the globalization. By connecting to internet

websites students can get together from all over the world to do group projects. Individualization and reliance on students' personal abilities, refraining from expenditure, setting the possible chances for those students that can not attend at the attended classes or those students that abstain from coming and going are the other characteristics of distant learning system (Discenz *et al.*, 2002; Alur *et al.*, 2002; Regan *et al.*, 2002). From the other major characteristics in this learning method is having appropriate speed for giving feedback (Discenz *et al.*, 2002). Today the students of distant learning systems can transfer their answers electronically. From every part in the world and at any time of day or night they can send or receive the personal feedback that contains the correct answers, false answers analysis etc and this is while often at usual colleges and universities much time is spent for receiving the results. The expense of effectiveness and inexpensiveness are the other common ways among specialties of distant learning especially in those developing countries that are in need of training more human staff, because in comparison with other forms it is an ability of creating a great effect on the national systems and every year with more than 100000 students quick changes are possible in professional fields through distant learning and without any need to the establishment of building, or other training spaces (Harden and Hart, 2002). The surveys show that there is a world crisis in training expenditures which is necessary for quick learning development and the increase of economic pressure on training has resulted in the increase of expenditures and the decrease of budget rate. There have been also preparations in the field of the quality of distant learning so that today many of the university programs have online classes in the list of their courses. From the reasons for offering internet classes were mostly on the basis that some people wanted to use distant learning technology for increasing the number of the attended people even by using a special group of people that would not receive any training at any time and some authorities believed that suggestions like laboratories, equipped libraries, participational seminars and non official participations can attract the needy students well for support. In other words, most of the technology views have appeared for the increase of learners' numbers or improvement of their learning ability. The noticeable point is this that both ends quality improvement and access improvement are in need of a motivation and stimulus for invention of online classes and offering of document (Mckimm *et al.*, 2003). Being evaluated and receiving document with low cost are from the advantages of

distant learning (Cahil *et al.*, 2002). This is a proven subject that as much as the classes be offered in online form and interchanged among other universities, the students' use will also increase because of the availability of internet at any place and time. That is the reason that many of the developed countries during recent decades have done expanded activities in this field. For example in China the Dianda System contains 44 universities that have registered students separately in every state and it seems that the number of the students in these universities is about a hundred thousand. In France, also, distant system has prepared learning facilities in elementary and secondary fields, professional and supplementary fields and graduate and post graduate fields. Or recently in Turkey at Anadolu University more than sixty thousand students have registered and this is another kind of university facilities depending on a distant learning system. The development and improvement of the collage and university were amazing by offering internet credits and this improvement has been fast too. Some authors have anticipated that there will be no university as we see it today in the future. There is little doubt that distant learning with internet credits has any effect on classic university. And a main question is whether internet credits will show a new and principal improvement for the students' learning in classic learning skill? Or it will only be an abatement and a decrease in the severity of academic programs. The survey results have shown that meanwhile the classic universities confront with some challenges from the revolution in distant learning, but not only their survival is not endangered but also this challenge may also lead to the completion of new technology without any decrease or principal deficiency in the quality of educational process (Mamary and Charles, 2003). True that this form of education will need more effort in organization (Minsasian-Batmanian, 2002). And with the decrease in communicational limitations there will appear appropriate chances for the exchange of information by this method. Although, during recent years other countries like India, Indonesia, Thailand, Northern Korea and Iran have established universities that can possess the intrinsic characteristics of distant learning systems but educational offices and designer have urgent need to the result of those researches that can offer useful information about the function of these systems. Particularly which of the distant systems, with what facilities and costs does act well in different countries' situation and cultures? and this is the main point that what advantages or occasionally deficiencies of quantity and quality, the gained results

from these kind of educations do possess so that the educational planers, based on these kind of data, can act well in preparation for educational policies. Based on this, the present research intended to do some part of physiopathology course credits education through electronic distant learning and by studying of its results, in comparison with existent classic and attended system, do functional analysis and examination.

## **MATERIALS AND METHODS**

This study was done in the way of randomized clinical trial. The study society was medical students, physiopathology section at Tabriz University of Medical Sciences. Total 120 students were chosen in the way of clustral-randomized in two groups, control group and study group. The control group used the classical methods of attending class and the study group used web based learning facilities for one month. The educational subject of both groups was physiopathology of heart. The professors and students of both groups in this study were Double blind. At the end of one-month period of heart physiopathology, the students' grades were taken from the educational center of medical college and then compared. The polling questioner with doing pilot study by Alfa Korenbakh par 65% was filled out. The gained data were analyzed and examined by statistical software, SPSS 12 and statistical tests of Independent sample test and Chi square. The meaningful level in this study is taken  $p < 0.05$ .

The web based e learning was put in the educational portable of [www. medsh. org](http://www.medsh.org) and for every student a password and a username was defined. The learning portable contained such sections as professors' power point files, additional resources for more study, weekly and planed chat room and chat board for trouble solving or for online and E-Mail contact with professors. These facilities provided the students' learning needs. In addition to these, the portable system contained some other educational and communicational facilities like: Announcements; Mailbox; 5 different log in forms: 1 student, 2 guest, 3 course director, 4 professor and 5 management; glossary; Events; Calendar that wisely showed the plan of the courses; FAQs (questions and their answers about a subject); Private Messages; Chat that enabled the user to chat with other users; electronic journal: recent essays; quiz, descriptive and multiple choices' quizzes besides professors' requested researches designed for the assessment of the users; Logging that made the exact logging possible based on

the users' day, time and the kind of his/her activity on portable and handled it with other features separately to the professors and managers; Who's online for the observation of the present users' state in the system for calling the roll and Grading (by professors based on the students' activities) and other side facilities.

## RESULTS

The obtained average grade from credit of physiopathology course in control group was  $13.05 \pm 1.7$  and the average grade of the study group was  $14.08 \pm 1.8$  that with the performance of Independent sample t-test and with  $t = 2.1$  there was a significant difference between two groups regarding the grade of credit of heart physiopathology course,  $p = 0.033$  (Fig. 1).

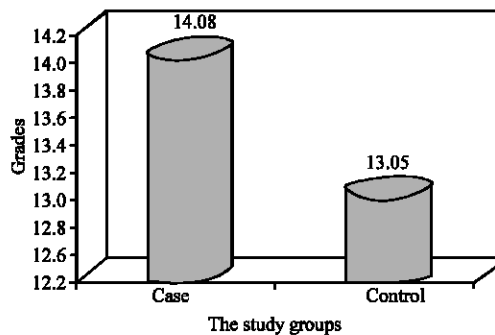


Fig. 1: The obtained average grades from credit of physiopathology course between 2 groups of control and case in medical students of physiopathology section at Tabriz University of Medical Sciences in 2006

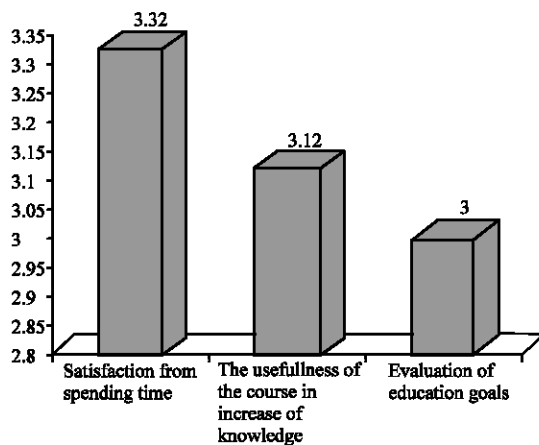


Fig. 2: The average general satisfaction of physiopathology section from holding the educational course at Tabriz University of Medical Sciences in 2006

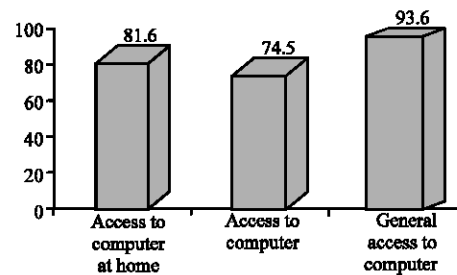


Fig. 3: The availability rate of students of physiopathology section to the computer and internet at Tabriz University of Medical Sciences in 2006

The examination of the results from students given polling questioner concerning e-learning method showed that the average general satisfaction from the learning period was 3.07 out of 5 (Fig. 2). Also, 78.7% of these students tended to attend the next distant learning courses. About 18.8% of the students intended the complete substitution of the physiopathology course by e learning and without attending class. And also 67.9% of the students that had taken the course intended to suggest the same courses for the junior students.

Most of the students had spent about 30-50% of their usual time of reading for e learning during the course. Total 64% of the students had noted that the existent materials on the web had estimated their learning goals around upper intermediate (Fig. 3).

Among all the students the availability rate to computer at home was 81.6% and the general availability at home or university was 93.6% and also 74.5% of the students accessed to internet.

## DISCUSSION

Regarding the novelty of this learning system, the obtained results indicated its good effects on the advancement of learning level of medical students. Nevertheless, based on the performed polling, in spite of the high level of satisfaction the students' inclination for the complete substitution of this method instead of the attended courses is low. As some studies have shown it, if the observation of learning principles be low they can produce inappropriate paradigms among the students. In a study by Casebeer and his colleagues the student groups in attended and online courses were compared, the results showed that there was no significant differences between them and at the same time the students of e learning group considered themselves knowledgeable than the other students (Casebeer *et al.*,

2003). Also, in a study done at Carolinska University about the effectiveness of web based and e learning at medical training, there is a direct relationship between the system user students' views about the information and communication technology which effects the learning satisfaction (Smith and Curry, 2003). As in this study we have gained access to the acceptable results in using the virtual learning in medical training curriculums, the gained results from the evaluation of the course in a study in learning program about female and obstetrician diseases at Bristol University in the way of web based learning show the high satisfaction of the participants from the content and the manner of educating (Curry and Smith, 2005). Of course it is necessary to say that in order to guarantee the quality of the web based educational programs it is necessary to use appropriate methods and expand internet based learning. In offering lesson contents, using system's high capacity by the help of animation, sound and picture can be a part of guarantee strategies of online classes quality during the active learning exercises (Laidlaw *et al.*, 2003), since distant learning programs are responsible against the crediting organizations for establishing the relation of the participated students with the criterions of quality guarantee applied in these kind of programs. There may be some negative views about the subject like this that with the improvement and advancement of the number of the internet credits the importance of university will diminish. But the result of the researches in this case shows that 51% of the managers and 75% of the supervisors were against this view and in answer to the same statement that with the improvement and advancement the number of the internet credits and the importance of university professors will diminish, the answer was very like to the former question meaning that 34% of the managers and 18% of the supervisors gave affirmative answer while 55% of the managers and 72% of the supervisors were against it Cahill *et al.* (2002). It should not be left unsaid that the authorities emphasize on the students' coming to the university environment and believe that in spite of distant learning system students should have the possibility of physical presence at university during the term (Beason, 2005). Most of the experts absolutely believe that the offering of those credits in which the bilateral contact of the student with student or educator with student diminishes, is like taking a wrong way since the value of these kinds of credits is low at student's view (Harden and Hart, 2002). This is another suitable point that the availability to the web based learning courses can also be available for the attended courses. So, in this study 89% of the supervisors believe that the On Campus students should

have the same availability to the internet credits as Off Campus students and they believe that when the internet credits are offered all of the students should have the same access to the credits (Alur *et al.*, 2002).

## CONCLUSION

The obtained results from this study and other studies show that web based learning, in addition to its specific benefits like low cost, time and place availability,... causes the advancement of learning level quality and students' grades regarding the quality of education. Then it can be said that this method has had positive effects on the basis of students' learning and reflects much more satisfaction. Then this method can be used in learning courses and theoretical credits of medical field, but it should be borne in mind that this method is not the complete substitution for all learning courses at university.

## REFERENCES

- Alur, P., K. Fatima and R. Joseph, 2002. Medical teaching websites: Do they reflect the learning paradigm. *Med. Teacher*, 24 (2): 422-424.
- Beason, C., 2005. Lessons learned: A successful distance learning collaborative between the department of veterans affairs and the department of defense. *Military Med.*, 170 (5): 395-400.
- Casebeer, L., S. Strasser and C. Spettell, *et al.*, 2003. Designing tailored web based instruction to improve practicing physician's preventive practice. *J. Med. Int. Res.*, 5 (3): e20.
- Cahill, D., J. Cook and A. Sithers, 2002. Evaluation of an online postgraduate education program. *Med. Teacher*, 24 (2): 425-28.
- Curry, M. and L. Smith, 2005. Twelve tips for authoring online distance learning medical post registration programs. *Med. Teacher*, 27 (4): 316-321.
- Discenza, R., C. Howard and K. Schenk, 2002. The design and management of effective distance learning programs. Idea group publishing, united state of America, pp: 155-171.
- Harden, R. and I. Hart, 2002. An international virtual medical school: The future for medical education. *Med. Teacher*, 24 (3): 261.
- Laidlaw, J. *et al.*, 2003. The design of distance learning programs and the role of content experts in their education, 25 (2): 182-187.
- Mckimm, J., C. Jollie and P. Cantillon, 2003. Web based learning. *Br. Med. J.*, 326 (7394): 870-874.

- Mamary, E. and P. Charles, 2003. Promoting self-directed learning for continuing medical education. *Med. Teacher*, 25 (2): 188-190.
- Minsasian-Batmanian, L.C., 2002. Guidelines for developing an online learning strategy for your subject. *Med. Teacher*, 224 (6): 645-657.
- Regan, M., P. Oneill and C. Whitehouse, 2002. Student access and use of it during general practice attachments. *Med. Teacher*, 24 (2): 429-433.
- Smith, L. and M. Curry, 2003. Twelve tips for supporting on line distance learners on medical post-registration courses. *Med. Teacher*, 27 (5): 396-400.