

An innovative approach study “Health students example”

Nuran Akyurt^{1a}

¹Vocational School of Health Services, Department of Medical Imaging Techniques, Marmara University, Istanbul, Turkey

Abstract. Globalization; A process of international integration arising from the exchange of products, ideas, cultures and worldviews. Globalization is an economic as well as political, technological and cultural process. As in other areas, technological developments have brought innovations into the training of health care workers, as well as access to information and the use of this information. These developments necessitated new orientations in the education systems of health students. In this study, the effects of computer assisted instructions involving the topics of medical and vocational terminology course on the attitudes and academic achievement levels of students' use of medical and vocational terms were investigated. Marmara University Health Services Vocational School Medical Imaging students constitute the sample of the research. In the experimental group, medical and vocational terminology topics were processed and tested by computer aided instruction method for 12 weeks.

Keywords: Computer aided teaching, Terms related to human anatomy, Cardiovascular system and endocrine system, Attitudes towards the use of medical and occupational terms, Academic achievement

1 Introduction

The technological innovations and the continuous development of the technology show its effect in all areas as well as in the education. In parallel with these developments, researchers, educators and managers are exploring ways of integrating technology into education in order to increase learning capacity and improve the quality of teaching.

In the world, rapid developments in health education require that the terminology to be used in this area be common. Just as it is important and natural in a country to communicate in its own language, it is also important that the staff working in scientific areas around the world communicate with a common language. Medicine, one of the earliest professions in human history, needed a common language for its international character. Words used as medical terminology are usually of Latin origin. However, the words of Greek and other languages are also used. As the terms used in the health area of preventive, diagnostic and treatment methods and in health education are common, it is an advantage for the

^a Corresponding author: nakyurt@hotmail.com

communication of those working in these scientific fields. For this reason, it is important in health institutions to learn the technical, managerial and health terms as a common language and to use them in the field.

2 Terminology Definition and History

The term; It is used to express special words which are used in different fields of science and arts and occupation, have a special usage area and have a long working memory. Terminology is a scientific discipline dealing with terms.

Medical terms originate from Latin and Greek. Scientific anatomy has been the first science of medical terms. After the alphabet revolution, the Turkish alphabet, based on the Latin alphabet, was accepted and in particular the Latin and Greek terms started to be used more actively in our language.

3 Computer Aided Learning

Computer-assisted learning (BDI) with its audiovisual elements is a method used in the teaching of abstract concepts where the students have difficulties describing it by other methods, difficulties understanding it, and difficulties visualizing it in their minds.

4 Aim

In the literature, there are studies using computer-aided learning methods. For effective use of BDI methods there are studies with content of contribution of students to academic achievement, the great convenience it provides in research in the field of health, the differentiation of anatomical structures, and the effective use of medical and Latin terms in health education. The following statements can be taken for computer-aided learning: concepts and processes can be better understood [1], the themes are easier to learn through visualization [2], self-confidence can be built, the information process can be supported, critical thinking can be stimulated and the ability to solve problems can be improved [3 -20].

The main purpose of the study is to facilitate the learning process and to ensure the permanence of the learning process by experimenting with different teaching methods in order to ensure that the students in health field learn the medical terms effectively and easily.

In order to reach this aim, the following questions were tried to be answered:

1. Medical imaging techniques; What are the opinions and perceptions about the places of use of medical and professional terms, their purpose of use, methods of computer assisted learning?
2. What are the thoughts about “computer technology”, “computer games”, “smart phone applications” used in medical terminology and vocational courses?

5 Methods

The research started with literature search in October 2016. Electronic database PubMed, ScienceDirect and various Publisher databases are used. As a keyword to search engines; “Motion System”, “The circulatory system”, “Respiratory system”, “Digestive System”, “Uriner System”, “Urogenital System”, “Endocrine System”, “Sense Organs”, “Professional Terms”, “Medical Terms”, “Education”, “Undergraduate Medical Education”, “Teaching”, “Learning”, “Anatomy”, “Cross-Sectional Anatomy”, “Radiology”, “Medical Imaging”, “Diagnostic Imaging”, “X-Rays”, “3-D Imaging”, “Magnetic Resonance Imaging”, “Ultrasound Imaging”, “Ultrasonography”, “Computed Tomography Scanner”, “X-Ray”, “Four- Dimensional Computed Tomography”, “4D Computed Tomography”, “Multidetector

Computed Tomography”, “Internet”, “Online systems” and “PACS (Radiology)” were given. In the obtained literature, it was aimed to reveal the medical imaging techniques program students' ability to use the terms and the items in the terms with "Computer Assisted Instructional Method”.

In the study, relevant to control group pretest-posttest model, a semi-experimental study was conducted in order to investigate the effect of computer-aided processing of medical and vocational terminology course on the attitude and academic achievement of first-year students of medical imaging techniques program. In the questionnaire prepared in the light of the literature, socio-demographic characteristics of the students and expressions about computer usage are given.

In the study; computer, internet use, computer-assisted teaching method and traditional teaching methods are the independent variables. Dependent variables are the level of academic achievement in medical and vocational terminology course and attitudes towards medical and vocational terminology. When the research was completed, the same tests were carried out as a final test, and the data collected was taken as the basis.

Table 1. Research figures

Groups	Pre-test	Practice	Post-test
Control	Medical and Professional Terminology	Traditional Teaching Methods (10 Weeks)	Medical and Professional Terminology
Experimental	Medical and Professional Terminology	Computer Aided Teaching Methods (10 Weeks)	Medical and Professional Terminology

5.1 Universe and Sampling

The sample of the study is composed of 2nd grade students who are educated in medical imaging techniques program in 2016-2017 academic year. In the sample, there are two groups as "Control Group" and "Experimental Group". The total number of students participating in the pretest-posttest was 89 (female = 55, male = 34), the number of students in the control group was 36 (40.4%), and 53 in the experimental group (59.6%).

5.2 Data Collection Tools

In order to measure the medical terminology knowledge of the first year students, a questionnaire consisting of multiple-choice questions of Motion System, Joints and Bones, The Circulatory System, Respiratory System, Digestive System, Urinary System, Urogenital System, Endocrine System, Sense Organs, Professional Terms and Medical Terms was created. Created question bank is presented to experts. In line with the opinions, 12 multiple-choice tests suitable for "Medical and Professional Terminology" topics were developed. The prepared tests were applied as a pilot project to the 2nd grade students of the medical imaging techniques program. The reason for the application of the pilot application to the 2nd grade class is that the medical imaging program students should have learned the medical and vocational terminology the previous year. The test was then applied as pre-test and post-test to the first-year students. Points were scored with "1" points for each correct answer and "0" for false and blank answers. On the tables in the results, identification information (name and surname) of the students voluntarily participating in the survey was kept confidential. The identity information was coded by the researcher in the form of a sequence number.

5.3 Application of the research

In the experimental group, a session was created by computer assisted teaching methods (by using smart phone applications). From the teacher applications, "username and password" was received in order to get the software ready for use. By preparing slides covering all curriculum topics of terminology, with animations, subject tests, puzzles and short experimental videos the course content has been enriched. In the control groups, the same lessons were carried out with traditional teaching methods such as lecture, question-answer, discussion.

5.4 Analysis of Data

Analysis of the data was made using the SPSS 17.0 package program. In the analysis, groups (experimental and control) were used as independent variables, and pre-post test scores of the students who took the course with computer-assisted teaching method were taken as dependent variables. Frequency distributions are given in table form.

6. Results

6.1 Demographic Characteristics

When the genders of the participating students were examined, it was seen that 38.2% (n = 34) of the participants were male and 61.8% (n = 55) were female students. The total number of students is n = 89. According to educational status 59.6% (n = 53) are 1st class, 40.4% (n=36) are 2. class students. The tables showing the socio-demographic characteristics of the students of medical imaging techniques are given below.

Table 1a: Socio-demographic characteristics

What grade

1st year	53	59,6%
2nd year	36	40,4%
Total	89	100,0%

Gender

Male	34	38,2%
Female	55	61,8%
Total	89	100,0%

Age range

between 15 - 18	14	15,7%
between 19 - 22	69	77,5%
between 23 - 27	6	6,7%
Total	89	100,0%

The economic situation of the family

Well done	17	19,1%
Mediocre	69	77,5%
Poor	3	3,4%
Total	89	100,0%

Who are you living with at school time?

with family	76	85,4%
with relatives	2	2,2%
People sharing an apartment	3	3,4%
Dormitory	8	9,0%
Total	89	100,0%

When we examined the age range of the students who participated in the research, we see that the age range of 19-22 years constituted the majority with 77.5% (n = 69); The economic situation of their families gave 19.1% (n = 17) as well treated, 77.5% (n = 69) as mediocre and 3.4% as poor (Table 1a).

Table 1b: Socio-demographic characteristics**The number of computer in your family?**

1	45	50,6%
2	25	28,1%
3	4	4,5%
None	15	16,9%
Total	89	100%

Connection to the Internet?

From the family's computer / mobile phone	5	5,6%
From friends computer	3	3,4%
From own mobile phone	61	68,5%
No possibility to connect	2	2,2%
From own computer	17	19,1%
From tablet	1	1,1%
Total	89	100%

What social media applications do you use?

Facebook	70	78,7%
Whatsapp	89	100%
Twitter	59	66,3%
Snapchat	34	38,2%
Instagram	69	77,5%
Youtube	35	39,3%
Others	34	38,2%

Do you believe in the power of social media?

Yes	88	98,9%
No	1	1,1%
Total	89	100%

Can you connect to internet from your mobile phone?

Yes	88	98,9%
No	1	1,1%
Total	89	100%

Are you playing computer games?

Yes	52	58,4%
No	37	41,6%
Total	89	100%

How many hours a day do you spend with computer/phone??

0-1 hour	10	11,2%
2-5 hours	62	69,7%
6-8 hours	13	14,6%
9+ hours	4	4,5%
Total	89	100%

Do you want your university courses to be supported By computer technology?

Yes	82	92,1%
No	7	7,9%
Total	89	100%

Do you have an e-mail account?

Yes	89	100%
No	0	0%
Total	89	100%

For what purpose do you use Internet the most?

For research	32	36%
For course follow-up	30	33,7%
To track social media	27	30,3%
Total	89	100%

Do you follow the activities of friends and other People you have on your follow up list on social media?

Yes	73	82%
No	16	18%
Total	89	100%

Do you have a smartphone?

Yes	88	98,9%
No	1	1,1%
Total	89	100%

Who has mobile phones in your family??

Mother	61	68,5%
Father	79	88,8%
Sister	54	60,7%
Brother	54	60,7%

Are you playing games?

Yes	62	69,7%
No	27	30,3%
Total	89	100%

Does the university have computer facilities?

Yes	11	12,4%
No	78	87,6%
Total	89	100%

Dou you think that computer technology is necessary in vocational courses like medical terminology?

Yes	78	87,6%
No	7	7,9%
Undecided	4	4,5%
Total	89	100%

Do you think that Wi-fi services in university are Adequate and convenient?

Unideaed	6	6,7%
Sufficient	23	25,8%
Insufficient	60	67,4%
Total	89	100%

The question, in vocational courses such as medical terminology whether computer technology is necessary has answered 87.6% (n = 78) with yes, 7.9% (n = 7) with no and 4.5% (n = 4) answers with undecided.

6.2 Medical Terminology “Control Group” and “Experimental Group”

Table 2. Medical Terms Pre-Post Test

Unit	Number of Questions	Total Correct	Total Incorrect Answers	Average Score (points)
The Circulatory system	20 of 20 questions	77,46%	22,54%	17261,910156
Sense Organs	30 of 30 questions	69,70%	30,30%	21321,837891
Joints and Bones	25 of 25 questions	76,31%	23,69%	20598,623047
Endocrine System	25 of 25 questions	69,83%	30,17%	17579,082031
Motion System	25 of 25 questions	35,21%	64,79%	11485,217773
Professional Terms	25 of 25 questions	69,70%	30,30%	21321,837891
Digestive system	20 of 20 questions	79,45%	20,55%	17602,699219
Respiratory system	21 of 21 questions	78,57%	21,43%	17903,216797
Medical Terms	25 of 25 questions	67,24%	32,06%	17252,589844
Urogenital System	25 of 25 questions	65,94%	34,06%	17076,882813
Uriner system	20 of 20 questions	71,66%	28,34%	13913,317383

When we evaluate some results in the table; **Motion System:** Understanding, correct response rate 35.21%, post test scores 11485.2777; **Joints and Bones:** Understanding, correct answer rate 76.31%, post test scores 20598.62305; **The Circulatory System:** Understanding, correct answer rate 77.46%, post test scores 17261.91; **Respiratory System:** Understanding, correct response rate 78.57%, post test scores 17903.216; **Digestive System:** Understanding, correct answer rate 79.45%, post test scores 17602.69922 (Table 2).

7 Discussion

When the answers to the questions about socio-demographic characteristics are examined; 87,6% of respondents answered yes to the question of whether they need computer technology in vocational courses such as medical terminology, 79.8% think that it is necessary to make vocational courses with smartphone, 98.9% have smart phone, 87.6% of the respondents answered that there is no computer opportunities in the university, 69.7% play mobile games, 69.7% of those who spend their time with computer / phone between 2 and 5 hours a day, the proportion of those who want to support their university courses with computer technology is 92.1% (Table 1a and 1b).

When studying exams made to the control group and experimental groups related to all terms; the total score of the control group is 118; the total score of the experimental group (pre-test) was 200, and the total score of the experimental group (post-test) was 388. In our study, the total scores of students who learned and used medical terminology by classical method were low. The final test scores of the study conducted with computer aided teaching methods are high with 30704 (correct: 24, false: 1).

Uriner System: Nutrients and oxygen are needed for the cells that make up the human body to survive. Some of the metabolic products resulting from reactions within the cell are transported through the blood to the kidneys to be discarded. Understanding, the correct answer rate is 71.66% and the post test score is 13913.31738.

Urogenital System: It is through reproductive function that human beings can survive their generation. A collection of organs that differs in structure, shape and location, which fulfills the reproductive function in men and women and allows for the shaping of sex specific characters, constitutes the genital system. Understanding, correct response rate is 65.94% and the post test score is 17076.88281.

Endocrine System: Inner secretion glands are defined as endocrine glands (glandulae endocrinae). The system that these glands form is called Endocrine System. Understanding, correct answer rate is 69.83% and the post test score is 17579.08203.

Sense Organs: It is through sense organs that they perceive and evaluate events that occur in the environment of living things. Understanding, correct response rate is 69.70% and the post test score is 21321.84.

Professional terms: It is a branch of medical science dealing with the treatment of these diseases by radiotherapy and other ionizing radiation methods such as diagnosis of diseases of internal organs of the body and X-ray gamma. Understanding, correct response rate is 69.70% and the post test score is 21321.84.

Medical Terms: The term is used to refer to specific words that are used in different fields of science and arts and have a long history of employment, which have been found to be of special use. Terminology is the science branch dealing with terms. Understanding, correct response rate is 67.24% and post test score is 17252.58984 (Table 2).

The dizzying progress in the health field results in a large number of terms and concepts emerging. This fast information and term loading also brings with it important problems. These new medical terms entering the language used can lead to confusion and problems in the use of the language. Today, in many academic curricula, the imaging anatomy is integrated as part of anatomical education according to a variety of strategies. [21, 22, 23, 24, 25, 26, 27,].

8 Conclusion

It is very important to use medical terms effectively and correctly in every area of health. More extensive work is needed to achieve this. In this context, our work is a study that can be used in the health field, which can easily use medical terms for the students, and the writers will rise. In connection with globalization, universities need to offer cost-effective training to students using information technology.

References

1. Klopfer, E., Squire, K. Environmental Detectives - The Development Of An Augmented Reality Platform For Environmental Simulations. Educational Technology Research and Development. April 2008, Volume 56, [Issue 2](#), pp 203–228.
2. Kaufmann, H., Schmalstieg, D. Mathematics and geometry education with collaborative augmented reality. Computers & Graphics. Volume 27, Issue 3, June 2003, Pages 339–345.
3. Kaufmann, H., Schmalstieg, D., Wagner, M. Construct 3D: A Virtual Reality Application for Mathematics and Geometry Education. [Education and Information Technologies](#). December 2000, Volume 5, [Issue 4](#), pp 263–276.
4. Abersek, B., Abersek, M. K., Technologia Vzdelavania “Role Of Teacher and/or Technology In The Education Process”; Nitra [20.6](#) (2012): 1-11.
5. Bassett, L. W., Squire, L. F. (1985). Anatomy instruction by radiologists. Invest Radiol 20:1008–1010.

6. Benninger, B., Matsler, N., Delamarter, T. (2014). Classic versus millennial medical lab anatomy. *Clin Anat* 27:988–993.
7. Craig, S., Tait, N., Boer, D., McAndrew, D. (2010). Review of anatomy education in Australian and New Zealand medical schools. *ANZ J Surg* 80:212–216.
8. Drake, R. L., Pawlina, W. (2014). Multimodal education in anatomy: the perfect opportunity. *Anat Sci Ed* 7:1–2.
9. Grignon, B., Oldrini, G., Walter, F. Teaching medical anatomy: what is the role of imaging today? *Surg Radiol Anat* (2016) 38:253–260 DOI 10.1007/s00276-015-1548-y.
10. Ganske, I., Su, T., Loukas, M., Shaffer, K. (2006). Teaching methods in anatomy courses in North American medical schools: the role of radiology. *Acad Radiol* 13:1038–1046.
11. Granger NA, Calleson DC, Henson OW, Juliano E, Wineski L, McDaniel MD, Burgoon JM (2006) Use of web-based materials to enhance anatomy instruction in the health sciences. *Anat Rec B New Anat* 289:121–127.
12. Mena, G., Llupià, A., García-Basteiro, A. L., Sequera, V. G., Aldea, M., Bayas, J. M. and Trilla, A. Educating on professional habits: attitudes of medical students towards diverse strategies for promoting influenza vaccination and factors associated with the intention to get vaccinated” *BMC Medical Education*. 2013 13:99. 18 July 2013. DOI: 10.1186/1472-6920-13-99.
13. Hege, I., Radon, K., Dugas, M., Scharrer, E., Nowak, D. “Web-based training in occupational medicine. *International Archives of Occupational and Environmental Health*; Heidelberg 76.1 (Jan 2003): 50-4.
14. Jack, A., Burbridge, B. (2012). The Utilisation of radiology for the teaching of anatomy in Canadian medical schools. *Can Assoc Radiol J* 63:160–164.
15. Aoki, K., Downes, E. J. An analysis of young peoples use of and attitudes toward cell phones. *Telematics and Informatics* 20 (2003) 349–364. <http://www.angelfire.com/ego2/lostboyrahul/work/cellphoneuse.pdf> 27.05.2017 tarihinde ulaşılmıştır.
16. Aydoğdu Karaaslan, İ., Budak, L. Üniversite Öğrencilerinin Cep Telefonu Özelliklerini Kullanımlarının ve Gündelik İletişimlerine Etkisinin Araştırılması. *Journal of Yasar University* 2012 26(7) 4548 – 4525.
17. Kuronen, R., Jallinoja, P., Airola, R., Patja, K. Educational implementation programme of guidelines on cardiovascular risk factors: an analysis of changes in familiarity, use and attitudes. *Primary Health Care Research & Development*; Cambridge 11.3 (Jul 2010): 241-249.
18. Maleck, M., Fischer, M., Kammer, B., Zeiler, C., Mangel, E., Schenk, F., Pfeifer, K. J. (2001). Do computers teach better? A media comparison study for case-based teaching in radiology. *Radiographics* 21:1025–1032.
19. Kish, G., Cook, S. A., Kis, G. (2013). Computer-assisted learning in anatomy at the international medical school in Debrecen, Hungary: a preliminary report. *Anat Sci Educ* 6:42–47.
20. Korner, N. (1973). Diagnostic radiology in the medical curriculum. *Med J Aust* 24:605–611.
21. Mitchell, B. S., William, J. E. (2002). Trends in radiological anatomy teaching in the U.K. and Ireland. *Clin Radiol* 57:1070–1072.
22. Rakel, D. P., Hedgecock, J. Healing the healer: a tool to encourage student reflection towards health. *Med Teach* 2008, 30:633–635.
23. Phillips, A. W., Smit, S., Straus, C. M. (2013). The role of radiology in preclinical anatomy: a critical review of the past, present, and future. *Acad Radiol* 20:297–304.

24. Shaffer, K., Small, J. E. (2004). Blended learning in medical education: use of an integrated approach with web-based small group modules and didactic instruction for teaching radiologic anatomy. *Acad Radiol* 11:1059–1070.
25. McNulty, J. A., Halama, J., Espiritu, B. (2004). Evaluation of computer-aided instruction in the medical gross anatomy curriculum. *Clin Anat* 17:73–78.
26. Phillips, G. S., LoGerfo, S. E., Richardson, M. L., Anzai, Y. (2012). Interactive web-based learning module on CT of the temporal bone: anatomy and pathology. *Radiographics* 32:E85–E105.
27. Tam, M. D., Hart, A. R., Williams, S. M., Holland, R., Heylings, D., Leinster, S. (2010). Evaluation of a computer program ('disect') to consolidate anatomy knowledge: a randomised-controlled trial. *Med Teach* 32:e138–e142.
28. Johnson Jr, T. H. (1969). Medical school radiology teaching and examination methods. *Radiology* 93:443–446.
29. Dunleavy, M., Dede, C., Mitchell, R. Affordances and Limitations of Immersive Participatory Augmented Reality Simulations for Teaching and Learning. *Journal of Science Education and Technology*. February 2009, Volume 18, Issue 1, pp 7–22.