In the
name of
God

Modern Technologies in University Teaching

Message from the University Rector

All praise is to Allah alone, and His peace and blessings be upon His messenger and bondman our Prophet Muhammad, his family and his companions..

Innovation in university teaching has become one of the important and vital issues and one of the main pillars of university teaching and learning development.

Since Imam Muhammad bin Saud Islamic University (IMSIU) realizes their duty toward the development of higher education in Saudi Kingdom and toward the activation of their role locally and internationally and since they aspire to achieve the mission of excellence in university teaching and to activate communication and experience sharing amongst faculty members of all scientific disciplines at national and international universities, University vice presidency of Studies, Development and Academic Accreditation, represented by the Deanship for Development of University Education has worked on organizing the International Forum for Innovators in University Teaching (IFIUT) at IMSIU campus.

IFIUT is based on a pioneering idea; to attract outstanding experiences in university teaching locally and globally then to present these experiences to recipient faculty members and likewise in universities in which they can develop their teaching skills and then improvement of Higher Education outcomes. Therefore, they can keep pace with the practical and scientific ambitions of our society.

This Forum and all university initiatives come to coincide with the recognition given by the Custodian of the Two Holy Mosques, King Abdullah Bin Abdul-Aziz, and his Crown Prince, Salman Bin Abdul-Aziz to the development of education, particularly university and higher education. Also, it comes as a result of the continuous support of his Excellency, the Minister of Higher Education and the Chairperson of the University Council, Professor Khalid bin Muhammad Al Ankari.

Message of Vice- Rector of University for Studies, Development and Academic Accreditation

All praise is to Allah alone, and His peace and blessings be upon His messenger and bondman our Prophet Muhammad, his family and his companions..

The International Forum for Innovators in University Teaching (IFIUT) at Imam Muhammad bin Saud Islamic University is one of the most significant events the university organizes. Its importance appears clearly when we consider the Forum's role in developing university education in creative ways that focus on outstanding teaching experiences of innovators from inside and outside the Kingdom. The goal is to present their experiences of different disciplines; thus, faculty members in Saudi universities, in particular and in International, Arab and Gulf universities, in general can get benefits in a way that reflects on their teaching performance at their classrooms with their students.

Accordingly, the scopes include: planning innovative university teaching, creative strategies and methods of teaching, modern technologies in university education, methods and means of creative evaluation, excellent activities and practices of university teaching, excellence in managing university teaching and others.

This leading Forum and all developing efforts exerted by the university in order to promote university teaching and learning at Imam University come with the recognition given by the Custodian of the Two Holy Mosques, King Abdullah Bin Abdul-Aziz, and his Crown Prince, Salman Bin Abdul-Aziz to the development of education, particularly university and higher education. It is under the supervision of his Excellency, the Minister of Higher Education and the Chairperson of the University Council, Professor Khalid bin Muhammad Al Ankari, and the continual support of the University Rector, Professor Sulaiman bin Abdullah Abalkhail whose efforts are endless in developing the educational process and promoting the university and the staff to the highest standards locally and globally.

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Message of Dean of Development of University Education

All praise is to Allah alone, and His peace and blessings be upon His messenger and bondman our Prophet Muhammad, his family and his companions.

The idea of IFIUT has emerged to achieve the mission of excellence and leadership in IMSIU teaching and learning through enriching and encouraging creativity and keeping pace with modern approaches of higher education.

Therefore, the Forum aims to provide innovative, realistic and distinguished experiences in university teaching which are presented by faculty members of different specialities. The experiences include introduction of excellent and creative strategies and methods of university teaching and discussions of teaching and learning related experiments. They focus on excellence in teaching and the most recent approaches in university teaching; in addition to, providing opportunities for (academic) educational and scientific meetings and exchanging creative realistic experiences among faculty members and those who are concerned about developing university teaching and learning nationally and internationally.

In brief, IFIUT is "from and for faculty members". It is all about realistic and excellent experiences in university teaching that are applicable and that are presented, so instructors get benefits in a way that reflects positively on their teaching performance and learning outcomes in all different scientific, humanity and applied majors. In addition to the previously mentioned scopes, the Forum will involve other events; such as, model lectures, workshops, discussion sessions, an exhibition relevant to the Forum in which our associates in success and innovation present examples of their educational and technological products and modern strategies for development in university teaching and learning sectors.

In conclusion, I am always thankful to Allah the Almighty for his blessings then to the Custodian of the Two Holy Mosques, and his Crown Prince for the endless support they give to higher education development in our beloved country. Also, my sincere appreciation is to his Excellency, Minister of Higher Education, Professor Khalid bin Muhammad Al Ankari, for his efforts and

sincere support for IMSIU and to the University Rector, Professor Sulaiman bin Abdullah Abalkhail, for his continues support to the deanship and his assistance to all its developing activities and programs and for his guidance that has encouraged us to work and reach creativity that our country, society and university look for. Finally, my sincere thanks are for Prof. Khaled Al Abdurrahman, Vice- Rector of University for Studies, Development and Academic Accreditation, and the Director of the Forum's Organizational Committee, for his efforts, constant supervision, his leading role in the deanship's achievements, and for his efforts toward the success and excellence of   this   Forum.

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English Papers

Modern Technologies in University Teaching

Websites and Lectures: Compatibilities and Demands

Carmen Medina and Roslyn Mohamed

English Department, Prince Sultan University, Riyadh, KSA

Abstract

Higher Education is moving into the era of technology at an increasing rate. It has become vital that university instructors adapt instructional methods to include technology. An inventive way of including technology in the course room is by developing a course webpage. A course webpage allows instructors to be creative, innovative, and provides a database, which encourages self-learning, and provides the basis for life-long learning. This small - scale humanities study used a quantitative data collection method in order to answer the research questions involving whether course websites enhanced the instructional learning experience of course participants. The research study took place at a private woman's college in Riyadh, KSA. The study findings showed that the use of course websites enhanced the instructional experience of the course participants in a positive manner.

Keywords

academic achievement, Internet, instructional technology, higher education, webpage

Introduction

The present paper describes an extension of the teaching and learning with a website experience which started in 2008 in a completely different context and country. The precursor to the current websites was started at the Official School of Languages[1] in Antequera (Spain). The first website was started with a free website creator called

"Wetpaint". The mission at the time was to cater for the needs of a mixed ability class for future Content

and Language Integrated Learning (CLIL)[2] teachers who were learning English with the objective of working in a bilingual school.

Wetpaint proved to offer too many limitations for the needs which were demanded by both the teacher and the students. The need for a user friendly, easily accessible site drove the focus towards "Google sites". It must be said at this point

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[1] *Escuelas Oficiales de Idiomas* (Official Schools of Languages) are government owned institutions which are fully funded by the Andalusian Ministry of Education (branch of the Spanish Ministry of Education). They offer professional preparation in foreign languages as well as in the co-official languages of the Spanish territory. They range in size and location. The student profile is varied as well because access is granted from the age of 14 onwards. They also offer different types of tuition: in class, blended learning and distance education.

[2] Content and Language Integrated Learning (CLIL), refers to teaching subjects such as science, history and geography to students through a foreign language.

that Dr. Medina had a working knowledge of computers and the Internet, but had never created a website herself. The simplicity and variety of tools offered, tilted the balance in Google's favor. These websites require the most basic computer knowledge, are almost like editing a word processing document, yet at the same time allow for the incorporation of videos, sound, power points, own site links as well as exterior links amongst many more options. On the other hand, Dr. Mohamed's expertise with various technological tools contributed to enhance the existing model. The combination of the researchers' experience and backgrounds has led to the results detailed in the following paragraphs.

We will subsequently describe the shared teaching experience carried out for ENG 101 (Intensive Writing).

Teaching Experience

Goals

Internet, social networks and cellular phones are undeniably with us to stay; they are evolving at a head-spinning pace; they have become both a source and a tool. The websites were created in order to keep up with the educational trends and explore the possibilities they have to offer. The websites were also used as a learning center for the students. These websites act as a place where students can sequentially follow what is carried out in the classroom. Websites are a place of reference and communication with both the teacher and other students. With this said, it then becomes imperative for educators to adapt their instructional styles to incorporate the technological explosion which has influenced the multiple intelligences of the college population of this era.

The mission of any institution of learning is to instill upon its students the ability to foster the skills necessary to become life-long learners. In this endeavor, the researchers implemented the use of a course website in order to enhance the learning experience of the course participants. The limited instructional time placed upon instructors at the higher educational level does not will itself to the implementation of additional instructional learning support within the context of the course classroom. In order to combat this instructional barrier, universities have additional learning supports such as tutoring and writing centers. The question then arises, "what if students are not able to access these additional learning supports?" and "how can the instructor provide assistance without demoting learner autonomy?" Hence, the implementation of the course website which allows for learner autonomy and provides the additional learning support within the context of the course classroom.

Importance

The mission statement of Prince Sultan University clearly states, "In its efforts towards a successful and responsible life-long learning, PSU integrates modern technology, pedagogy and human values for the advancement of scientific research, productivity and leadership towards a more meaningful social life." Within the context of the university mission statement and the outcome of the courses, the researchers implemented online course webpages as additional instructional tools to promote course participants' learning during course

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time as well as outside of it. The researchers applied two models of the online course website which consisted of one public webpage, while the other webpage remained private. The public webpage was accessible on the World Wide Web, while the private webpage was only accessible through an invitation from the instructor.

Both models of the webpage provided course participants with supplementary course material and additional lecture material to promote further understanding of the weekly course lectures. Individual course participants accessed the course webpages as frequently as they needed in order to fulfill the course requirements. Overall, having course webpages, which allow instructors the capability to meet the additional instructional needs of their course participants, enhanced the teaching experience of the researchers.

Relation to Educational Theories and Research

There were four theoretical frameworks, which guided this research, the expectancy-value theory, achievement goal theory, service learning theory, and technology in the course room.

The expectancy-value theory is based upon the work of John W. Atkinson in 1957, which states students' motivation to succeed and achievement behaviors are influenced by their beliefs about how successful they are able to complete an activity as well as how much they value the activity (Wigfield & Eccles, 2000). The expectancy-value theory was later developed further by Martin Fishbein (1970), which states the amount of effort that students are willing to expend on

a task is the product of the degree to which they expect to succeed at the task, and they value the task and value success on the task. In order to place value on a task a student must first place value upon their self (Corenblum & Armstrong, 2012). Within the context of the presented research study, course participants were provided an instructional tool in which they had the capability to successfully achieve. The course webpages acted as a motivational catalyst, which allow participants of the course the ability to achieve academic success.

The achievement goal theory explores the rationalizations for participating in achievement behaviors. Ford (1992) indicates that there are levels of goal achievement in which individuals are motivated to achieve task. The achievement goal theory assumes that goals are cognitive representations and that they are potentially accessible and conscious (Pintrich, 2000). Covington (2000) suggests that achievement goals influence academic achievement. The course webpages allowed its participants an opportunity to take part in the instruction manifesting achievement behaviors.

The service-learning theory provides students with real-world learning experiences which compliments textbooks and course-based learning. According to Erickson and Anderson (as cited in Wilkinson, Doepker, & Morbitt, 2012) service learning is most often defined as "a pedagogical technique for combining authentic community service with integrated academic outcomes". John Dewey (1938) defined service learning as embodying the concept of individuals learns by doing. Course participants within the context of the

research study embodied the service learning theory by using the course webpage to take charge of their learning and use the real world element of technology to enhance their learning experience.

Technology in the course room has evolved from overhead projectors, PowerPoint slides, and liquid crystal display projectors to course management systems such as Angel, Blackboard, and WebCT (Tansey, et al., 2009). Students' use of blogs, wikis, and social bookmarking has been of particular interest to educators who perceive these technologies as beneficial in higher education (Kumar & Vigil, 2011). The technological revolution has placed an emphasis upon the use of alternative technological educational tools such course webpages, blogs, and social networking to enhance learning in the course rooms of higher educational institutions. The researchers' implementation of a course webpage emphasizes the modern development of encompassing innovative technological to enhance course room practices.

Detailed Explanation of the Stages

After being allocated the subjects for the semester, being new to the University, the need was found for organization of both the students and the teachers. This need included activities such as helping the students locate subject materials with ease, facilitating a chronology of relevant events in the subject, organizing the contents, accounting for the classroom experience, recording queries and so on.

What better or more permanent method of keeping track of a subject than through the Internet?

Each subject of instruction was allocated a main page with subordinate pages added as were needed. This format can be seen in Figure 1.
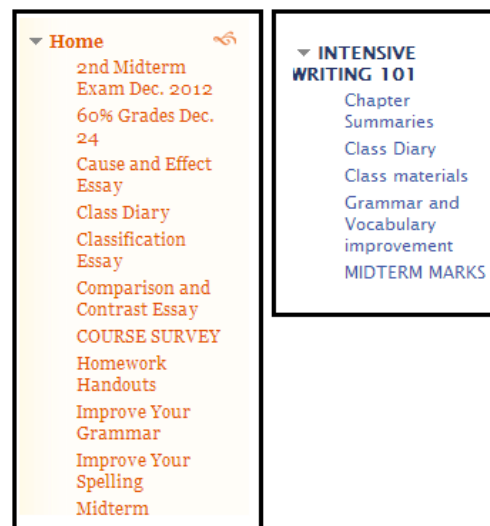

Figure 1. Sidebar sample for Intensive Writing ENG 101(Sections 222 and 101).

The structure agreed upon was a main page containing the course objectives, contents, assessment, in other words, all the relevant information pertaining to the subject, which might be needed by the student at any particular time, and a page for the class diary.
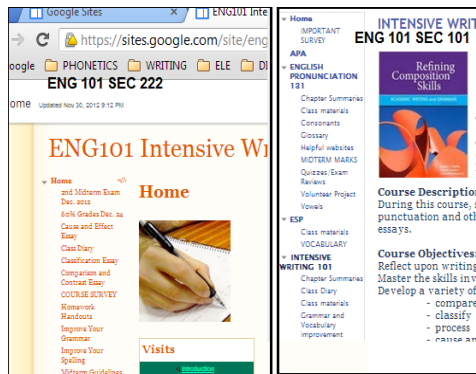
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Figure 2. Comparison of the two sites created for ENG 101

Coordination between the two researchers was complete for Intensive Writing 101 (ENG 101) because both taught the subject during the first semester. Despite the coordination, as can be deduced from the aspect of the web pages present, each researcher maintained their teaching persona and autonomy.

The following step was organizing the subject, for instance, the content which would be taught, the procedures, materials and methods which would be required. For ENG 101, four stages were detailed. In stage one, students carried out a self-evaluation of their writing skills, writing experience, the essay goals that they were aiming at, and target areas of improvement.

Stage two was dedicated to organizing thought processes. At this stage, students were to produce a mind map using an online mind mapper [3] in order to organize their ideas to produce descriptive and expository essays. The three topics offered for the essays were: 1) The Olympic games, a

showcase of mastery and determination; 2) Humankind is running out of new, creative ideas; 3) Internet shopping: a new addiction. Reading texts based on these topics were also offered as a background for their development. The mind map received 10% of the grade and the essay 15%. The rubric used can be found in Appendix 1. The mark obtained constituted the First Mid Term mark.

For the third stage, templates were provided for the five main essay types (expository, classification, compare and contrast, cause and effect, process analysis). Students were to sign up to produce one of the essay types. During this stage, the importance of revision, re-writing and proof-reading was also dealt with.

In the final stage, students went back to their writing portfolios and carried out a self-evaluation of the work produced during the semester, comparing the first writing works with the writing produced at this stage. They also carried out an oral presentation as a self-reflection on their work.

For the Second Mid Term mark, students chose from a selection of background readings, they created a mind map which was their only reference material on the day of the exam. Dictionaries were not allowed.

For the Final Exam, a similar procedure will be followed. However, since five instructors share the subject and their instruction has not followed the same pattern, the students will not only be allowed the use of the text provided, but also, two alternative subjects. It will be interesting to see the choice the students make. These results will be provided in an ensuing paper.

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[3] Online mind mappers suggested were: ThinkBuzan.com; mindtools.com; mindmeistter.com; and freemind.sourceforge.net

At the time of writing, four surveys had been carried out during the semester in order to keep track of the students' progression and feedback. The results of the portfolio self-assessment together with the results of the usefulness of the course webpage are briefly detailed. A full account can be consulted at the websites of the two researchers[4].

Outcomes

Due to the excellent results obtained during the initial experiences with the websites dating back to 2008, the researchers were expecting a successful outcome for students who actively participated in the use and consultation of the current websites.

The researchers have found that using the website:

1. provides a daily log of classroom performance;

2. promotes creative thinking;

3. engages and motivates;

4. allows students to be up to date even if they have to miss one or more sessions;

5. removes trouble with not copying the right information during a lecture;

6. is a constant reminder of the mission and vision statements of both the University and the Department;

7. is environment friendly because it saves on ink, paper and electricity.

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[4] Dr. Carmen Medina and Dr. Roslyn Mohamed: https://sites.google.com/site/drcmedinagarriguez/home/research-results

Evidence and Proof of success and Effectiveness

The self-evaluation survey asked the students of the two sections three questions:

1. Is self-evaluation useful?

2. What have you learnt from this self-evaluation?

3. Are you more aware of your progression now?

Twenty-one participants from Section 222 took the survey, however, only thirteen participants returned the survey in Section 101.

The results can be seen in the following table.

Table 1 – Self-evaluation survey results.

Question	Section 222	Section 101
1.	57% very useful 43% useful 0% not useful	63% very useful 50% useful 7% not useful
2.	38% good to reflect 62% stay updated 0% nothing	78% good to reflect 15% stay updated 7% nothing
3.	95% yes 5% no difference 0% no	93% yes 7% no difference 0% no

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In order to measure the outcomes of the use of the website, a final survey was carried out using the online questionnaire service Survey Monkey. The survey received a total of 78 responses from a possible combined total of approximately 150 students from the two researchers. The questions posed to the students were:

1. Was the course webpage a useful additional instructional tool?

2. How many times a week did you access the course webpage?

3. Did the course webpage have a positive or negative influence upon your learning experience within the course?

4. Would you like to have a course webpage available in all your courses?

The most relevant results are detailed in the table below.

Table 2. Website survey.

Question	Response
1.	43 very useful 24 useful 7 somewhat useful 1 not useful
2.	6 never 66 once or twice a week 7 three or four times a week 1 more than five times a week
3.	75 positive influence 2 negative influence
4.	71 yes 8 no

From the feedback received and briefly detailed in the two tables, the researchers concluded that a course website is an engaging and motivating way for students to interact with the teacher, the fellow students, feel that the instruction is useful, learn and put that knowledge into practice. Therefore, they will continue to incorporate websites and technology into their instruction, improving and incorporating the suggestions made by the students and learned from their own experience.

Recommendations

Contingent upon the data results, it would be highly recommended that the instructional staff at higher educational institutions implement the use of course webpages. Overall, course participants found that having a course webpage accessible to them as an additional instructional tool aided them in having a positive learning experience within the course. Teacher educators have to find ways to leverage skills with new technologies in informal environments in activities and projects in coursework (Kumar & Vigil, 2011).

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Giving audio-visual e-feedback in a Saudi University

Wael Hamed Alharbi[a]

Department of Applied Linguistics, Yanbu University College, The Royal Commission, KSA

Abstract

This study explored how instructional audio-visual feedback was perceived by English as a Foreign Language (EFL) who participated in a blendedlearning project involving two classes in a Saudi University. Specifically, it examined: 1) the possible differences between high achieving and low achieving university students in terms of their perceptions of audio-visual and text-based feedback when receiving both types of feedback on their electronically submitted essays and 2) the possible differences between thescores of their first and second drafts as a result of responding to each type of feedback. A mixed methods research design was utilized. The two groups preferred receiving audio-visual feedback, and their second drafts were way better when audio-visual feedback was offered. This study has broad implications not only for online learning environments but any learning environment that involveshigher education students.

Keywords:

e-feedback, audio-visual-feedback, text-based feedback, screen recording, Computer Mediated Communication(CMC).

Introduction

With the advancement of technology and the increase in numbers of digitally native students, higher education institutions find themselves in a position where digital delivery of education is more of a learning style than a mode of learning. In education literature, feedback has been emphasized as the most powerful tool that has an impact on student achievement and progress. Giving electronic feedback (e-feedback) on students' electronically submitted work has always posed a challenge to practitioners in higher education in terms of cost, availability and applicability. Lecturers ask for their assignments to be typed using a computer and ask the students to either submit them electronically or print them out on sheet of papers. The papers are scored either manually or electronically by using comments and tracking changes aspects that are available in some word processing programs. The assignments then are returned to the students with some feedback which is either unclear or ambiguous sometimes. In this paper, we will showcaseour experience on how we introduced audio-visual electronic feedback using a screen recording software in an undergraduate blended class in a Saudi college. We will see whether this kind of e-feedback would lead to better learning and generate positive attitude towards teachers' feedback.

Teaching Experience

Goals

The goals of this study are threefold. First, we want to find out whether higher education students will have more positive attitudes towards learning when we provide them with e-feedback in the form of audio-visual comments. Second, we want to see if these students will improve academically as a result of getting audio-visual feedback. Thirdly, we wanted to find out if there is any differences between high achieving students and low achieving students in terms of benefitting from audio-visual feedback.

Importance

This study was guided by social constructivist pedagogical theory (Driscoll, 1999; Gagné, 1987; Jonassen, 1994). Social constructivism stresses the importance of feedback for constructed behavior to help learners construct their own reality or knowledge, and this constructed knowledge is formed through learners' interpretation of previous experiences of the external world, mental structures, and beliefs (Jonassen, 1994; Pear & Crone-Todd, 2002). According to social constructivist theory, both learners and teachers learn by engaging in a dialogue and by interacting verbally with others to construct meaning (Pear & Crone-Todd, 2002).

Relation to educational theories and research

Gibbs and Simpson (2004-05) reviewed a wide range of studies on feedback to elaborate seven conditions under which feedback may influence students' learning and increase academic success. Gibbs and Simpson's seven conditions of feedback are:

1) sufficient feedback is provided, both often enough and in enough detail; 2) the feedback focuses on students' performance, on their learning and on actions under the students' control, rather than on the students themselves and on their characteristics; 3) the feedback is timely in that it is received by students while it still matters to them and in time for them to pay attention to further learning or receive further assistance; 4) the feedback is appropriate to the purpose of the assignment and to its criteria for success; 5) the feedback is appropriate in relation to students' understanding of what they are supposed to be doing; 6) the feedback is received and attended to; and 7) the feedback is acted upon by the students (pp.16-25).

The seven conditions identified for providing feedback (Gibbs & Simpson, 2004-05) were based on the principles of effective feedback by Chickering and Gamson (1987). The principles are that students need appropriate feedback on performance to benefit from courses; students need chances to reflect on what they have learned, what they still need to know, and how to assess themselves (Chickering and Gamson, 1987).

The role of instructional feedback in asynchronous online environments and specifically in asynchronous online discussions is the most important strategy because students participating in asynchronous online discussions feel stressed, disconnected, or left behind when they do not receive any feedback on their posting (Dabbagh, 2002). Feedback in asynchronous online discussions supports students' success to complete the online course, i.e., the lack of feedback is viewed as one of the reasons why students drop the courses (Ertmer, Richardson, Belland,

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Camin, Connolly, Coulthard, Lei, & Mong, 2007).Vasilyeva, Puuronen, Pechenizkiy, and Räsänen (2007) classified the following functions of web-based feedback: 1) *confirming* getting the user's response; 2) *informing* the user about his or her performance (how many tasks were performed, number and ratio of correct answers, time of test processing, etc.); 3) *correcting* the user (in the case she or he has not given a correct answer); 4) *explaining* (the feedback could include an explanation about the reasons the user's answer was considered correct or guidance to the correct answers in the case of a wrong answer); 5) *evaluating* (for example, in the case of an answer until correct feedback); 6) *motivating* the user; 7) *rewarding the user;* and 8) *attracting* his or her attention (p. 11).

However, there are several problems with delivering feedback in asynchronous online discussions. The most common problem is that students are unable to understand feedback comments and to interpret them correctly (Higgins, 2000; Quinton &Smallbone, 2010). By adapting Higgins's framework for interpreting, Carless (2006) argued that students encounter challenges in interpreting the comments; there is an emotional process that students face while receiving feedback. The impact of feedback can negatively threaten students' learning engagement (Carless, 2006). To understand students' perception of the effectiveness of feedback, Poulos and Mahony (2008) in their qualitative analysis elaborated the key themes related to the effectiveness of feedback: 1) students' perceptions of feedback were related to the individual meaning attributed to the feedback, the accessibility of lectures to provide feedback, types of feedback, feedback related to criteria and marks and comments; 2) the impact of feedback was related to timeliness, significance and first-year experience. Timeliness related to the need for feedback as early as possible; and 3) credibility of feedback was related to the students' perceptions of the lecturers themselves. The lecturers' ability generally and also their biases influenced the credibility of the feedback they provided (p. 145).

Indeed, to interpret feedback comments correctly, students need meaningful and frequent instructional feedback (Rossman, 1999); they may greatly benefit from teacher presence (Anderson et al., 2001) and clear instructional comments (Biesenbach-Lucas, 2003).

Detailed explanation of the stages

Participants and Sampling Method

The target population of this study consisted of EFL Saudi students enrolled in a blended writing course. Fifty-one volunteers from Management information Systems and Computer Sciences Programs at Yanbu University College served as the study sample. However, 15 students left the experiment. The EFL students were told that participation in the study was voluntary. They were told that, by participating in this study, they would benefit from a new instructional technique that may help them in learning English and participation in future blended courses. All the 51 participants were male. The participants ranged in age from 20 to 22, with a mean age of 21. They had been studying English for more than eight years (including seven years in school).

Research Design

This quantitative research utilized a quasi-experimental design with one within-subject factor to address the proposed research purpose, which is displayed in Figure 1. In the design, participants were assigned to one of two levels of language proficiency, but all of them experienced both types of feedback delivery methods (text-based and audio-visual feedback). The purpose for choosing the repeated design was that the design was efficient with a higher power with fewer participants than between group ANOVA designs. This design had advantages because the participants served as their own control in a perfectly matched experimental condition (Johnson & Christensen, 2008).

Dependent Variable

The dependent variable was the participants' perceptions of the audio-visual feedback as measured through the audio-visual feedback survey to examine students' responses to audio-visual and text-based feedback (Ice, 2008). This dependent variable is described below in detail.

Participants' Perceptions

The dependent variable was defined as student perceptions gained from the audio feedback survey containing students' responses to audio-visual and text-based feedback (Ice, 2008) and included in Appendix A. Participants were asked to respond to the survey before and after completing the experiment. The survey focused on gathering participants' perceptions about clarity of instructional voice, perceived motivation and retention, feeling of involvement in the online course, and feeling of instructional care by comparing audio feedback and text-based

feedback. The overall scores of the participants' perceptions were computed by taking the average of participants' responses on the seven survey questions.

Independent Variables

The two independent variables of this study were (a) level of language proficiency (high versus low) and (b) type of feedback delivery method (audio-visual versus text).
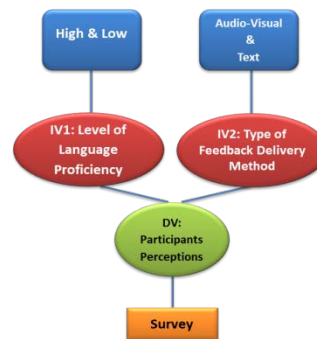

Figure 2. The relationships between the dependent and independent variables.

Level of Language Proficiency

A standardized test for proficiency in English as a Foreign Language (TOEFL) Paper-Based Test (PBT) was used to classify participants by level of language proficiency to create the first independent variable and to assign them to the levels of language proficiency. The TOEFL examined participants' level of listening comprehension, reading comprehension, and knowledge of English structure/grammar. The total TOEFL PBT score ranges from 310 to 677. The participants who scored above 513 were classified as having a high level of language proficiency. The participants, scoring 513 and below, were

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classified as the low level of language proficiency. Consequently, 25 participants were assigned to the higher level of language proficiency, and 26 participants were assigned to the lower level of language proficiency.

Type of Feedback Delivery Method

Following the research findings by Ice, Swan-Dagen, and Curtis (as cited in Ice & Richardson, 2009) that audio feedback may be most powerful when combined with text and visual markups, audio-visual feedback was provided in this study by using Jing, a program that allows instructors to record their computer screens along with their audio feedback while highlighting the errors and points of interest in the students' papers. Jing allowed audio-visual recordings to be uploaded to a server online. Each participant received a link, clicking upon which led to the e-feedback that was specially given to that student. Each e-feedback was a five-minute recording of the instructor's screen along with his verbal comments on the student's paper. The instructor scrolls up and down the student's paper, moves the cursor and highlights certain areas making it easy for students to associate audio with video easily and simultaneously. The only difference between the types of feedback was that the audio-visual feedback provided more in-depth and detailed comments to compare with text-based feedback which was detailed typed feedback.

Evidence and proof of success and effectiveness

As we noted earlier, we used two types of research instruments to test the effectiveness of audio-visual feedback; perceptions questionnaire and test scores. In this section, we will be reporting the results of our experiment staring with discussing students' perceptions of audio-visual feedback as opposed to text-based feedback. After that, we will discuss how conclusions can be derived from the students' test scores.

Audio-Visualand Text-Based Feedback Perceptions Questionnaire

The two groups of students (high achievers and low achievers)wrote about the same topics and were allowed the same time throughout the study. Each group wrote six essays in total. Every time they submitted their essay, the instructor scored them and commented on them and provided them with his feedback. They were then asked to rewrite their essays using and responding to that feedback. Once they have rewritten their improved second drafts, they sent them to their instructor who in turn scored these essays again. Throughout the study, each group received six feedbacks; three text-based feedbacks and three audio-visual ones. At the end of the study they were asked to fill in the perceptions questionnaire.

Students were asked to rate seven statements on Likert Scale from 1 to 5, where [1] means 'Strongly Disagree' and [5] means 'Strongly Agree'. Graph 1 shows the high achievers' mean scores for their responses to AVFand TF questionnaire's statements.

Graph [1]: The Mean Scores of the High Achievers' Responses for AVF and TF Questionnaire
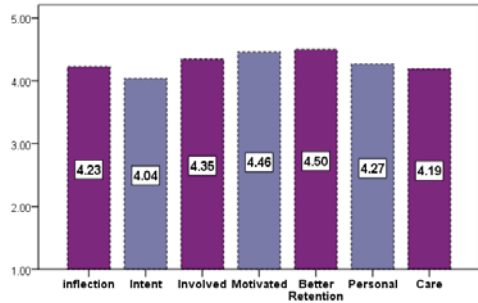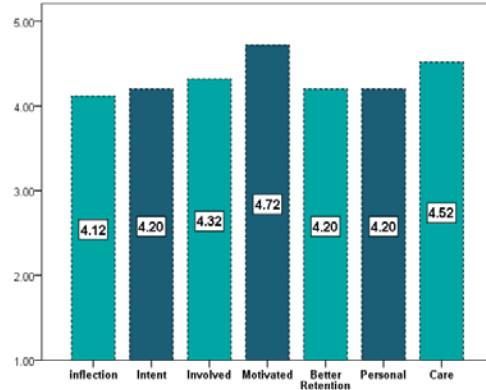

The above graph shows that the high achievers group scored an average of 4 and above in response the seven statements regarding the type of audio-visual feedback they received. This means that they agree to the statements in the questionnaire confirming that:

1. When using audio-visual feedback, inflection in the instructor's voice made his intent clear,

2. The instructor's intent was clearer when using audio-visual than text,

3. Audio-visual comments made them feel more involved in the course than text-based comments,

4. Audio comments motivated them more than text-based comments,

5. They retained audio-visual comments better than text-based comments,

6. Audio-visual comments are more personal than text-base comments, and

7. Receiving audio-visual comments made them feel as if the instructor cared more about them and their work than when they received text-based comments.

The low achievers were also asked to respond to the same questionnaire. Graph2 shows the low achievers' mean scores for their responses to AVF and TF questionnaire's statements.

Graph [2]: The Mean Scores of the Low Achievers' Responses for AVF and TF Questionnaire

The graph above shows that the low achievers group scored an average of 4 and above in response to AVF and TF questionnaire. This shows that they also agree to the seven statements that favour AVF feedback over TF feedback.

The results above support our claim that audio-visual feedback is better than text-based feedback and generates better attitudes towards the whole learning process in which it was implemented. Although both groups scored an average of 4 in response to all the statements in the questionnaire, the low achievers seem to have more positive attitudes towards audio-visual feedback than the high achieving ones regarding two statements. They seem to feelmore motivated when they received AVF than when they received AF. They also felt that the instructor cared more about their work on their essays thanwhen they received text-based comments.

As we mentioned earlier, looking at the effectiveness of AVF just through the students' perceptions lens is not enough. We need to put these two types of feedback into

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further tests by checking how much they may contribute to the students' overall achievement. In the following section, we will shed light on how we did that when we compared our students' first and second drafts using different types of feedback.

AVF vs. TF for Producing Better Drafts

The second test to which we subjected our two types of feedback was comparing our students' scores before and after receiving each type of feedback. As we mentioned earlier, over six-weeks period, each student had to write twelve essays; six first drafts and six improved second drafts. For half of these drafts, they received text-based feedback and received audio-visual feedback for the other half. To see which type of feedback generated more positive results by helping our students produce better drafts, we compared their first and second scores for the fifth and sixth writing task during the fifth and sixth week. Graph 3 shows that the high achievers have improved their second drafts under the two conditions; TF and AVF. A repeated measures analysis of variance (ANOVA) confirms that the difference between the mean scores of the first and second drafts is significant for both conditions where (F=25.29, p<.001) for TF condition and (F=385.65, p<.001) for the AVF one. The results of the test confirm that the increasing trend is strictly linear leading upwards.

Graph 3: First Draft vs. Second draft Mean Scores Under TF and AVF Conditions for High Achievers
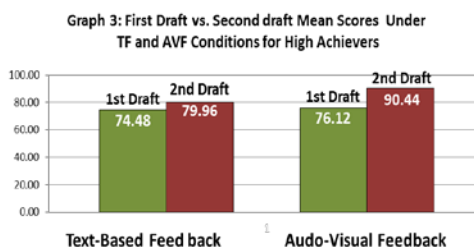
As we explained above, our high achieving students made use of both types of feedback as their scores improved significantly from first drafts to second one. It should be noted, though, that although it seems both types of feedback helped the students improve their essays, receiving audio-visual feedback seemed to have more positive effect on their final scores. For text-based feedback, they only scored an average of 5.48 points more than their average scores in their first drafts, while they scored an average14.32 points more than what they scored in their first drafts. These results are in line with our findings from the perceptions questionnaire in which we found that our students tend to prefer audio-visual feedback more.

The low achieving students also seem to prefer audio-visual feedback over text-based one. A repeated measures analysis of variance (ANOVA) confirms that the difference between the mean scores of the first and second drafts is significant for both conditions where (F=30.88, p<.001) for TF condition and (F=331.41, p<.001) for the AVF one. The results of the test confirm that the increasing trend is strictly linear leading upwards.

Graph 4 below shows how our low achieving students made use of both types of feedback as their scores improved significantly from the first drafts to second one. It should be noted, though, that although it seems that

both types of feedback helped the students improve their essays, receiving audio-visual feedback seemed to have more positive effects on their final scores. For text-based feedback, they only scored an average of 2.93 points more than their average scores in their first drafts, while they scored an average 16.53 points more than what they scored in their first drafts. These results are in line with our findings from the perceptions questionnaire and the test scores of our high achiever students in which we found that they tend to prefer audio-visual feedback over text-based feedback.

Graph 4: First Draft vs. Second draft Mean Scores Under TF and AVF Conditions for Low Achievers
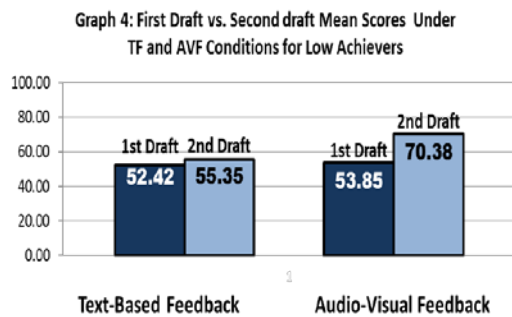
The results of the perception questionnaire and the test scores show that audio-visual feedback is most preferred type of feedback for both high and low achieving students. It was surprising to find out that not only did low achieving students prefer audio-visual feedback, but it also seemed to have more positive effect on their performance compared to their high achieving counterparts.

Recommendations

In light of the results discussed above, it was obvious that students do need informative feedback in order to develop and improve. Having positive attitudes towards the learning experience is every educational practitioner's ultimate goal. By introducing this new type of feedback, we were able to prove that audio-visual feedback ticks all the boxes when it comes to applying it in higher education settings. The results have proven that AVFpromotes motivation, enhances learning and generates better results and could help knowledge retention. Moreover, AVF technology is freely available and does not require thorough training or restricted learning platforms or environments. Although this is a small scale study the findings of which are not necessarily generalizable to all higher education settings, we believe that it is worth implementing in all higher educational settings whether face-to-face, blended or distance learning for the strong and high potential this technology can offer to higher education students. Further research is still needed to further scrutinize the effectiveness of this technology for different learners and disciplines.We should work very hard to change the way we look at higher education by analyzing and responding to our students' demands and make every effort to avoid caring forquantity on the expense ofquality. Giving detailed feedback to our students will definitely contribute to improving quality in our higher education systems.

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Implementation of Teaching Objects for Computer Programming Structures Using Presentation-Based Animations and Graphics

Abdullah Ahmad Basuhail[a]

[a]*Faculty of Computing and Information Technology, King Abdulaziz University, Jeddah, KSA*

Abstract

This paper demonstrates the use of presentation-based animations and computer graphics practices and experiences that we adopted during teaching and delivering the basic computer programming structures, elements and programming techniques and algorithms in our computer programming courses. The developed contents can be considered as teaching objects for the topics under consideration. The main characteristics of our approaches are effectiveness, attainability, rapidness of the development for the instructors and the trainer. It is also characterized by the effort, time and cost reduction. Other features include attractiveness, easiness of use and manipulation. The contents can function as hands-on experience for the learners and the trainees. Moreover, using the developed teachingobjects does not require an external software, plug-ins, or any add-in modules. The teaching objects that we developed here are also characterized by the possibility of reusability and integration into e-learning environments. The approaches and techniques we applied in our courses and trainings could be as well, implemented in other fields and disciplines of science and technology.

Keywords:

Computer animation, Computer graphics, Teaching objects, e-teaching, e-learning,Programming structures.

Introduction

Using technological tools in teaching becomes necessary and essential in contemporary modernhigher education. They enhance the ability of the learners and assist the instructors to convey information, ideas and concepts in an easier,fluent, and faster manner. Instructors may be able to implement teaching objects using these tools.A teaching object could be defined as "a small collection of information content, practice items that are combined based on a single learning objective".

Among the modern tools that could be used for teaching enchantments are educational animations to implement and develop e-teaching objects.

Educational animations are defined as"animations produced for the specific purpose of fostering learning0, and assist in teachingand conveying the subject matter".

The popularity of using animations to help instructorsand authors of e-content to convey information and explanations has greatly increased since the advent of powerful computer systems and the development of graphics-oriented software packages.

Previously, traditional educational animations required the availability of specialized well trained authors and the use of intensive techniques that were both time-consuming and expensive; money-wise.

Nowadays, several computer software packages are available forinstructors and authors to assist them in conveying their expertise and explanations for the educational concepts and ideas and to author

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these concepts and transform them intoteaching animated objects.Instructors are no longer limited to rely on static objects related to their teaching topics, but can readily convert them into more efficient, assisting, vivid,and dynamic electroniceducational animations.

Animations can efficiently portraysequential changes over time,"temporal changes". For this reason, they seem ideally suited for the teaching ofprocesses,events, procedures and the like.

Using animation to present dynamic content can reflect both the changes in position (translation), and/or the changes in form (transformation) for some or all of the individual components that are fundamental forimplementing an electronic object for teachingthe subject matter.

In contrast with static teaching objects, animations can show temporal change directly (rather than having to indicate it indirectly using auxiliary markings such as arrows and motion lines)0. Using animations instead of static graphics removes the need for these added markings so that displays can be not only simpler and less cluttered, but also more vivid, engaging, and more intuitively comprehended0.

With animated depictions, information about the changes involved is available to be read straight from the display and it can assist the instructor during the presentation sessions. Well designed and implemented educational animations for teaching objects could be delivered to the learners for further self-study and independent use without a facilitator or the learner need to perform mental animation or interpretationin the off-class times.

Animations could be implemented in several ways. One way is the use of graphic-oriented animated diagrams by making the animations to occur over several frames. This can be used in constructing the proposed educational animation, but it requires an extra effort in the case of updates or modifications of the teaching object.

Sometimes, such technique might produce an enormous file size due to the replication of images and graphics items, which is a disliked trend with respect of contentsharing or transfer over computer networks.

Other external sophisticated animation software, such as Flash, can be used to build sophisticated teaching objects, but it imposesthe useof these objects externally or installing plug-ins to use and embed into presentations with some experienced problems of integration functioning and compatibility. Another obstacle with the implementation using such packages is the need for the authors to learn and get experienced with the use of new software. Moreover, it requires dedicating a considerable amount of time for the process of development and implementationof objects due to the relative difficulty in the use compared with other user-friendly and cumulative experience software packages.

The software presentation package: PowerPoint has an easy-to-use and straightforward animation capability that, in the right hands, can produce very effective and informative educational animations in an easy manner.

Most instructors used to use technology tools and facilities such as computers, presentations, and data show devices, which nowadays become crucial in modern classroom and teaching environments especially in higher education. These tools could be exploited to enhance teaching and learning and to attract the attention of the learners.

Using presentation-oriented animations and graphics packages, such as PowerPoint, can save the time and effort because it exploits the cumulative knowledge and experience that the instructors gained fromfamiliarity and earlier use of such packageand build upon it.

Presentation packages are usually used by most of the instructors to assist hem in lecturing and conveying the teaching materials. As a consequence, using

presentation-based software packages for implanting teaching objects can serve both rapid implementations and assurance of functioning, integration and compatibility without the needfor additional or external software packages.

Teaching Experience

Goals

This paper reports a computer-based animation experience aimed to facilitate the teaching of the programming structures to university undergraduate-level students in introductory programming courses.

The main goal is to use modern technological tools to assist instructors in teaching and to help students to understand different topics of the programming courses and to simplify the topic matters of the programming structures specifically.

A second goal is to develop simple and effective teaching objects and within the mind the consideration of the cost and time limitations.

A third goal is to develop an in-session teaching follow-up electronic tools thatcan assist instructors in teaching instead of using the traditional tools such as markers, arrows, whiteboards, etc.

One more goal for implementing electronic teaching objects is to convert the developed teaching objects into learning objects that can be easily used by the students during the off-class sessions or can be integrated and embedded into e-learning environments.

Importance

During the teaching of the introductory college of computing programming requirement courses, we have been faced with the difficulty for most of the freshmen students to understand and grasp from the first glance the mechanism, logic, and flow of execution of the programming structures and the manner of their functionalities. Our observations from teaching those programming courses for several years revealed that a significant number of students could not visualize the logic and the functioning mechanism of the programming control structures.

Traditional techniques used in the field, such as flowcharts, can help but it lacks the dynamics that can assist in following the flow of execution without a facilitator.

We used to deliver lectures using technology tools and facilities such as computers, presentations, and data show devices, which nowadays become crucial in modern classroom and teaching environments especially in higher education. These tools could be exploited to enhance teaching and learning and to attract the attention of the students during in-class teaching sessions.

We proposed the use of animations to help students to understand these topics and assisting instructors of the programming courses during the conveying of the topic matters.

Due to the time and cost limitations, and software integration and compatibility of developing educational animations that serve our purposes, we decided to use presentation-based animations and to develop and implement them by ourselves. The design methodology discussed in the next section for developing animated teaching objects can help and assist in teaching. Using educational animations saves time andefforts of the instructors who uses them during teaching sessions. The saved time can be exploited in more teaching elaboration and discussions.Moreover, the developed educational animation objects could serve as hands-on experience for the students and the trainers.

Generally, teaching objects help students and learners in grasping the topics and allow replicating complex or expensive experiments in an easy and tangible manner.

Using the proposed techniques can help in time and cost reductions due to the simplicity of implementation and

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attainability of the used tools, but also not at the expense of the quality or the way of use.

There are some limitations for the presentation packages that we used, such as PowerPoint; with regard of the flexibility and the control of the developed teaching objects, but for our purposes it worked and functioned properly toa satisfactory extent.

Relation to educational theories and research

This research explains the use of animations in the implementation of teaching objects that could be used by instructors in class sessions and it could be converted into learning objects that can be used in an e-learning environments.

Educational animations are used widely and attracted the attention of instructors, learners, and researchers in education and computer fields. Implementing and development of such objects could be intended for either the learning process or the teaching process.

Some researchers reported that using visualization tools such as animations could be used to give an accurate and rich picture of dynamic nature for some topics which are often very hard to grasp from text-based presentations of information 0 and 0.

An active way to use a computer animation in molecular genetics class that helped students to work interactively with a computer animation which deals with abstract concepts and processes in molecular biology0.Analysis of the post-test showed that the mean score of theexperimental group was significantly higher than the meanscore of the control group. This positive trend was also reflected in personal interviews0.

Some researchers 0, explored the effect of computer animations on college chemistry students and found that instruction with animations may increase conceptual understanding by prompting the formation of dynamic mental models of the particulate nature of matter. In this type of instruction, animations provided more scientifically correct visual models for submicroscopic processes.

Others, argued that some of the main advantages of the use of computers for instruction are the possibility to represent phenomena as a sequence of animation, adding a temporal component; the possibility to manipulate data sets, and to test the impact of the manipulation0, and increasing students'motivation0.

Other researchers 0, claimed that animated software can illustrate and elucidate biological concepts more clearly and effectively than more traditional means—lecture, discussion or even conventional laboratory activities.

Interactive models can address core ideas in a visually engaging way that makes them accessible to students with vastly differing learning styles 0.

As students work with the models, they are more likely to remember and transfer their learning to new situations0.

A researcher concluded that simulationsfurnish suitable cognitive environments withinwhich learners can exercise a range of inquiry skills. Healso mentioned that many educators have found virtuallearning environments to be powerful, indispensable toolsfor developing conceptual understanding0.

Some other researchers conducted experimental study regarding the use of animation to learn vocabulary 0.

Detailed explanation of the stages

The first step towards implementation of an educational concept, procedure or task using electronic computers is to design and construct a model for the desired item. The design can be developed and implemented using the available electronic tools which consist of computer systems and proper software packages.

The subsequent paragraphs suggest an assisting design technique for implementing

ateaching concept using simple and attainable tools with the non-computer specialization or non-experienced authors in mind.

Figure 1illustrates the design methodology cycle and its stages that can be followed in the development and implementation of an animated teaching object.

Figure 1- Stages of implementing animated teaching object.

The following sub-sections explain this design methodologyand elaborateits different stages.

Topic preparation

The developing of an electronic teaching object starts by preparing the topic matter to be considered. Thiscan be considered as a small chunkof information, process, or procedureto be explained and demonstrated to students. It is important to make the topic as small as possible in order to have control during the implementation phase"divide-and-conquer".

Interface Design

This stage deals with the design of the interface in which the author is planning for what can be incorporated in the teaching object. The design can be done by crafting a certain template to be used for all future implementations. The interface may include adding control and action buttons that can be usedfor navigation and transitions. This stage may also comprise selecting proper colors and background to be used and unified in the overall design.

Figure 2 illustrates an example of designing an interface. It depicts a crafted interface of a teaching object for the programming control structure: "if/else selection structure" (see0 for more detail).
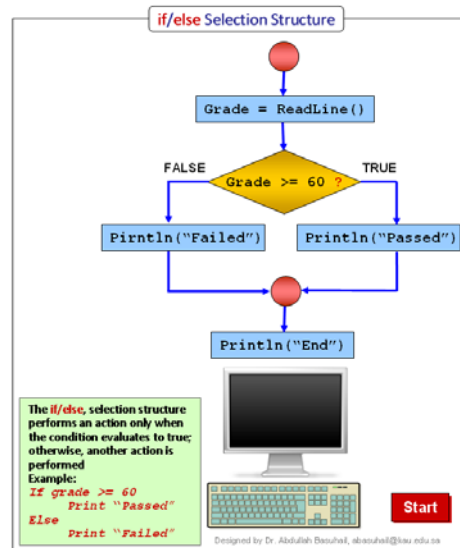

Figure 2- Teaching objectof the if--else programming structure.

The control buttons are incorporated to help the instructor and the user to navigate through the topic and to proceed through animation transitions. In the exhibit of Figure 2, a button labeled "Start" is used to start-up the animation of this teaching object. A hidden button labeled "Next" will appear at the start of the animation transitions. This

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button is used to facilitate and direct navigation and proceeding through the animation transitions and stages of the teaching object.

Adding Graphics and Images

This stage in the development deals with selecting and adding proper topic related graphics and images. Ready-made graphics collected from outside resources such as web-sites(e.g. see 0 and 0) can be used for faster implementations. Images and drawings can also be compiled by the developers and the authors using proper electronic tools and/or computer software.

It is recommended to use simple, straightforward, and meaningful drawings and images. An overwhelmed teaching object with such itemsmight confuse the users and learners.

Figure 2comprises graphics and images related to the teaching topic. For example, in this exhibit, the keyboard image stands for the input from the user and the monitor image is used to display the output to the user.As a second example for incorporating images in a teaching object, Figure 3 depicts a teaching object for the programming structure: "for repetition structure"(see 0 for more detail). Here, the exhibit shows the use of an integrated circuit chip (IC) that represents the counter as it mimicsa register or memory location inside the processor. It is used for displaying the content of the variable counter as it is changing inside the for-loop structure. By using such image, the user perceives the idea of connecting a used variable in the program code a to temporary memory location inside the computer hardware.
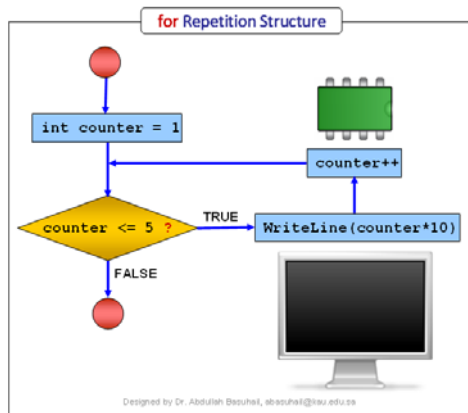

Figure 3- Teaching object of the for programming structure.

Text Entry

In this stage, the author is advised to add topic-related: text, captions and/or instructions to the design which make the teaching object more significant and well understandable without a facilitator. A well designed and self-explained teaching object could be used as an independent learning object by the learners. Figure 1illustrates the use of textbox that briefs the topic matter.

Animation Cascading

The animation cascading stage is the most important phase.It might take the longest time andeffort during the entire design process. Compiling-up animationsover the different graphical and textual componentsof the object is performed in this stage.This is done by applying transitions driven by the teaching topic under consideration. The available assorted animations must be selected carefully to reflect and mimicthe intended teaching topic in the mind of the instructor and according to the mechanism of the topic under consideration. In a presentation-based animation such as PowerPoint software package,a variety of animation effects can be selected from. Specifically, "Entrance", "Emphasis", Exit, and "Motion paths" animation categories with multipleeffects under each category

with are available and can be selected from and cascaded overdifferent components of a teaching object. Moreover, animation transitionsand proceeding can becontrolled by mouse clicks, timings, or by linking them to navigation or action buttons using triggers. This task can beperformed according to the need of the instructor and/or be steered by the topic matter.

Integration

In this stage, the designed teaching object is integrated with the related topic. It might also be integrated for functioning with probably other teaching objects. The object can also be integrated in a presentation for use during class sessions by instructor or for distribution to learners. The proper and order of functioning must be respected to overcome any confusion that may result from this stage.

Testing

The last stage is the testing stage. The author might end up with a relative complex teaching object that includes drawings, images, textboxes, captions, etc, superimposed with assorted cascaded animation affects and timings. These blended ingredients requirethoroughly testing before official use or delivery.

Testing must take place as an incremental testing module during all the design stages and steps of a teaching object. It must also be conducted as an integral testing module at the end of the entire design process.

After completing the implementation cycle, the stages are to be revisited for future modifications and enhancements. This revision guarantees integrity of the content and proper functioning of the final .working product.

Outcomes

All of the computer programming languages include different programming structures which are the main ingredients used for implementing computer programming systems that can be used to solve problems by the means of computers (see 0 for more detail).

The designing technique demonstrated in this paper was used to implement teaching objects for all the programming structures. That's include but not limited to: if-selection structure, if-else selection structure, nested-if structure, while structure, do-while structure, and for repetition structure.

The implementation period spanned over one academic semester. Modifications and improvements were made to the design of each structure based on the in-class teaching use and observations and also based on student feedbacks.

The developed structures were used during the in-class teaching sessions. Figure 4 illustrates an in-action teaching object of the "If /else" programming structure. As can be noticed from the figure, the instructor steered the teaching object using the action button "Next". The colors of the arrows changed dynamically to reflect the flow of control in the structure which is a consequence of the input value from the input device. Any output from the structure is directed to the monitor as shown in the figure.In order to assist the instructor and the students in following-up with the execution cycle, the place of execution in the structure was flashing during the use and teaching of this structure. This was reflecting the mechanism of operation of the structure and to keep track with the order and the flow of the operation.

The teaching object for this programming structure was very helpful and informative to the students and aided them for better understanding of the topic.

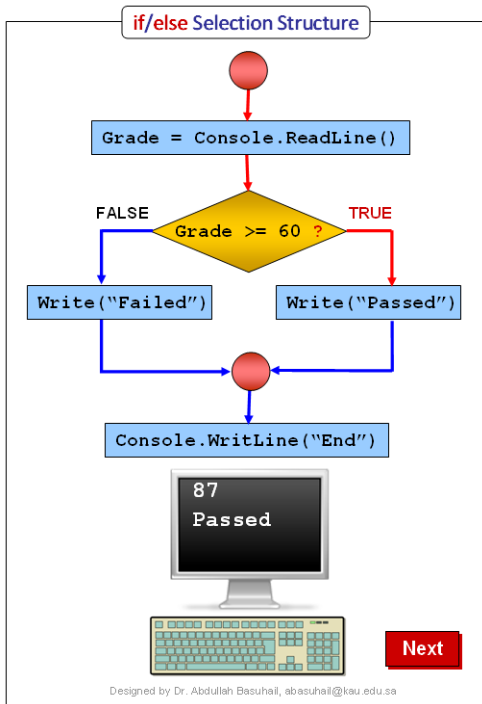# Modern Technologies in University Teaching

Figure 4- In-action teaching object of the If /else programming structure.

Figure 5 illustrates a second example for a teaching object of the "for" programming structure in-action.
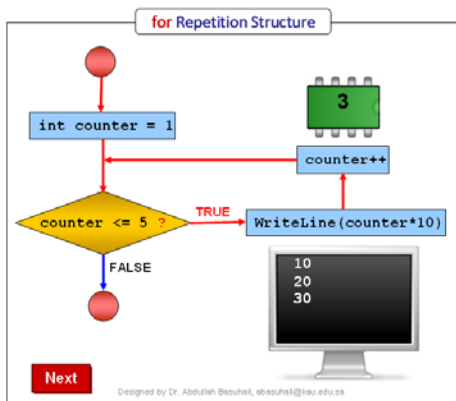

Figure 5- In-action teaching object of the for programming structure.

It can be noticed from this figure that the flow of control reflected the idea of the loop. In-class dynamic animation was demonstrated to the students. The students perceived the ideas of looping and repetition, the flow of control, and the change of memory contents during the execution of the structure.

The other programming structures were demonstrated to the students in a similar fashion and according to their respected way of functioning and operation.

Evidence and proof of success and effectiveness

We used the developed teaching objects for the programming structures and shared them among our colleagues and students during several academic semesters.

Students reported some advantages of using the teaching objects in teaching the programming structures. As students mentioned, "animations helped them to visualize the concepts and processes of programming structures by representing the subject matter in a more visualized manner." It demonstrated the process, and facilitated the connection between the subject components. Some students commented that it is much easy to visualize the concept, to understand it, and to remember itin this way.

Another advantage of using the teaching objects is that students have the chance to use the animations to work with and manipulate in their own time, and to run the animation over and over as much as they need.From our observations and comments of other instructors involved in the use of the implemented teaching objects, students showed better and faster understanding and increasingly participation in the topics covered using the early mentioned experience.

The instructors who used the compiled teaching objects in their classes were very enthusiastic and expressed their satisfaction and appreciation with this way of teaching.

Some commented that it gave them an opportunity to gain insight into students teaching process and saved times during teaching the related topic matters compared to the traditional ways. That time was exploited in education by giving them more time that they could spend for extra course activities and discussions.Some instructors expressed their wish to apply the model of presentation-based animations on other topicsas well.

The experience presented in this paper was presentedin several higher education colleges to staff members in quite a few workshops.Several related workshops were also presented by the author (for more detail, see appendix: [1]-[9]). Most of the attendants were highlyinteracting during the sessions and they expressed their appreciation and welling to developeducational material using the specified technique.

The experience was shared with other instructors which attracted their attentions and they declared its effectiveness Furthermore, the experience of teaching objects was applied in other courses as well

Recommendations

This paper demonstrated the implementation and use of presentation-based animations and computer graphics practices and experiences that were adopted during the teaching and delivering of the basic computer programming structures, elements, and techniques in undergraduate university-level computer programming courses for several years. Specifically, electronic contents for topic matters were developed. The implementede-contents are considered as teaching objects for the topics under consideration. The teaching objects are characterized by the simplicity and rapidness of implementation. Other features include attractiveness, easiness of use and manipulation. Teaching objects play a role of hands-on experience for the learners and the trainees. Moreover, when using the

developed learning objects by the mentioned scheme, there is no need for external software, plug-ins, or any add-in modules. The learning objects that were developed here are also characterized by the possibility of reusability and integration into e-learning environments. The approaches and techniques were applied in our courses and trainings could be as well, implemented in other fields and disciplines of science and technology.

As a conclusion, it is recommended to use the methodology explained in this paper to develop teaching objects. It is also recommended to encourage the instructors in the higher education colleges and institutions to get benefit of the approaches discussed here to implement teaching objects due to their effectiveness, rapidness of the development, and effort, time, and cost reductions. Another recommendation is to raise awareness among faculty staff members for the importance of the use of electronic educational materials and teaching objects developed using the mentioned techniques and encouraging such trends. It is recommended to hold short-courses, practical sessions and workshops for educating faculty staff members about the production of educational materials and teaching objects using simple and attainable tools and building upon their cumulative experiences. This approach will be more attractive to their desires and it will be more productive; time-wise. Finally, it is recommended that instructors share their developed teaching objects with colleagues in other institutions. This kind of sharing opens the floor for exchanging ideas and enhancing and enriching teaching process.

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