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## Editorial

# Academic journals – an alternative business model

Donald G. Perrin

The concept of an academy dates back to Plato in 385BC. His school of philosophy was located at the town of Athena (named after the goddess of wisdom). Scholarly journals are usually periodicals that serve as a repository and communication medium for scholars to share, access and discuss articles on theory, research, policies, and practice in a specific discipline. The first academic journals were initiated in the 1660's. Refereed or peer-reviewed journals appeared about seventy years later.

Patrick S Portway was sponsor of TELCON, the world's largest event for interactive media and collaborative communication. As President, Publisher and Executive Director of the United States Distance Learning Association, he initiated Ed at a Distance and ED Journal in 1987.

ED (Education at a Distance Journal) is interested in research, studies, and policy frameworks and analysis in the areas of electronically mediated distance learning and teaching, curriculum design, distance learning technology, administration of distance education, and related policy and institutional change.

In January of 1995, Dr. Elizabeth Perrin was appointed as USDLA Publications Editor. Toward the end of the century publication cost became a major concern. For a short time the printed journal was available on the WorldWideWeb. In the new millennium it became a web only publication. It was discontinued in March of 2003 and replaced by a quarterly magazine behind the USDLA membership paywall.

The editors of the now defunct USDLA journal continued to receive articles for publication and requested permission from authors to publish their articles in the new refereed International Journal of Instructional Technology and Distance Learning (IJITDL). It was published monthly from January 2004. through March of 2018 and went into hiatus for over a year as a result of ill health and death of several key personnel. IJITDL is now revived as a quarterly journal and should be up-to-date with its publication by June 1 of 2019. It will remain as one of very few free and open access journals in instructional technology and open and distance learning. It is seeking additional reviewers, editors, copy writers, and web-publishing staff.

The IJITDL journal serves a primary audience approaching 50,000 views each month. Many organizations share the journal for internal distribution on their servers, and the .PDF file of each monthly issue is easily copied and shared. As a result, the actual number of readers is not known. It should also be noted that the journal has a wide international readership and it has published articles from over 30 different countries.

Social media totally changed the landscape for academic communications, but the selection, retention, tenure and promotion of faculty is still based on publication in refereed journals. Loss of funding closed many free publications, while the paywalls of traditional academic journal publishing companies greatly limited access to these publications. The result is a lot of bogus publications and fraud. In addition, there is real concern that even the best peer review systems are less than perfect, creating additional work for authors, review committees, and journal editors who now receive frequent requests for information about their peer review procedures.

Perhaps it is time to change the system to meet 21<sup>st</sup> century needs. This might incorporate interactive aspects of social media such as blogs and video conferences to enable designated readers, reviewers and authors to collaboratively analyze, interact, and discuss papers that meet submission criteria. A scoring system would determine which publications were retained on the web page, published after minor modifications, or rejected. A video of the meeting could be available for review committees to authenticate publication criteria and referee decisions. It would also be possible for editors and staff to meet with groups of authors to discuss criteria and procedures that would reduce rejection rates and accelerate publication.

It takes approximately 120 volunteer hours from receipt to web for a journal involving 5 or 6 articles. The new quarterly format will take at least 180 hours. In the past there has been a lack of communications with authors regarding acceptance and publication dates. A computer application is necessary to facilitate tracking by authors, reviewers, editors, and publication staff. IJITDL needs young members with energy and new ideas to become the new volunteers, add new technologies, and avoid future delays in publication.

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**Editor's Note:** Email is an excellent feedback mechanism for student inquiries, student concerns, and for student responses to lesson materials. This exploratory study finds some significant difference in response patterns for male and female students.

## **Interaction behaviour of the students with the teachers in E-mail mediated communication**

**Sunil Kumar and M K Salooja**  
**India**

### **Abstract**

The Open and Distance Learning (ODL) system is mediated through technology and is witnessing transformation. The effectiveness of teaching under the ODL depends on potential and capacity of the mediating technology. The advents of Information and Communication Technology (ICT) have brought vivid changes in delivery of teaching-learning through the ODL mode. The E-mail messages facilitate asynchronous communication between the students and the teachers for individualized support. It easily fits in daily work schedule of the students and the teachers. The teachers have been using e-mail mode for mass mailing to communicate same information to all the students. The use of E-mail messages has brought academic, cultural and procedural changes under the ODL system.

This is an exploratory study, based on review of e-mail messages exchanged between the students and the teachers over a period of fifteen months, to understand potential of e-mail in facilitating academic, personal and administrative communication under the ODL system. Quantitative and qualitative techniques have been applied in examining the messages exchanged between the students and the teachers. The study reveals that students have used e-mail messages to have social interaction and resolve administrative problems apart from having academic interaction with teachers. It was observed that the female students wrote lengthier e-mail messages and wrote more formal messages, as compared to the male students, while addressing to their teachers. It also confirms that the activity takes significant time of the teachers, and quick response to the learners improves their retention and fellow feeling for the University. The outcome of this study will guide in instrumenting e-mails mode in meeting pedagogical, social and administrative requirements of students. Geographically dispersed students and teachers are better connected with appropriate usage of e-mail messages.

**Keywords:** distance education, open learning, student-teacher interaction, content analysis, email, academic interaction, social interaction, asynchronous communication.

### **Introduction**

Academic programmes delivered through the Open and Distance Learning (ODL) mode are no longer confined to self-paced learning style mediated through printed Self-Learning Instructional Materials. The other interventions introduced by the ODL include - periodic feedback on studies, assignments and frequent student-to-student and student-to-teacher interaction to obviate transactional gap between the student and the teachers (Moore, 1993). Clark and Feldon (2005) acknowledged the importance of interactions between the teacher and the students in improving retention of students in the programme. Salmon, 2005; Gonzales and Sujo de Montes (2001) slammed the effectiveness of Information Communication Technology (ICT) in improving interactivity and feedback mechanism of the ODL system. The Computer Mediated Communication (CMC) has been instrumental in delivery of instructional resources, improving interactivity between the students and the teachers, and inducing peer group support among students. Crystal (2001) asserted that computer mediated language is the fourth and the latest medium of communication developed in the history of the human race. It is the responsibility of

educators to examine these claims and understand the proper usage of various tools of ICT in delivery of education.

Online learning mode has emerged as a result of applications of the CMC in delivery of education. Richardson and Swan (2003) defined the online learning as a virtual class that delivers courses, information and facilitates interaction mediated through internet, without physical presence of instructors or other students. The effectiveness of the online learning mode in continuing education has convinced educators to consider it as an integral part of everyday teaching at University level education (Erika and Anne, 2008). Online learning offers numerous instruments to facilitate interaction between geographically dispersed teachers and students. Institutions have been using e-mail, discussion forum, chat and web conferencing to improve social and academic interactivity and extended peer group discussions among isolated students (Chanmin Kim, 2008). E-mail, out of these instruments has become the prime instrument for interaction among students and teachers, under the ODL mode (Stefan Hrastinspi, 2008; 'O' Neill and Colley, 2006). The students and teachers can use e-mail mode with minimal training and as per their convenience. Dean Sittig (2003) termed e-mail as the first killer application of the Internet. O'Neill and Colley (2006) noticed that e-mail mediated interaction between the students and the teachers had expanded beyond instructional supports as it was being used for contact between the students and the staff, and resolve administrative issues. Isbell and Cote (2009) suggested that sending of personalized e-mail messages for expressing concern to struggling students and offering additional instructional, supports could lead to improvement in their performance.

The inclusion of e-mail mediated learning by higher education institutes has encouraged e-mail solutions providers to offer their services either free of cost or at economical rates to higher education institutions to enhance interactivity between teachers and students and facilitate peer group activities. These organizations have grabbed this opportunity to promote their products among young generation by making them habitual of using their products. For examples, the Mirapoint has been offering e-mail solution at very low cost to more than 200 academic institutions around the world. Similarly, Gmail, Hotmail and other popular e-mail service providers have been offering e-mail messages solutions to higher education institutions at low cost. E-mail services at the Indira Gandhi National Open University are being managed by the Google Corporation.

This paper deliberates on pedagogical, social and administrative relevance of e-mail mediated interaction between the students and the teachers under the ODL mode. The nature and volume of e-mail mediated interaction between the teachers and the students reflect on pedagogical relevance and acceptability of the e-mail mode as an instrument for interaction. The content analysis of messages exchanged between the students and the teachers helps in understanding students' perceptions and experiences with e-mails.

## Literature review

The conventional distance education system involves learning in an environment, where students and teachers are separated in terms of distance and time (Keegan, 1990). A major component of the research literature on the ODL system is devoted to understand and obviate these transactional gaps (Moore 1989 and Bates 2005).

Wagschal (1998) claimed that online technology induced dynamic force in the distance education by providing a new and interactive mean to overcome the transactional gap between teachers and students. Harworth (1999) appreciated the e-mail mediated communication, under the ODL, in obviating the transactional gap between teachers and students. E-mail is one of the prime means of interaction under the ODL system due to its easy operation, anytime use, easy to fit in daily schedule and quick transmission of messages. (O'Neill and Colley 2006; Madeline, Ricky, Tracy,



Grady and Emil 2005; Vitalicy, 2008; Naney and Chaohua, 2007; Jane Sunderland, 2002; Waldeck, Patricia and Timothy, 2001; Yu and Yu, 2002). Waldeck, Patricia and Timothy (2001) applauded e-mail mediated interaction between teachers and students as an efficient, economical and frequently used communication channel. Moran and Hawisher (1998) claimed that e-mail's speedy transmission of messages and resultant rhythms of response provided a sense of immediacy.

Clingerman and Bernard (2004); Atamian and DeMerville (1998) reported improvement in intimacy between the students and the teachers, when interaction was mediated through email. E-mail mediated messages are more personal and individual (Ng, 2001; White, 2000; Waldeck, Patricia and Timothy 2001). Tali Heiman (2008) perceived that e-mail from teachers improved the sense of belongingness among students. Yu and Yu (2002) conceived that frequent exchange of messages from the teachers to the students through the e-mail mode improved the perceptions among students towards online learning and contributed for the betterment of relationship between the students and the teachers. However, Woods (2002) failed to notice this association in frequency of exchange of messages between the students and the teachers mediated through e-mail and favourable perception of students toward student-teacher relationship.

D'Souza (1992) emphasized that e-mail mode created a non-threatening two-way communication link between the students and the teachers, and enhanced students' ability to express more freely to teachers. Catherine and Diane (2003) noted that students had better control over interaction, when it was mediated through e-mail. Yu and Yu (2002) claimed that e-mail mediated interaction between the students and the teachers contributed in the cognitive growth of students and construction of the online society.

Laurillard (2002) envisaged change in roles of teachers under the online learning environment. One of the prime responsibilities of teachers, as identified by her, was to extend academic and personal supports to students through e-mail. Robert, Lynne and James (2005) further précised her concept by stating that teachers used e-mail mainly to make announcement, clarify doubts related to course materials, invite students for interaction, convey status of students' performances, supervise learning activities and build social relationship. Similarly, they noted that students sent e-mail to teachers mainly for course related issues i.e. seeking clarification on doubts related to instructional resources, tips to solve assignment exercises, request for appointment, excuses for the delay in submission of replies for assignments, express concern over low grade, contest the grade or request to send grade status. Grunberg and Armellini (2004) appreciated potential of applications of e-mails in sharing professional resources and information. Waldeck, Patricia and Tomothy (2001) found that students sent e-mail to teachers for three main reasons i.e. for procedural clarification; efficiency of communication; personal and social causes.

Jane Sunderland (2002) categorized e-mail messages from the students to the teachers, under the distance education mode, into three broad categories to explain purposes of sending mails to teachers, i.e. 'telling about', 'asking for' and 'other' categories. The messages under the 'telling about' category were about informing progress, plan for research, usages of e-mail itself and expressing feelings. The messages under the 'asking for' category included seeking advice on coursework, thesis, other learning events; requesting an extension of time for submission of assignments; upgrading profile; confirmation or permission from teachers. The messages under the 'other' category included a range of social interaction; thanking; apologizing; expressing good wishes; inviting, suggesting and other topics not directly related to the studies. Ferguson (2010) identified major reasons encouraging students to interact with teachers were to share thoughts and views; access tutors; avoid isolation; ask for supports; tips for solving assignments; seek up-to-date information and peer group support. O'Neill and Colley (2006) has also reported potential issues such as suggestions to solve assignments, arrangement for meetings, provision of feedback on work and advice on submission of works to those, who could not submit on time. Offir, Ingrid,

Joseph and Arkady (2005) categorized students-teachers interactions under distance education into five categories, i.e. social, procedural, expository, explanatory and cognitive interactions. Thus, the research literature affirms the competency and capabilities of e-mail in mediating interaction between the students and the teachers for developing professional attitude apart from mediating cognitive, social and personal interactions.

The research literature acknowledges the role of e-mail in sending individualized messages to each student as well as same message to all the students of a batch through the mass mail system. Joshi and Saxena (2005) acknowledged the effectiveness of e-mail supported mass-mail in sending reminders and advices to students under the distance learning system, in Indian context. Visser (1998) recommended for mass mailing to avoid wastage of time involved in writing and delivering individualized messages. Huett, Kalinowski, Moller and Huett (2008) claimed that mass mails contributed in improving the retention rate. Visser, Plomp, Arimault and Kuiper (2002) noted no difference in the motivation of groups of students, who were sent mass mails versus other group, in which the personalized messages were sent to the learners. They recommended using mass mails instead of writing individual mails to students, as later approach consumes lot of teachers' time.

The researchers have cautioned that e-mail based academic supports require careful planning. The *ad hoc* inclusion of e-mail would result in more negative than positive ones. Teachers should not be swayed by marketing hypes of Learning Management System (LMS) solution providers. Salmon (2000) noted low effectiveness of web mediated academic interaction. Alexander, Zhao and Underwood (2002) found that half of the e-mail messages had course related information and this medium was mainly used in delivering of assignment activity rather encouraging collaboration and discussion among students. Card and Horton (2000) observed that students cited more literature and incorporated other works rather their own experiences in answering assignment exercises submitted through e-mails. Madeline, Ricky, Tracy, Grady and Emil (2005) noted that e-mail mediated interaction between teachers and students suffered from long delay in response from teachers and this delay leads to escalation in anxiety among students.

Some researchers have expressed balanced opinions about the effectiveness of e-mail mediated interaction between students and teachers. Robert, Lynne and James (2005) highlighted positive and negative consequences of e-mail mediated interaction between the students and the teachers. The positive consequences as noted by them included close acquaintance with students, encourage students to face interaction and improve teaching. The negative consequences were poor performance of the students in assignment exercises, relationship between the teachers and the students did not improve and fewer face-to-face interactions between students and teachers. The extent of positive and negative impacts relies on appropriateness of blending of e-mail in delivery of learning.

Alvarez (2005) emphasized that the interaction under the online learning was conceptually very strong; however the online learning was not practically perfect yet. Chain Min Kim (2008) made an appeal to the researchers to investigate e-mail mediated interaction between students and teachers to make perfect embedding of it in specific learning context. Mishra (2008) emphasized on exploring what really works and what does not under the web based learning environment in Indian higher education scenario. Thus, there is need for systematic research to understand academic relevance of e-mail mediated communication in distance education (Duran, Kelly and Keaten, 2005). This study attempts to bridge the gap in pragmatic and conceptual understanding about the potential of e-mail mediated interaction between students and teachers under the ODL system.

## Context and background

Indira Gandhi National Open University (IGNOU) is an apex institution under the ODL system in India, known for instrumenting innovative technology in delivery of education through the distance mode. IGNOU is the first Open University in India having applied pedagogical aspects of the web technology extensively. IGNOU introduced three academic programmes under the web based learning environment in July, 1998. Since then the University has been using web in extending academic and administrative supports to students. In early stage, the inclusion of web was discrete and confined to delivery of specific learning events, mainly in professional and advanced levels education. Later, the scope of web based delivery was expanded; now it is being used in delivery of the entire programme over the web. The University classified these programmes as online programmes. IGNOU was offering 18 academic programmes in the year 2010 at Research, Masters, Bachelors, Diplomas and Certificates and appreciation levels in different disciplines through the online mode. The implementation of the online mode at the University is evolutionary rather based on any prescribed policy.

The Post-Graduate Diploma in Food Safety and Quality Management (PGDFSQM) is one of online programmes of the University with a minimum duration of one year for successful completion is selected for this study, as it is a popular online programme, having good enrollment. The programme was being offered through SAFE (Safe and Assured Food E-Learning) platform [www.ignouonline.ac.in/safe](http://www.ignouonline.ac.in/safe). This programme aims at imparting professional skills in food safety and quality management. This programme was launched in the January, 2009, and since then admission is being offered annually in the programme.

This programme is also simultaneously offered through traditional ODL mode, therefore curriculum structures, assessment of students' performance and delivery style under the online version are over-shadowed by traditional academic structure and delivery styles being practiced by the University under the ODL mode. The delivery mechanism under the online version of the programme differs slightly from that of traditional ODL system. The delivery under the online mode is enriched with inclusion of web based support, in delivery of instructional materials, counselling, formative assessment (assignments) feedback, individual support and peer group discussion. Assignments are communicated through e-mail and instruction materials in the digital form and assignments are made available on the web site of the programme as downloads, however, access to these resources over the web is restricted to the students registered for the online mode. A discussion forum and chat tools are instrumented on the programme web-site for peer group discussion among students registered for the online mode.

An Induction programme of two hours duration is held for students at the starting of the academic calendar to make them familiar with learning styles and ethos desired under the online mode. The induction programme focuses on imparting self-learning skills, explaining online learning strategy, guidance on project work, schedule and pedagogical relevance of various learning events/activities. The students are encouraged to participate in peer group activities and interact with other students using e-mail, discussion forum and chat tools. The induction programme is crucial for retention of the students, who are new to the ODL based online mode of education. This induction programme is delivered simultaneously through satellite and web to ensure maximum participation of students.

The learning activities in each academic programme, at the University, are managed by the individual teacher, designated as the Programme Coordinator for that programme. The names and e-mail addresses of the Programme Coordinators of all the academic programmes are available on the web site of the University. A number of aspirants for admission approach the Programme Coordinators to seek further details about the academic programmes of their interest. The

investigation of these unsolicited e-mails received from admission seekers, to the Programme Coordinator of the PGDFSQM programme, is one of the objectives of this study.

The Programme Coordinator of the PGDFSQM programme has been using E-mail as one of the instruments in meeting interaction needs of the students, informing schedule of various learning events, delivering of learning resources and monitoring the progress of students. The students approach the Programme Coordinator through e-mail to get individual support on academic, personal and administrative issues.

The Programme Coordinator and administrative staff engaged in delivery of the PGDFSQM programme have been sending e-mail messages to communicate same information to all the students. These messages have been sent to leave written reminders with students about schedule of various learning activities/events, its academic relevance, procedure to participate, prerequisite, if any, for participation in activities referred in the e-mail.

The messages sent to the enrolled learners started with an enthusiastic tone, explaining purpose of sending that message followed by schedule and relevance of the learning events, procedure to participate and academic goals to be achieved through these learning events. These messages encouraged students to participate in learning activities and remain in the main stream of delivery of programme. The last segment of the messages usually ended with enlightening students on alternative ways to approach teachers and administrative staff to get further details about activity referred in the message. Thus messages sent to the learners enrolled are a blend of advice on administrative and academic issues with a dosage of encouragement.

### **Objective of the study**

The student-teacher interaction is a crucial variable in appraising learning and attitudinal outcomes under the ODL system (Offir et al, 2005). Low and Dugmore (2009) emphasized on investigation of e-mail mediated interaction to understand learning experience as discussion threads of e-mail messages are developed over time, thus researcher can avoid the snapshot response, that would be obtained from interview and questionnaire based research instruments.

### **The objectives of the study are:**

- to understand nature of academic and administrative supports sought by students from teachers through e-mail understand the ODL system with progress of study in a batch;
- to identify factors encourage students to write e-mail to teachers;
- to stipulate change in monthly volume of e-mails from students with progress of study in a batch to understand workload on teacher in responding these mails;
- to understand problems faced in delivery of a professional academic programme having practical component with the support of professional laboratories, which are neither involved in teaching nor employed teachers; and
- to understand gender difference in way of addressing to teacher through e-mail.

### **The hypotheses addressed in this paper are:**

There is no difference in lengths of messages (number of words) posted, through e-mail, by the male and female students to the teachers, and

There is no difference in ways of addressing to the teachers in messages posted through e-mail, by the male and female students.

## Methodology

This study is designed as preliminary exploratory survey, based on the secondary data, to understand interaction pattern cultivated over a long period between the students and the teachers.

The interaction through e-mail grows naturally rather being driven by researchers or stakeholders with specific purposes for conducting research. Low and Dugmore (2009) recommended for the content analysis of messages exchanged between target groups to understand evolution in interaction behaviour over the time. The source of data for the study is based on messages exchanged through e-mail mode between prospective/enrolled students and the Programme Coordinator from December, 2009 to February, 2014.

This time-frame covered an entire cycle of the programme, which was initiated with enrollment of students and concluded with award of diploma to the successful students. The long timeframe for the collection of messages ensures extensive coverage of key issues emerged at various stages of programme. Qualitative and quantitative research techniques have been applied for analysis of data.

Jeong (2003) and Hou, Chang and Sung (2009) advocated for the quantitative analysis of messages exchanged between students and teachers to understand the discussion behaviour. Joshi and Saxena (2005) used quantitative technique to analyze e-mail messages exchanged between students and teachers under the ODL system in Indian scenario to understand interaction pattern and profile of students, who preferred to communicate with their teacher through e-mail. Yoo and Alive (2002) recommended for the quantitative analysis of the messages in terms of number of messages and length of messages. The quantitative analysis has been performed to understand behaviour and pattern in students-teacher interaction mediated through e-mail in terms of countable merits such as average length (no of words) of messages and numbers of messages posted by the male and female students; average response time to students' queries and numbers of messages posted by students in each month to stipulate change in workload on teachers in replying to these e-mails.

The qualitative analysis of messages is based on the content analysis research technique. The content analysis helps in categorization of messages to identify major issues under the student-teacher interaction. Hsieh and Shannon (2005); and Seale (2003) acknowledged the relevance of the content analysis research methodology in understanding views of stakeholders. De Wever, Schellens, Valcke and Van Keer (2006); and Stubbs and Delamont (1986) also recommended for content analysis and systematic categorization of messages exchanged between the students and the teachers to understand experience and prime requirements of students.

Gunawardena, Lowe and Anderson (1997) further elaborated procedure for content analysis and advised researchers to treat single message as an independent entity for analysis, while conducting content analysis of messages. Thus an individual message exchanged between students and Programme Coordinator through e-mail is treated as a single independent entity for the qualitative investigation in this study. This approach facilitates unitizing, though may not account for a variety of elements within a multi issues in a single message.

The content analysis is based on meaning of content of messages rather on the ways contents are structured and language style of messages. The e-mail messages from the students were classified in mutually exclusive categories. Each message is placed exclusively in single category, depending on major issues covered in that mail. The content analysis of the texts of messages probed the dynamic context, which encouraged the students to approach teacher through e-mail. This research approach explores in detail gap between expectations of students and its realization under the online education mode. The content analysis also reflects on frequency and nature of academic, administrative and personal issues disturbing studies.

The inferential statistics techniques are applied to understand gender differences in writing e-mails to teachers. The gender of students is treated as independent parameter, and way of addressing to teacher is treated as dependent parameter for statistical investigation.

### **Content analysis approach**

Despite sincere efforts, the authors of this paper did not come across any published research work reporting utilization and effectiveness of e-mail mediated interaction between the students and the teachers on the basis of content analysis under the ODL system in India. Therefore, content analysis of e-mail messages was conducted into two stages. The inductive research approach was adapted for the content analysis in the first stage, due to lack of relevant research evidences and guidance on classification of messages. The inductive content analysis approach investigates relevance of various factors actuating students-teacher interaction through e-mail, as being highlighted in the research literature. In the current study, 20% of the messages archived in each month in the period of investigation were selected through random sampling approach, in the first phase of analysis for inductive content analysis. The outcomes of the inductive content analysis approach included identification of the major factors that encouraged interaction between the students and the teachers in the current scenario. The categories evolved in the first phase were used to device an instrument for content analysis at the second phase of the study for the classification of messages exchanged between the students and the teachers. Thus, the instrument applied for categorization of messages at the second phase of the content analysis is a true representative of the research literature and the context under investigation.

Two experts performed the coding and classification of the messages independently during the second phase of the content analysis. These experts were briefed by the researchers about the objectives and methodology of the study, prior to their involvement in categorization of messages. The Cohen Kappa score of the inter-rater agreements of coding of messages was 0.81. Researchers deliberated with the experts on messages, which were placed in different categories by them, to minimize their differences in classification. The experts achieved consensus on coding of some of disagreed cases. The Cohen Kappa score of the inter-rater agreements reliability raised to 0.87 after resolving the conflicts; rest of the messages, which were still coded in different categories by experts, were dropped from the analysis. The Cohen Kappa score of inter-rater agreement is high due to pooling of high percentage of messages in few categories; definition and coverage of each category was highly specific, and this left little chances with the individual coder to place the same message in different category. Thus, inductive content analysis and review of research literature at the first phase was successful in designing a highly reliable instrument for classification of messages for the second phase of the content analysis.

### **Demography of students**

The study analyzed e-mail messages received by the Programme Coordinator of the PGDFSQM programme from the students enrolled in January, 2010 academic cycle and admission aspirants, during the period of investigation. 250 students were enrolled in the target group of the study, out of which 162 students were male (65%). 182 students were residing in urban areas, 56 in rural areas and one student in tribal area of the country. Six students hailed from abroad. Rural and tribal areas of the country have been still struggling with the digital divide phenomena, thus area of residence is a vital attribute of the students' profile to understand their accessibility and competence in using ICT applications. The age range of participants was from 21 to 38, with median age of 26. The open admission policy of the ODL system caters to the educational needs of the diversified population.

Sixty two per cent (62%) of the students were employed in food industries or allied sectors at the time of admission. Most of the employed students resided in metropolitan cities as food chains or

their employers are concentrated in the cities. The food processing units linked with these food chains outlets are situated in the rural areas in close proximate of cities. These students enjoy ICT friendly environment. The student's demographic profile and job experience may not have direct statistical impact on nature of their participation in e-mail mediated interaction with the teachers. However, these parameters express the level of exposure of the students to the ICT and e-mail mediated communication. The students residing in metropolitan cities and employed in food chain have good exposure to applications of ICT and internet in managing day-to-day life and office.

However, application of web in delivery of education might be new to most of the students irrespective of extent of exposure of e-mail and ICT in their personal and professional life.

## Analysis and discussion

Three hundred forty eight (348) messages were received from the students or aspirants for admission, 321 messages were sent to them from the mailbox of the Programme Coordinator during the period of investigation, i.e. 1st December 2009 to 28th February, 2011. Thus, 769 messages were exchanged between the students and the teachers in the time span of the fifteen months; and the average works out to 51 messages per month. This is an average on the programme coordinator's side, i.e. he reads/replies about 51 messages in a month. The students, who are passive and silent learners, just received messages from the programme coordinator sent through mass-mail; other got individual replies for messages sent by them. 92.1% of messages received from the students were replied by the Programme Coordinator. Some of the messages received in the last two weeks of the period of the investigation were yet to be replied at the time of coding of messages. Some of the messages from students were either appreciation of learning resources/events or expressing thanks/acknowledgment for support received from the Programme Coordinator. Programme Coordinator felt that such messages need no reply from his side. 198 male students and 64 female students approached the Programme Coordinator through e-mail. 75.6% of students, who approached the Programme Coordinator through email, were male students, however; proportional of male students in the batch was 65%. Thus, the participation of the female students in e-mail interaction was less as compared to the male students.

The research literature raises the concern about the time devoted by the teachers in sending individual reply to students' e-mail messages. Bender, Wood and Vredevoogd (2004) claimed that faculty devoted more time on individual student under distance education than time devoted on individual students under face-to-face classroom environment. Zhau, Alexander, Perreault, Waldman and Truell (2009) acknowledged the importance of personalized feedback to students through e-mail under distance education; however they also expressed concern over increase in volume of work of teachers in replying to individual e-mail messages of the students. The Table-1 consolidates the number and nature of messages posted by the students and indicates whether teachers' time is devoted in answering either many e-mail messages from few students or few e-mail messages from large number of students.

Table 1 shows the four male students had sent more than five messages; five students (four males and one female) had sent four to five messages; 29 students (20 males and 9 females) had sent two to three messages and 224 students had sent only one message to the Programme Coordinator. Thus, 84.9% of students who had interacted with the Programme Coordinator through email had sent only one message. Table-1 reflects that the Programme Coordinator devoted most of the time in replying few e-mail messages from large number of students rather replying frequent e-mail messages from few students. Thus, the Programme Coordinator was successful in approaching large number of students through e-mail mode. The teacher's time was effectively utilized in catering needs of a large number of students. The students, who had sent one or two e-mail messages raised specific query in their e-mail.

**Table 1**  
**Number of messages posted by individual student**

Number of messages posted by individual student	Male Students		Female Students		Total
	Number	%	Number	%	
One message	170	76.0	54	24.0	224
Two to three messages	20	71.0	9	29.0	29
Four to Five messages	4	82.4	1	17.6	5
More than 5 messages	4	100.0	0	--	4
Total	198	76.6	64	23.4	262

They did not continue interaction once they got the satisfactory responses for their queries, although the Programme Coordinator was prompt in replying to queries of the students. This finding is against the established belief that the quick response to students' e-mails can persist long interaction. The continuity of interaction relies on purpose of interaction, power relation and intimation between the sender and the receiver. However, prompt replies from institution ensure affiliation between institution and students. The students tend to feel personally attached with the institution and the Programme Coordinator, due to timely action on their concerns. Most of the students had sent only one e-mail message. Thus students were successful in expressing their queries in written form, in the first instance. Similarly, the Programme Coordinators had resolved queries of students in the single instance and thus e-mail mediated interaction between the students and the teacher is on effective and efficient in resolving queries of the students.

The maximum number of e-mail messages from an individual student was nine, which were received from an admission seeker, working in a Gulf country. Later, he joined the programme. Admission seekers and students from abroad approached the Programme Coordinator frequently through e-mail mode as these students either failed to locate nearby Partner institutions (PIs) of the IGNOU, which are engaged for offering academic and administrative support to the international students or admission seekers or could not get adequate information from the existing PIs. The difference in time zones of the students and the Programme Coordinator and expensive international tariff for telephone calls might have encouraged the students residing abroad to use e-mail mode to approach the Programme Coordinator.

### **Factors for sending e-mails to the programme coordinators**

Classification of messages through the content analysis is based on Bales Interaction process Analysis (1950) (IPA). This scheme is extensively used for classification of messages in the closed group interaction. The IPA classifies messages into following categories

- a) social-emotional,
- b) positive reaction,
- c) attempted answers
- d) ask for opinion & suggestion, and
- e) negative reaction.

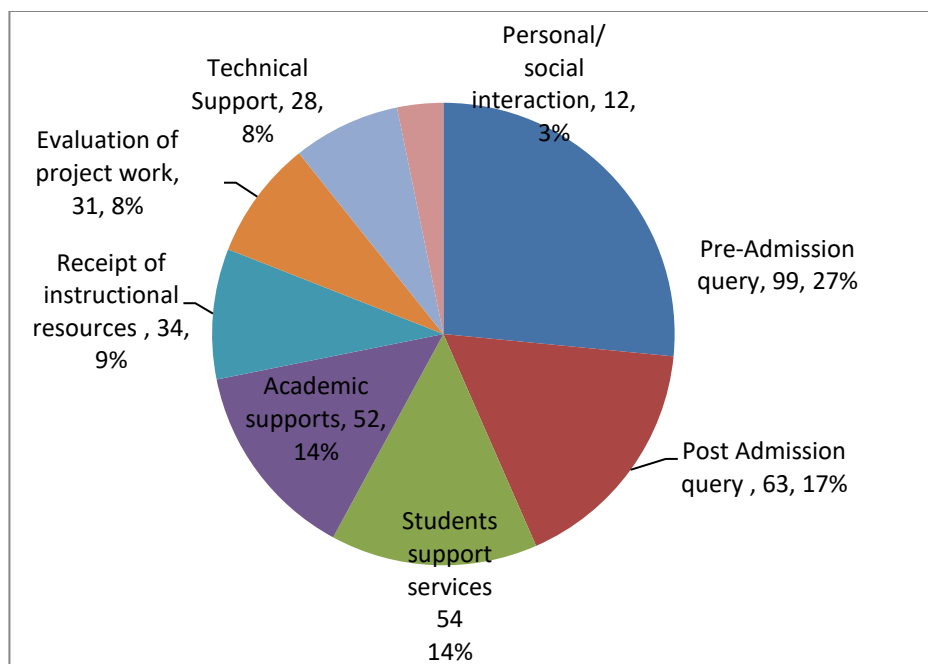
The IPA is revised and adopted for the content analysis during the second phase of the study. The messages were classified into eight categories and each category consisted of several sub-categories.



**Table-2**  
**Classification of messages from the students to the Programme Coordinator**

Category	Issues Covered/Sub-Categories	No. of messages in sub-category	No. of messages in category	% of total messages in each category
Pre-Admission query	Recognition of online mode for advanced study and employment, Eligibility, procedure and schedule for admission, Venue of contact programmes for theory/ practical components, other courses in offer in food safety disciplines, mode of payment of tuition fee for students residing abroad	99	99	26.9
Post Admission query	Delay in confirmation of admission	39	63	16.9
	Seeking clarification on admission procedure after submission of admission form	24		
Receipt of instructional resources	Delay in receipt of instructional materials	21	34	7.2
	Instructional materials is received partial/ wrongly	4		
	Course materials is not uploaded on the web-site	9		
Students support services and delivery of practical component	Permission for taking examination or submitting assignments, when students failed to appear in scheduled examinations/ assignments	6	54	14.5
	Request for Change in venue of practical component	15		
	Query about schedule of practical; counselling and assignment	13		
	University Changed venue for practical without consent of students	3		
	Schedule of Practical component was not adhered by centre result in delay and Clash in schedules of counselling and practical	13		
	Delay in declaration of results of summative assessment (Term-End Exam)	4		
Evaluation of project work	Procedure for submission of synopsis	6	31	8.3
	Seeking guidance on drafting of synopsis and scheduling research plan.	7		
	Seeking help in identifying supervisor and topic for project	7		
	Delay in evaluation of synopsis and project	11		

Category	Issues Covered/Sub-Categories	No. of messages in sub-category	No. of messages in category	% of total messages in each category
Academic supports	Pedagogy of online mode; delivery of practical components through distance	15	52	13.9
	Seeking help in understanding difficult contents of study materials	12		
	Seeking list of reference books and open-source resources for advanced study	8		
	Appreciation or acknowledgement for high quality of course materials, learning activities or other supports	3		
	Suggestions to improve delivery of programme	4		
	Seeking further details on contents delivered through counselling	3		
	Seeking advice for solving assignment exercises	7		
Personal/ social interaction	Share personal problems affecting studies	8	12	3.2
	Students introduce himself/herself to initiate social interaction	4		
Technical Support	Technical assistance to participate in online events.	6	28	7.5
	Password is lost	2		
	Failed to upload documents needed to complete the admission formalities due to format incompatibility	6		
	Layout of contents is distorted or partially visible in specific web-browsers	7		
	Could not update his/her profile on the website	2		
	Contents of the web site are not updated for a long time.	7		
Total			373	100.0



**Figure 1: Classification of messages received by students**

Figure-1 depicts the category-wise messages received. Three hundred seventy three (373) messages were classified into eight categories to summarize factors that encouraged the students to send the e-mail messages to the Programme Coordinator. Each category is further apportioned into sub categories. The maximum number of messages (26.9%) was placed under the pre-admission category. The Admission seekers desired to know about eligibility, procedure and schedule for admission under the online mode, venue for delivery of practical component nearest to their home/work place. The analysis of queries from the admission seekers affirms that student community has numerous doubts and misconceptions about pedagogical relevance of the online delivery mode in the job market and advanced studies. The students raised doubts about the recognition of online delivery mode in job market and its parity with the conventional education system. The students desired to know about delivery mechanism for inducting practical and hand-on-training based learning events under the online mode. Whether these components would be delivered entirely through virtually mode without physical presence at laboratory/field? Poor understanding of pedagogy of the online mode and concerns about recognition of degree in the job market are some of the major discouraging factors for the online mode. The students with such doubts/misconceptions might be compelled to join online mode in absence of viable alternatives to pursue continuing knowledge and skill development in areas of their interests without disturbing professional and personal life. The queries about admission procedure and expressing concerns over delay in conformation of admission were other major factors which encouraged the students to send e-mail messages. The students sought interventions of the Programme Coordinator in resolving the administration problems faced by them in getting enrolled in the programme. The e-mails messages in the first two categories were sent before the commencement of academic activities. 44 % of total messages were sent for these purposes. Muilenburg and Berge (2005) reported that the administrative problems were the most common issues under the online learning environment; they recommended for immediate action on problems faced by the students to retain their interest. The prospective students must be guided about admission procedure through advertisement, web-site and PSCs in pre-admission phase.

Centres delivering practical/counseling support are interface window between the students and the University and offer on the spot support. These Centres are known as Programme Study Centres

(PSCs). Students' e-mail reflected that most of these centres have been underperforming in facilitating students. The PSCs were failed to provide sufficient information about admission procedure and generic details about scope of programme; students were usually recommended to contact the Programme Coordinator even for obtaining minor information. The PSCs did not help the students in identifying supervisor for the project work, advice on selection of topic for the project, research methodology and schedule for conducting project work. PSCs reschedule practical/counseling session as per their convenience result in clash in schedules of practical and interactive video counselling sessions organized by the University. The students were forced to skip either of practical or counseling session although both the activities are integral components of the programme. Some students reported that they missed practical sessions as PSCs arranged these in working days, despite of University advice arranging practical and counseling sessions only on holidays and weekends, to minimize the distribution of students from workplace.

The National Accreditation Board for Testing and Calibration Laboratories (NABL) approved food testing commercial laboratories have been functioning as the PSCs for imparting counseling and practical sessions. Supporting students is not the prime responsibility of the PSCs. Some of these centres had been concentrating only on its core business interests and treat facilitating practical/counseling of students as a mean to generate additional revenue. The students remained at the periphery and could not get adequate support from such PSCs. Staff of PSCs, who were engaged in counselling, were practitioners and were able to demonstrate the practical counseling sessions effectively. However, they had limitation in conducting theory counseling sessions as they were not teachers by profession. The University should strengthen the coordination in various units engaged in delivery of the support services to the students. The University should frequently conduct induction programmes for the staff of PSCs to impart skill and knowledge desired in teacher in the online distance mode. The Programme Coordinator should create a database of experts, who are willing to supervise students in the project work and share this database with the students. The University should carefully identify PSCs, who are really interested in supporting the students.

Muilenburg and Berge (2005) reported that technical snag was one of the main constraints of the online learning mode. The technical problems can cease the online education system when remain unattended for a long. Kedar, Baruch, and Gruvgald (2003) advocated for immediate action on technical problems faced by students otherwise it would have negative impact on student's satisfaction. Carswell and Venkatesh (2002) noted positive association between the students' perception about relevance of technology in education and their performances. 7.5% of messages sought help from the Programme Coordinator to resolve technical problems emerged while surfing the web-site of the programme. The visuals of few frames of web-pages of courseware were not displayed correctly, when browsed in other than Internet Explorer as these frames of the courseware were blocked by the web-browsers due to display and security policies of web browsers or preferences laid for the browser by the students. The induction programme for newly joined students offers necessary guidance to customize preference and security of web-browser for uninterrupted display of courseware. The technical staff of the University involved in providing web support should ensure that contents of web-pages should be displayed correctly on the popular web browsers. The dynamic web frames, which invoke false security threats in some browsers, should be replaced with simplified web frames. The Academic staff should frequently update contents on web-site to foster a sense of aliveness.

Lovelock and Wright (1999) perceived students' complaints as a formal expression of dissatisfaction with any aspect of services offered by the University. About 16% of messages were complaints for poor students' support services. These complaints reflected frustration among students, mainly due to failure of the University in offering services and support as were promised at the time of admission. The delay in action on students' complaints, at University's end, might

propagate negative feeling among student community and it would also discourage prospective students to join the University (Lovelock and Wright, 1999). Singh (1988) noticed that the students desired multiple actions, on their complaints from the University:

- Rectification of the errors, compensation in terms of money and psychology;
- Express dissatisfaction with poor services offered to him/her, seeking immediate intervention of teachers to improve services;
- Complaints to third party for seeking interventions, or
- Negative communication to friends, relative and society.

The administrative problems were frequent but confined to a few domain. The teachers should treat these issues as concern of the entire class rather complaints of individual students. Hence, a copy of solutions to frequently reported problems/complaints encountered by the students should be forwarded to all the students of the batch and also uploaded in Frequently Asked Question (FAQ) section of the web-site. The solutions and guidelines on frequently reported complaints in the FAQ section of the web site are very helpful for students, who are reluctant or hesitate to report problems to the teachers due to lack of intimacy or confidence.

Sometime, the students had used abusive or the threatening language for expressing his/her displeasure with the delivery of programme. The writers of these abusive messages remained hidden under the mask of distance. These students were least concerned that the teacher would have a negative impression about them after reading their abusive mails. The students in classroom situation normally avoid interactions which would damage their relations with the teachers. The students rarely or don't dare to use abusive language in face- to-face learning environment. These students failed to establish personal rapport with teachers and institutions.

The problems relevant to the PSCs in the first instance were sent to the Programme Coordinator instead of making an appeal to the concerned PSCs to take corrective measures. The Programme Coordinator forwarded such messages to the concerned PSCs to initiate corrective measures on the complaint. The problems directly related with PSCs could have been resolved easily and in short time, if the students would have approached the PSCs directly. The reporting of complaints to higher authority, which needs to be reported to the PSCs, reflects either students were not aware of complaint redressal mechanism or deliberately they approached higher authority to cut short the grievance redressal mechanism. The Programme Guide covers many of these aspects and should be well covered. The students should be advised on whom to contact to resolve specific kinds of problems, during the induction programme.

Fourteen percent (14%) of the messages sought academic support from the Programme Coordinator. The major academic support sought by the students were help in understating specific contents of the study materials, references for further study, tips for solving assignment exercises, selection of appropriate topic for the project, guidance on layout and structure of synopsis, project research methodology and schedule of the project work. The students sought academic support from the Programme Coordinator, only when they had failed to get adequate support from the PSCs, i.e. very few students approached the programmes coordinator for academic support. Thus, exchange of e-mail messages between students and teacher on academic issues made substantial contribution in cognitive development of students, especially when PSCs failed to deliver requisite academic support.

About 64% of the admission seekers were employed in food processing industries or allied sectors. The employed admission seekers usually faced frequent transfer in place of work as outlets of food-chains and food processing industries are spread widely. These students reported that they could not join the courses being offered through the conventional mode due to round the clock

inevitable commitments at work and frequent transfer at the workplace. IGNOU's students support network is spread across the country so that the employed students can continue their studies despite of frequent transfers from one place of work to another place of work. The Practical and Theory counseling sessions are held during weekends so that student can attend these sessions with minimal interruptions in job/home responsibilities. The students just need computer and internet connectivity to participate in the learning events offered through web. These factors encouraged employed admission seekers to join the programme and realize their dreams. A few of these admission seekers did not have any formal academic qualification in food and nutrition discipline; however, they gained basic knowledge in the discipline while working in this sector. These students desired to know whether knowledge gained through work experience would be sufficient to get enrolled in the programme. Thus, online mode and open admission policy of the University are successful in meeting academic needs of the diversified group of learners.

The eligibility criteria for admission should be more flexible so that admission seekers without formal education in relevant discipline, but having gained knowledge by working in the field can also join the programme and have bright growth in their career after acquiring formal qualification in the food processing sector. 15% of admission seekers were pursuing other courses, while making query for admission. Such students were in the final semester of their studies and wanted to continue advanced study either after completion of current course or pursue both the programmes, simultaneously.

Few admission queries were raised by relatives or friends of the admission seekers. Most of these admission seekers were extremely busy with responsibilities at home/work-place and their well-wishers were concerned about their professional growth. The findings of the study suggest that social interaction with teacher was another driving force for sending e-mail messages to teachers. Thus, e-mail media contributed in shrinking the social transactional gap between the teachers and the students. It is one of the major concerns of the ODL system. The social interaction induces feeling of belongingness among students with institution and teachers and improves retention of students in courses offered through ODL mode (Kember, 1995).

### **Time taken in replying messages**

The time lag between sending a message and getting back its reply through an instrument inevitable affects uses of that instrument in facilitating interaction. The interaction instrument becomes live and sensitive with short time lag between sending a message and getting its response. In a study to understand impact of response time on performance of students, Northrup (2002) calibrated teacher's responses on time to student's e-mail messages as the second most rated interactive indicators. Long time lag between sending a message and getting its reply diminishes chances of realizing a truly connective discourse (Hans and Kerst, 2002). Russo and Campbell (2004) noted that timely replies to the students' queries, message tone and style affected the participations of the students in interaction. The message tone of Programme Coordinator, while replying to the students' queries, was mild and encouraging. The messages from the students were replied by the Programme Coordinator within 24 hours, when actions on students' e-mail messages were confined to the desk of the Programme Coordinator, for instance queries related to academic supports; schedule and procedure for submission of assignments; status of evaluation of assignments, synopsis or project, and guidance on project etc. were resolved solely by the Coordinator within a day or two.

Prompt replies from the Programme Coordinator might have encouraged the students to continue interaction with the Programme Coordinator, whenever they are in need of support. Replying of messages, which demanded actions at PSCs took slightly longer time. However, the Programme Coordinator immediately sent an acknowledgment of the receipt of the queries to students, while forwarding mails to the concerned PSCs for further necessary action on students' queries.

## Pattern of volume of e-mails sent by students

The Table-3 reflects month-wise numbers of e-mail messages received by the Programme Coordinator from the students, during the period of investigation. The Programme Coordinator received 348 e-mail messages within 15 months.

**Table-3**  
**Numbers of messages from the students to the teachers**

Month	Dec' 09	Jan' 10	Feb' 10	Mar '10	Apr '10	May '10	Jun' 10	Jul' 10	Aug' 10	Sep' 10	Oct '10	Nov '10	Dec '10	Jan '11	Feb' 11	Total
No.	3	7	3	15	24	12	10	28	19	41	55	23	56	25	27	348
%	0.9	2.0	0.9	4.3	6.9	3.4	2.9	8.0	5.5	11.8	15.8	6.6	16.1	7.2	7.8	100

The Programme Coordinator received on an average 23 messages per month. The maximum numbers of messages were received in the December, 2010 and it was closely followed by October month. 111 messages, 31.9% of total messages, were received during these two months. An academic session of the PGDFSQM programme concludes in the December month, each year. The, academic activities are in full swing; students are very active and eager to complete all learning events in stipulated time to become eligible for award of the Diploma. This might be one of the reasons for high numbers of messages in the October, i.e. close to award of the Diploma. The less numbers of messages were received during the first three months of the academic session i.e. from January to March. Most of the queries during that period were regarding administrative issues with the programme. The numbers of queries from aspirants for admission to the programme were uniform across all the months, during the period of investigation. It was observed that volume of messages with academic queries rose gradually with the advancement of the session.

The Table 3 reflects large variation in number of messages received across months; therefore assessment of utilization of teacher's time in replying to messages of the students should be drawn on the basis of time devoted for this purpose over a long span of the time, e.g. workload on monthly basis. However, large variation in numbers of messages over the months requires for monthly monitoring of the volume of the messages to keep a track on academic and administrative needs of students.

## Length of messages and gender

Jose, Mireia, Silvia and Patricia (2001) perceived positive association in length of messages and verbal fluidity. Punyanunt and Hemby (2006) noted gender differences in perceptions and uses of e-mail messages. The female students were more frequent in checking their mail boxes and they frequently used shorthand in the messages directed to the teacher. They further stated that the male students were more likely to use emotions in e-mails and preferred e-mailing only when they couldn't meet someone in person. Siti and Intan (2001) noted that the female students wrote lengthier messages when interacted through e-mail. However, Herring (1994) and Jose, Mireia, Silvia and Patricia (2001) noted lengthier messages from the male students.

This study examined differences in writing skills of the male and the female students in terms of length of messages and way of addressing to the Programme Coordinator. The length of message is measured in terms of number of words used in the main body of message. The formal addressing to the Programme Coordinator and ending segments of messages are not counted in the length of messages.

**Table-4**  
**Length of messages written by the male and the female students**

Length of messages	Male		Female		Total	
	Number	%	Number	%	Number	%
More than 100 words	32	12.0	9	11.1	41	11.8
More than 50 but less than 100 words	136	50.9	34	42.0	170	48.9
Less than 50 words	99	37.1	38	46.9	137	39.4
<b>Total</b>	<b>267</b>	<b>100</b>	<b>81</b>	<b>100</b>	<b>48</b>	<b>100</b>

The average length of messages sent by the students to the Programme Coordinator was 64 words. The lengthiest message had 324 words, which was written by a male student. The average length of replies sent by the Programme Coordinator to students was 87 words. The research literature criticized inclusion of e-mail in facilitating individual support to students as teachers need to devote lot of time in reading and replying to individual messages received from students. However, the Table 4 indicates that the messages from the students and its replies by the Programme Coordinator are very concise. Reading and replying of these messages did not take much time. The students had also ensured correctness on sentences. There were hardly any grammar and spelling mistakes. The well structure sentences further reduced the reading time. The difference in the lengths of messages sent by male and female students was statistical examined with the independent T test (Table-5 and 6).

**Table-5**  
**Descriptive statistics of length of messages written by male and female students to the programme coordinator**

Gender of students	No. of messages	Mean length of messages (number of words)	Standard deviation in length of messages	Standard error in length of messages
Male	267	63.6	33.646	2.05908
Female	81	65.8	36.674	4.07492

The average length of messages written by female students was more than that of written by the male students. The high value of standard deviations in length of messages written by the female students reflects higher variation in length of messages sent by them. High number of messages from males was also responsible for low value of standard deviation in length of messages written by them.

**Table-6**  
**T test examining difference in lengths of messages written by male and female students**

	Levene's Test for Equality of Variances (F)	Significance	t-test on means in lengths of message written by males and females	df	Sig. (2-tailed)
Equal variances assumed	0.105	0.747	0.632	346	0.528
Equal variances not assumed			0.603	123.64	0.547

The level of the significance of the Levene's test value indicates no statistical difference in variance in lengths of messages of both the groups. The female students wrote lengthier messages



(number of words). However, the value of independent t test in the Table-6 also confirms no significant difference in length of messages written by the male and the female students.

Herring (1994) asserted that the male students and the female students enjoy distinctive ethics in writing and addressing to teachers in messages sent through e-mails. The difference in ways of addressing to the Programme Coordinator, among female and male students is reflected in the Table-7.

**Table-7**  
**Addressing Styles of the male and the female students in messages sent to the programme coordinator**

	Gender	Way of addressing to teacher/ Programme Coordinator			Total
		No salutation	Dear	Sir	
Female	No. of messages	2	15	64	81
	% within Gender	2.6	18.4	78.9	100
Male	No. of messages	27	33	207	267
	% within Gender	10.2	12.2	77.6	100
<b>Total</b>	<b>No. of messages</b>	<b>29</b>	<b>48</b>	<b>271</b>	<b>348</b>
	<b>% within Gender</b>	<b>8.4</b>	<b>13.7</b>	<b>77.9</b>	<b>100</b>

The Table-7 reflects that most of the students were formal in addressing and expressing regards to the Programme Coordinator, while writing e-mail messages to him. However, the addressing styles of the group of students under observation, among themselves on the discussion board were not so formal. Thus, students were more formal in addressing messages to the teachers rather to others in the peer group. The difference in addressing styles in messages posted to the Programme Coordinator and those posted to the peer group reflects the differences in approach of the students in addressing messages to the individual and to the group. The students are more formal in addressing e-mail messages to the individual rather to group. Guiller and Durndell (2006) observed that the genders power differences evidenced in face-to-face communication were transferred into the online environment also. The male students, in large numbers, wrote messages without formal addressing to the Programme Coordinator. The informal addressing to teachers blurred the power boundaries between the teachers and the students, particularly when students are mature and meeting with teachers in personal.

The association between gender and ways of addressing to teachers is statistically examined with the Chi-square test (Table-8).

**Table 8**  
**Chi-Square Test in reference to association between genders and addressing style to teachers**

Statistical tests	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.083	2	.048
Likelihood Ratio	7.196	2	.027
N of Valid Cases	348		

The level of significance of the chi-square test value reflects remarkable association between gender and ways of addressing to the teachers. The female students are more formal and polite in addressing to the teachers. The formal addressing in e-mail messages reflects on relative power, relationship, distance and degree of imposition (O'Neill and Colley, 2006; Catheren and Mayer, 2003). Holmes (1995) remarked that submissive social roles of women could be held responsible for this behaviour.

## Conclusion

The web-based learning environment has brought fundamental changes in roles of teachers under the ODL system. The pedagogy under the traditional ODL mode is based on self-learning instructional material and partially guided by the counsellors. The teachers are also involved in development of curriculum, instructional materials, assignments and monitoring of the programme. Teachers are also associated in delivery of induction programme at the beginning of the academic session. The teaching becomes more guided under the web based learning environment. Teachers are at the nucleus of support network and lead most of the learning events over the web. E-mail messages have been used in extending academic and administrative support to the group as well as to the individual. The finding of the study affirms the potential of e-mail in instrumenting academic interaction between the learner and the teacher. Thus, the University should look beyond the traditional role of the e-mail messages for intimating students about schedule of learning events and delivery of learning resources. It can be used in resolving academic and administrative problems and extending social interaction.

E-mail as a mediation media is a vital instrument for one-to-one interaction, in asynchronous mode, between the students and the teachers under the Open and Distance Learning system (ODL). The outcome of study reaffirms the potential of e-mail in facilitating interaction between the students and the teachers. The communication interactions between students and teachers and counseling under the ODL have become more dynamic and guided. The prompt deliveries of messages and quick responses have made this mode serialistic interactive in which only one person articulate at a time. E-mail as a mediation tool not only improves effectiveness of communication, but also brings fundamental change in the interaction behaviour and frequency. The e-mail messages have become short, frequent, and full of shortcuts and icons to express feelings. The students have become far more formal, individual, and share their personal problems with the Programme Coordinator. The students used harsh language also at time and this behavior is normally not reflected under conventional system. This calls for more responsibility and accountability of the Programme Coordinator and University in running the programme under ODL.

A few students expressed displeasure with quality of services offered by the University and demanded immediate intervention and support from the Programme Coordinator for resolving administrative and procedural problems faced by them. The displeasure of students highlighted the gap between students' expectations and experiences in the programme. This gap is true assessment of effectiveness of the delivery mechanism and the University should be committed to minimize this gap. The frequently occurring problems reflect on the gray areas of the delivery mechanism. Teachers can improve the effectiveness of services by paying special attention to these gray areas. This step can improve retention of the students in the programme by making learning more convenient. One of the reasons for delay in action on students' complaints was caused by addressing complaints to other than ombudsman. The students were not aware about grievance readdressal mechanism. The students should be enlightened on grievance readdressal mechanism in the induction programme and also be highlighted in the Programme Guide and Frequently Asked Question (FAQ) segment of the web-site.

The writing styles of male and female students differ in sending e-mail messages to the teachers. The female students wrote slightly lengthier messages. However, the difference in lengths of messages sent by the males and females was not statistically significant. The female students were more formal while addressing their teachers. The difference in addressing styles of the male and female students was statistically significant. The precise details about utilization of e-mail messages in instrumenting interaction between the students and the teachers can be obtained by repeating similar kinds of studies in other disciplines with different composition of gender population and learning scenario.

The research is an exploratory study, restricted to analysis of archive of messages exchanged between students and teachers. There was no opportunity to contact the students to further clarify meaning and purposes of posting e-mail messages to Programme Coordinator and their satisfaction with the response of the Programme Coordinator. This limitation narrows down the scope of study.

The content analysis of texts of messages exchanged in students and teacher reflects that most of e-mails in pre-admission session are seeking information about eligibility, schedule and procedure for admission; location of centres for delivery of practical and counseling. Such e-mail can be automatically replied by an intelligent auto reply e-mail system. Further study can be taken to devise an intelligent auto reply e-mail system, which can classify messages and decide whether e-mails can be replied automatically or need to be forwarded to teachers for further interaction with students. This system will be able to reply about 30 % of e-mails automatically without intervention of teachers/administrator of the university and able to reduce workload on teachers. The auto reply e-mail system will be very helpful for mega open universities, situated in highly populated countries, receiving thousands of email every week from students.

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## About the authors



**Dr. Sunil Kumar** is a Senior Analyst at Planning & Development Division, Indira Gandhi National Open University (IGNOU), New Delhi, India. He holds a Doctorate Degree in Web mediated education. His research interest includes social media in education, elearning, course management system, planning and funding of distance education. He as Sr. Analyst at IGNOU has been engaged in analysis and research in planning, functioning, funding and evaluating of delivery of higher and continuing education through distance mode from past 15 years. He authored more than 35 papers, three monograms, two books. In past five years, he has published research paper in the field of web-tools, e-learning and e-books, social media, plagiarism.

E-mail - [sunilk@ignou.ac.in](mailto:sunilk@ignou.ac.in)

**Dr. M. K. Salooja** is Professor, School of Agriculture, Indira Gandhi National Open University, New Delhi ; India

E-mail - [mksalooja@ignou.ac.in](mailto:mksalooja@ignou.ac.in)

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**Editor's Note:** As we digitize the curriculum and move to methods of open and distance learning, students, faculty and administrators must have realistic expectations and learn how to use these systems effectively in their new roles.

## **The reality of the use of the University of Jordan's students of the Moodle System in the process of learning and instruction from their perspectives**

**Azzam Jamil Falah Al-Rifaae**  
Jordan

### **Abstract**

The aim of this study is to identify the reality of the use of the University of Jordan's students of the Moodle system in the process of learning and instruction from their perspectives. The study sample consisted of (500) students from the University of Jordan during the first semester 2017/2018. The researcher used the descriptive method due to its suitability for the purposes of the study, and the researcher completed validity and reliability of the study instrument. Among the most prominent findings of the study is that there are positive attitudes towards the Moodle system.

**Keywords:** University of Jordan Students, Moodle System, Learning and Instruction.

### **Introduction**

At start, educational technology has been a major development and huge widespread in previous years in most countries of the world, and has become effective tools in conveying and communicating scientific information to teachers and students in different countries. This technology has become one of the most significant developments in the field of communications and has led to the development of university educational methods in line with these advances. It also positioned the world in front of a new revolution in the field of education and opened up the wide horizons for new types of education and training in all educational institutions, especially in university and higher education.

Besides, recent trends in education technology have contributed to the emergence of new and sophisticated teaching and learning systems that have had the greatest impact on positive changes and developments in the way students learn, the techniques and methods of communicating scientific information to them, as well as the content and format of the curriculum in line with these trends. Out of the systems produced by the modern trends in education technology is the so-called e-learning, which depends on the use of computers, the Internet and interactive multimedia of various kinds in the teaching process (Al-Khalifa, 2010).

E-learning refers to relying on modern technologies to effectively deliver students' learning content through the positive characteristics such as saving more time, effort and economic cost, as well as its great potential in promoting student learning and improving their scientific level effectively. It also provides an exciting and inspiring learning environment which is stimulating for teachers and students, as the determinants of time and space are eliminated in addition to allowing students to learn in light of their capabilities and scientific abilities and levels of knowledge (Al-Zboun, 2015). The e-learning system consists of inputs, processes, outputs and feedback. The implementation of this system requires a set of basic requirements and components that must be integrated with each other for the purpose of making the system and its various components excellently succeed. If change is measured in years, the past 10 years (2002-2012) can be equivalent to decades, for the reason that e-learning is one of the significant results of the digital era and its modern technologies, and is the main pillar in the future education because it

depends on information and communication technology, which changed a lot of ways that the individual relates with others, learns and works (Kinsara and Attar, 2012). Education has invested in the enormous technological progress of this era by utilizing the techniques in the classroom, laboratories and corridors of the school and the university. However, the most exciting thing is to use the technologies of computer, software and communications in establishing flexible and interactive electronic learning that enables learners to access the required information with minimal effort and during the time and location that he or she determines. The recent developments in the field of ICT have clearly affected the education system in schools, institutes and universities. The University and the scientific research centers have undertaken to develop and employ this technology to serve education and training (Alshbul and Alyan 2014).

The rapid developments in the field of computers and communications have contributed to changing the visions of universities and international institutes regarding educational programs. These developments came at a time when traditional programs were unable to meet market demands from new and overlapping disciplines. Such disciplines require educational and support staff that are difficult to provide. The high cost of education has become an obstacle for many who wish to complete their education, especially those with low incomes. These matters encouraged many universities and scientific institutes to develop online e-learning programs that offer an opportunity for those wishing to complete their studies at the time available to them and from any place connected to the international network of the Internet (Salloum and Radwan, 2011).

Of the interactive educational applications that serve the faculty member and the student through providing many educational tools, both technical and administrative, are Learning Management Systems, which are divided into open source and commercial systems, which are similar in performance to a large percentage with differences between them, as the educational institution determines its needs according to their potential to decide which system will be used (Salloum and Radwan, 2011). Learning Management Systems have been popular among different educational institutions, for the diversity of the use of tools, and factors affecting the effectiveness of the Learning Management System such as the ease and simplicity of the design of screens, the ease of use of course design tools, the compatibility of the technical management of the system with academic management System, ease of management of education and the acceptance of the system to download various multimedia files and the availability of flexibility and interactive tests and type of means of communication.

The study of National Institute of Corrections (2006) recommended the importance of training on the Learning Management System by the beneficiaries, as well as carefully characterizing inputs and outputs before embarking on any learning management system initiated by the institution. It also confirmed technical points for the Learning Management System, such as (Application Service Provider Model), and compatibility with SCORM standards, (Sharable Content Reference Model), which means the reference model for participatory content components, the availability of technical management of the system, the ability to produce the learning management system to provide technical reports on use, the availability of tools suitable for a file of Knowledge skills of learners and ease of use.

Al-Harbi (2007) points out that Learning Management Systems (LMSs) are divided into two parts: Open Source Learning Management Systems, which are used free of charge and are not subject to any sale and are subject to development and modification such as (Atutor - Dokeos - Moodle). The second part is the Closed Source or Commercial Learning Management Systems, which are owned and developed by a profitable company, and allowed to be used only with a license such as (Web CT, Blackboard, study, and your preferences). The Moodle Learning Management System is an open source curriculum management system that is distributed and abbreviated under the (GPL) General Public License. It is designed using educational principles in education to help learners

create their own online courses on the internet. The word of Moodle comes from Modular Object – Oriented Dynamic Learning.

Ayub, Tarmizi, Jaafar, Ali & Luan (2011) conducted a study aimed at identifying the factors influencing the students' use of and attitudes toward the learning management systems in the students' perspective. The study sample consisted of (215) male and female students studying in the Statistics Department at the University of Putra, Malaysia. The study used a questionnaire consisting of five areas to measure the factors that influence students' use of learning management systems and a measure of students' perceptions and attitudes towards them. The results showed a high degree of student use of learning management systems, including: students' technological competence, the role of faculty members and the learning system itself. The results also showed positive attitudes towards the system as it helps in easy access, research and design. The Learning Management System (Moodle) is featured a forum where it discusses subjects related to the learning process, the teacher's receiving of duties rather than e-mail, the availability of live chat rooms and content-related search, ten virtual templates to change the interface, as well as granting the students choose the appropriate learning method (Fictumova, 2010). Al-Zboun (2015) emphasized that the Learning Management System (Moodle) can provide these features, namely: provide learner interaction tools that mean the tools that the learner interacts with during his / her study as follows:

**Advertisements:** This tool lets the learner be aware of the latest news, alerts, or ads that faculty members want to send to learners or to a group of them. The learner clicks the mouse over the ad key to see a board so that he can narrate its content either alphabetically or historically.

**Timetable:** This tool tells the learner the timing of events related to the subject of learning and alerts him, and when times of such lectures and meetings on the network or done face-to-face meetings in the university and so on, and the learner can add to it any events he wants.

**Tasks:** Tell the learner what tasks he or she should perform, and allow him or her to organize those tasks according to the subject or according to his or her personal vision. The teacher can send a particular Arabic learner a specific task that he does not send to another learner.

**Estimates:** This task is concerned with the scores and grades of the learner, whether in the intermediate or final tests.

**User Guide:** This tool works as a guide for students participating in the course to get to know each other.

**Address Book:** It is a personal book for the student, which contains data about who wants to communicate with them through the system. The previous user guide may include hundreds of learners, while the address book includes the addresses added by the learner.

Hence, the development of education in general and university in particular and its growth depended on the availability of information knowledge in its comprehensiveness, sustainability and integration, in addition to the availability of skills to employ and use them optimally. While e-learning skills have a realistic presence in university education, it is expected that the reliance on information received by students will be less than typical in the classroom. University education has begun to seek the optimal investment of time, effort and energy for students seeking information through the Internet, and other learning management systems, forms, tools and techniques that contribute to the improvement of the educational process.

## **Problem and questions of the study**

The tremendous scientific and technological progress in the beginning of the twenty-first century has had a great impact on the progress of human life and its development in all fields, as its most important part is the field of higher education. Similarly, this has led to a change in its objectives, means, methods and techniques. The use of learning management systems has spread more in the fields of education and instruction, leading states and nations to compete among themselves to introduce these systems into their various educational institutions in schools, institutes and universities, leading to a qualitative shift in the teaching and learning process. As one of the most key pillars of the general objectives of the university education policy in the Hashemite Kingdom of Jordan is the introduction of the latest technology in the world. The educators were interested in learning management systems and their various forms, including Moodle as a challenge to the institutions of higher education. Being an employee at the University of Jordan and meeting with some faculty members and students, they expressed that quantitative progress in the field of technology was not accompanied by qualitative progress in the faculty and students in the use of modern technology, where learning management systems are still in its early stages. Those, who reflect on the reality of the technology of education at the University of Jordan, recognize that the field is in dire need of developmental efforts, as the experiences of using the learning management systems at the University of Jordan is still new. The University of Jordan used the Blackboard system, which resulted in the payment of large amounts of usage fees. Later on, the university found that the number of faculty members, who used it, was very small in return for the subscription fees paid by the university (King Abdullah II College of Information Technology, 2013).

Accordingly, the University of Jordan was thinking about using a learning management system without any financial obligations. The idea was to use the Moodle system, which is an open system, and this is what the university has done. It has modified and developed this system to suit the needs and requirements of the University and began to use it. Accordingly, the problem of this study was to identify the reality of the use of the University of Jordan's Students of the Moodle system in the process of learning and instruction from their perspectives. This study attempted to answer the following question:

**What is the reality of the use of the University of Jordan's Students of the Moodle system in the process of learning and instruction from their perspectives?**

## **The Importance of study**

The importance of the study can be summarized as follow:

- Its importance comes from dealing with the latest trends in the educational and instructive process, which is the learning management system (Moodle).
- It is hoped that this study will help officials, planners and developers of university education plan and develop the university plans.
- It is hoped that this study will contribute to the development of programs for the preparation and training of faculty members and students in the use and employment of technology in the process of learning and instruction.
- It is hoped that this study will identify the financial and physical demands, educational software and infrastructure necessary to use learning management systems in university teaching.

## **Procedural definitions:**

The researcher defined the terms in the study as follows:

**Moodle:** It is defined as a form of open source learning management systems used free of charge by universities, schools and businesses. Moodle is used to produce online courses and to support traditional courses (face-to-face education).

**Attitudes:** It is relatively stable acquisitions of the University of Jordan's students that make them respond to learning management systems (Moodle) positively or negatively, and were measured in the degree achieved by the student through responding to the items prepared by the researcher.

## ***The limits of the study***

This study included the following limits and determinants:

1. - The study was limited to students of the University of Jordan during the first semester of the academic year 2017/2018 registered for electronic courses in medical, scientific and humanitarian colleges at the University.
2. - The results of this study are partially determined by the nature of the study procedures in terms of the design of the study instruments and the extent of their validity and reliability.

## ***Methodology of the study***

The study was based on the descriptive approach due to its suitability for the purposes of the study. It is concerned with studying the reality and determining the factors influencing it in terms of nature and the existing relations among them, and is not limited to description but rather to interpretation and analysis to reach accurate facts about the existing conditions in order to develop and improve them.

## ***Study population***

The members of the study population are all students of the University of Jordan enrolled in electronic courses depended on the Internet and loaded on the learning management system (Moodle) for the first semester 2017/2018 in scientific, medical and humanitarian colleges. The number of students who interacted with electronic courses loaded on the learning management system (Moodle) was (2156) students, according to the Computer Department's statistics that is responsible for the follow-up and management of the learning management system (Moodle) at King Abdullah II College of Information and Communication Technology.

## ***Study members***

The study members are from (500) students who responded to the questionnaire.

## ***Study instruments***

The aim of the study was to identify the reality of the students' use of the Moodle system from their perspectives. To achieve this goal, the researcher developed the study instrument: a questionnaire to measure the reality of the use of the Moodle system by the students of the University of Jordan, with reference to previous studies such as Ashour, 2009, Salloum and Radwan, 2012; AL-Zboun, 2015), and included a set of items on the use of the University of Jordan students to the Moodle system.

## ***Instrument correction***

The level of the response to each item of the items of the study instruments was measured according to the five-level Likert scale and was set at five levels: strongly agree (5 degrees), agree (4 degrees), neutral (3 degrees), disagree (2 degrees) and disagree (1 degree). The level of students' use of the Moodle system was divided into three levels (high, medium, low) by dividing the

number range from 1-5 in three categories to reach each level of 1.33. The levels are as follows: Low level (1.33-2), the Medium level of (2.34-3.67), and a high level of (3.68-5).

### ***Instrument validity***

The apparent validity based on the raters: To ascertain the apparent validity of the study instrument, the researcher presented them in their preliminary form to (8) raters who are specialized in the field of educational technology, curriculum, teaching, measurement and educational evaluation at the University of Jordan to judge the degree of appropriateness of the item in terms of language formulation and its relevance to the field to be measured. After reviewing the observations of the raters, the study instrument for the student's use of the Moodle system became with its final form of the (28) items.

### ***Instrument reliability***

In order to ensure the reliability of the two study instruments, the test-re-test was used. The researcher distributed the questionnaire to 20 students from outside the study sample and re-applied it on them after two weeks. After that, the reliability coefficient was then calculated by calculating the Pearson correlation coefficient between the first and second applications, as the reliability coefficient of the questionnaire was (0.90.).

## **Results**

Results of the first question: What is the reality of the use of the University of Jordan's Students of the Moodle system in the process of learning and instruction from their perspectives? In order to answer the question of What is the reality of the use of the University of Jordan's Students of the Moodle system in the process of learning and instruction from their perspectives?, the arithmetic mean and standard deviations were calculated, and the ranks and the degree of directions for the measure items were identified too. Table 1 shows that:

**Table 1**

**The arithmetic means, standard deviations, rank, and grade of the reality of the use of the University of Jordan's Students of the Moodle system in the process of learning and instruction from their perspectives are in a descending order**

<b>No.</b>	<b>Item</b>	<b>A.M</b>	<b>S.D</b>	<b>Rank</b>	<b>Attitudes</b>
11	I feel that the Moodle system only takes me from the receiving stage to the stage of participation in the learning and instruction process	4.00	1.16	1	High
7	I prefer Moodle learning management systems in the traditional way	3.96	1.07	2	High
8	I am satisfied with the use and effectiveness of the Moodle system	3.96	1.06	3	High
1	I think it makes it easier to see the activities of the college and the university	3.92	1.11	4	High
9	I prefer to convert all courses electronically according to the Moodle system	3.92	1.11	5	High
3	I think the Moodle system raises my level of computer knowledge and use	3.91	1.13	6	High
21	I think it helps me follow the results of my exams	3.91	1.05	7	High
20	I prefer the Moodle system because it helps me know the dates of admission and registration through forums and e-mail	3.87	1.10	8	High

24	I feel that the Moodle system gives me the opportunity to move from traditional learning to e-learning in all its types	3.87	1.21	9	High
5	I think it gives me the opportunity to discuss and exchange experiences with fellow students and faculty members through forum discussions	3.86	1.16	10	High
6	I see that I can easily get to know my notes	3.85	1.15	11	High
4	I think it is easy for me to give tests	3.85	1.18	12	High
19	I see that communication through the Moodle system has a positive impact on achievement	3.83	1.11	13	High
23	I think it saves time and effort of the students	3.83	1.17	14	High
25	I think it offers various facilities and methods that prevent boredom	3.83	1.09	15	High
27	I think it is easy to manage student records	3.82	1.14	16	High
28	I feel that the Moodle system gives me the opportunity to discuss educational issues directly without the need for physical communication	3.81	1.25	17	High
14	I like the possibility of chatting in the system to communicate with colleagues	3.81	1.07	18	High
16	I feel that it helps me provide assignments and receive feedback through the tools provided by the system	3.76	1.12	19	High
22	I think it motivates me to participate actively	3.75	1.20	20	High
2	I see that the Moodle system saves much money	3.72	1.18	21	High
15	I enjoy the direct on-site help	3.70	1.19	22	High
17	I feel that the electronic course within the Moodle system prevails in a friendly and safe atmosphere	3.70	1.11	23	High
18	The best Moodle system is that it helps me access the electronic curriculum 24 hours a day	3.61	1.13	24	Medium
26	I think it helps me upload files and use them within the electronic curriculum	3.56	1.16	25	Medium
13	I have difficulty dealing with the Moodle system	3.08	1.45	26	Medium
10	I feel there are obstacles facing the use of the Moodle system	2.91	1.42	27	Medium
12	I feel that the use of the Moodle system limits interpersonal interaction and leads to introversion	2.87	1.41	28	Medium
<b>Total Score</b>		<b>3.73</b>	<b>1.03</b>		<b>High</b>

Table 1 shows the reality of the use of the University of Jordan's students of the Moodle system in the process of learning and instruction from their perspectives ranged between (2.87-4.00). The total score for averages of the items of the reality of the use of the university of Jordan's students of the Moodle system in the process of learning and instruction from their perspective was (3.73) with a standard deviation (1.03) and a high degree of attitudes according to the criterion adopted in the study. The first rank was item No. (11), which is "I feel that the Moodle system only takes me from the receiving stage to the stage of participation in the learning process" with an arithmetic mean of (4.00), a standard deviation of (1.16) and a high degree of attitudes. As for the second rank, it was item No. (7), which is "I prefer Moodle learning management



systems in the traditional way “with an arithmetic mean of (3.96), a standard deviation (1.07) and a high degree of attitude.

Moreover, it is noted from the previous table that five items, which on a medium degree of attitudes, are items of (18, 26, 13, 10 and 12), respectively, where item No. (10) was in the penultimate level, which is “I feel there are obstacles facing the use of the Moodle system” with an arithmetic mean of (2.91) and a standard deviation of (1.42) and a medium degree of attitude, meaning that the obstacles were few. At the last rank, item No. (12) states that “I feel that the use of the Moodle system limits the interpersonal interaction and leads to introversion”, with an arithmetic mean of (2.87) and a standard deviation of (1.41) and a medium degree of direction in the sense that the Moodle system does not limit the interpersonal interaction and does not lead to introversion. The interpretation of this result can be attributed to several factors including:

- The ease of explanation used by the e-course through the Moodle system.
- Follow the students through the forum and answer their questions.
- Interactive presentations in the e-course including its presentation of lectures through video programs that enabled the student to follow the lessons frequently and at any time.
- Access to the electronic course through the Moodle system at any time and from anywhere and take advantage of the possibilities of the Moodle program in communication with the faculty member.

Follow-up students through assignments sent through Moodle system and feedback through monitoring signs of appointments, solving them in an explanatory manner, and serial steps sent through Moodle system with the possibility to return to them by students at any time. This may also be attributed to:

- Learning based on the Moodle system is based on stimulating thought and attracting attention. The student is an active participant, not a recipient of information. He is an enthusiastic learner who learns according to his own speed, corrects mistakes and discusses his teacher electronically or face to face without being ashamed of his colleagues.
- This type of learning allows the student to review his educational course and study more than once without boredom, and at the time he wants and where he wants, and this in general increases the motivation to learn, which increases the direct educational achievement.
- Learning based on the Moodle system is a new way for students of the University of Jordan, which has raised their interest, and increased their motivation to learn.

Accordingly, the researcher believes that the formation of positive attitudes for students to use Moodle learning system may be due to several reasons such as submitting exams directly and checking the scores and self-evaluation on a continuous basis, ease of doing assignments and submitting them to the teacher, the continuous communication between the students themselves and faculty members and ease of browsing and research on the content of the curriculum, as well as enjoyment of education and acquisition of new skills.

At last, it has been found that the results of this study are consistent with the study of Abdul Majeed (2008), which confirmed the existence of high positive attitudes among the students of the experimental group that studied mathematics according to the training program based on the program Moodle. As it also agrees with results of Ayub, Tarmizi, Jaafar, Ali and Luan (2001), which confirmed the existence of high attitudes towards the system, as well as the study of Dougians and Taylor (2010), which confirmed high attitudes for students towards the Moodle system. Moreover, it is consistent with Thomas’s study (2006), which showed positive and high attitudes toward the Moodle learning management system. Still, it differs from the results of the Education Management System evaluation Committee (2011), which showed negative attitudes towards the Moodle system.

## Recommendations

In light of the results of the study, the researcher recommends the following:

- Attention to the use of the MOODLE system has an impact on the development of students' skills.
- Holding training courses to train faculty members on how to use the MOODLE system.

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## About the Author

**Azzam Jamil Falah Al-Rifae** is from the Faculty of Educational Sciences, The University of Jordan, Amman, Jordan. Contact at [azzamrefai@gmail.com](mailto:azzamrefai@gmail.com)

واقع استخدام طلبة الجامعة الأردنية لنظام موودل في عملية التعلم والتعليم من وجهة نظرهم

### الملخص

هدفت هذه الدراسة إلى معرفة واقع استخدام طلبة الجامعة الأردنية نظام موودل في عملية التعلم والتعليم من وجهة نظرهم. وأشتملت عينة الدراسة من (500) طالباً وطالبة من طلبة الجامعة الأردنية خلال الفصل الدراسي الأول 2017/2018، واستخدم الباحث المنهج الوصفي المسحي لمناسبته لأغراض الدراسة، وأتم الباحث الصدق والثبات لأداة الدراسة. ومن أبرز النتائج التي توصلت إليها الدراسة: وجود اتجاهات إيجابية لدى الطلبة نحو نظام موودل.

الكلمات المفتاحية: طلبة الجامعة الأردنية، نظام موودل، التعليم والتعليم.

**Editor's Note:** This study compares achievement using Brain Based Learning with traditional methods of instruction.

## **Enhancing academic achievement of Standard VII students in science using Brain Based Learning (BBL)**

**Kalpana M. More and Ashok R. Rane**

India

### **Abstract**

The present study deals with influence of Brain Based Learning (BBL) approach on academic achievement of Standard VII students in Science subject. For this study, true experimental design (pre-test post-test, equivalent group design) has been used, by selecting two intact divisions of Standard VII from same school, each having 43 students. The core part of the study involved indigenous development of intervention programme for some selected topics, based on the BBL principles, fundamentals, and seven stage lesson plan. The data was analysed quantitatively (using descriptive and inferential statistics) as well as qualitatively, using SPSS software. The results obtained herein imply that the BBL intervention programme leads to significant enhancement in student's achievement in science subject, which is attributed provision of interactive, challenging, and stress-free class environment. Moreover, the science teachers felt that such intervention programmes should be developed and implemented for other units, subjects, and standards.

**Keywords:** Brain Based Learning (BBL), achievement, Standard VII, Science

### **Introduction:**

The prime aim of school education is holistic development of the students. In today's era of globalization featuring rapidly changing scenario, the prevailing teaching-learning approaches/methods offer limitations and thus need either timely modifications or introduction of new teaching-learning approaches. In this context, Brain Based Learning (BBL), a joint endeavour of neuroscientist and educationalist, has been recognized as a potential teaching-learning approach. BBL is based on structure and function of human brain. A comprehensive model of BBL was due to Renate Caine and Jeffry Caine (1999), who consolidated the results of research studies, carried out by various neuroscientist and educationalist worldwide in terms of twelve principles and three fundamentals. These BBL principles and fundamentals offer theoretical structure for effective teaching-learning process, seeking the most desirable conditions to ensure learning takes place in the brain.

Amongst the various researchers who have put in efforts to develop BBL, the most noticeable contribution is due to Jensen Eric (2005, 2008). According to him "Brain based education is the purposeful engagement of strategies that apply to how the brain works in the context of education". Furthermore, he has quoted "Brain Based Learning is a comprehensive approach to learning based on Neuroscience". In nut shell, BBL is an interdisciplinary answer to the question, "What is the most effective way of the brain's learning mechanism?" The principles of BBL provide a theoretical framework for effective learning and teaching process, seeking the best conditions in which learning takes place in the brain.

### **Significance of BBL in teaching and learning of science subject:**

Amongst the different teaching-learning approaches, BBL is the most recent approach which is realized as an optimal one making learning more enjoyable and stress free. Since its initiation, many researchers have studied its effectiveness in the context of students achievement in various subjects, class room environment, learning ability of special children, and so on. Davis, L. (2004)

has studied use of BBL approach to increase grade IV student's academic achievement in science. It is observed that, with the implementation of BBL approach, the students displayed positive attitude towards learning leading to significant improvement in their achievement, and self-esteem. Dilek and Rahmi (2006) have studied impact of BBL approach on grade VII student's achievement and retention of knowledge about 'work energy' topic. This study was performed on 91 students consisting of 49 girls and 42 boys distributed as 30 in experimental group, 61 in two control groups I and II. In this study pre-test post-test control grouped design was used. Three tests were given to students as, pre-test, post-test and retention test. Another measuring tool applied to the students was Brain Dominance Instrument (BDI). The results of BDI indicated that 43.3% of the experimental group students have slight preference toward the left dominance, 26.7 % have slight preference toward the right dominance, and 20% have moderate preference for the left. It was summarized that nearly ~ 66 and 30 % of the experimental group students use dominantly the left and right sections, respectively, and the BBL approach leads to significant increase in their achievement. An experimental study carried out by Ozden and Gultekin (2008) reported that the BBL approach is more effective than the traditional teaching procedures in science course facilitating enhancement in the retained knowledge. Similarly, S. Saleh (2012) has reported a study on the effectiveness of the Brain Based Teaching approach in enhancing scientific understanding of Newtonian Physics. Recently, Kawthar and Mohammed, (2016) have published an article 'The impact of a teaching-learning program based on a BBL on the achievement of the female students of grade IX in chemistry'. The sample was 64 female students. The researchers applied t-test for independent sample means, standard deviations and ANOVA. The results indicated statistically significant differences at the level ( $\alpha \leq 0.05$ ) in contemporary and instructional achievement. The researchers recommended application of the BBL instructional methods in learning chemistry and science. These research investigations motivated to undertake to reveal the effectiveness of indigenously developed BBL intervention programme on achievement in science subject.

Although most of the research work has been focused on primary and secondary schools, it is interesting to note that researchers are exploring the effectiveness of BBL approach towards higher education. In this regard, Stephanie Clemons (2005) has reported an articles on "Brain-Based Learning: Possible Implications for Online Instruction", wherein the author has discussed how BBL may be implemented in the delivery of information and facilitation of online classes in higher education.

### **Need of study**

The literature survey reveals that rigorous research work on BBL approach and its significance has been mostly carried out overseas, and their results are interesting and encouraging. In Indian context, more research studies are anticipated, as these results cannot be applied as it is. Therefore, systematic research work to reveal the effectiveness of BBL approach on academic achievement of students is the need of hour. Such research studies necessitate development of intervention programme due to BBL principles and fundamentals(s) compatible to the Indian scenario. Furthermore, due to misbeliefs and superstitions, there is significant lack of scientific attitude in peoples of developing countries, which can be overcome by imparting good science education at school level. Following this, science subject has been purposefully selected for the said research studies.

### **Operational definitions**

**Brain Based Learning:** It is a learning approach that is aligned with how the human brain naturally learns best. It is an instructional approach in which conducive learning environment is created by the teacher with minimum threats and maximum challenges so as to make learning an enjoyable activity.

**Achievement in science subject:** In the present study, achievement in science subject is measured in terms of difference between scores obtained by the student in pre-test and post-test (i.e. achievement test prepared by the researcher)

### **Objectives of the Study:**

The present research study had following objectives.

To develop an intervention programme (lesson plan) using the BBL principles and fundamentals, for some selected topics (Food and Nutrition Food and protection of food, Health and Disease.) of Standard VII General Science textbook.

To study influence of BBL intervention programme on academic achievement of Standard VII students.

### **Hypothesis**

Null Hypothesis

H1: There is significant difference in achievement of the students of experimental and control group.

H0: There is no significant difference in achievement of the students of experimental and control group.

### **Methodology**

The research study belongs to the category of applied research. In this study, the effect of BBL intervention programme on academic achievement of the students was revealed using quantitative approach, for which the 'pretest - posttest equivalent group' design was selected. The pretest was administered before implementation of the BBL intervention programme, while the posttest was conducted at the end of its treatment. For group equivalence, matching for mean and standard deviation of their pretest scores was used. The two groups were selected randomly as experimental and control group. The statistical analysis was carried out with the help of SPSS software.

The control variables (extraneous variables) that may influence the dependent variable (academic achievement of the students) are school, class (Standard VII), medium of instruction, topic(s) to be taught, time of teaching (morning/noon session), and so on. The present study was carried out in only one school and randomly selecting two divisions of the same school as control and experimental groups (after testing the group equivalence). This has helped the researcher to control the aforesaid extraneous variables.

### **Data analysis:**

#### **Descriptive statistical analysis referring to group equalization**

The Table 1 depicts statistical analysis of the pretest scores of students of two divisions, selected as control and experimental groups. It is prerequisite to ensure 'equivalence' between the groups, so as to eliminate their influence, if any, on the final results of the research study.

**Table 1**  
**Statistical analysis for group equivalence**

Pretest	No. of students	Mean	S.D	r	Df	t value	Level of Significance
Experimental Group	43	19.69	6.3865	0.93	42	0.259	0.01
Control Group	43	20.04	6.1835				

As seen from Table 1, the obtained t-value is 0.259 for the degrees of freedom (df) of 42. The obtained t-value is less than 'Table t-value' of 2.71 at the significance level of 0.01. Therefore, it is concluded that both selected groups are equivalent, and do not differ in achievement in science subject.

### Descriptive statistics of the pretest and posttest scores

The statistical analysis of the pretest and posttest scores of the students of experimental and control groups is presented in Table 2.

**Table 2**  
**Descriptive statistics of the pretest and posttest scores**

Variable	Group	Test	No. of students	Mean	Median	S.D	Skewness	Kurtosis
Achievement	Experimental	Pre	43	19.69	20	6.386	0.0730	-0.302
		Post	43	36.98	38	6.815	-0.6812	0.571
	Control	Pre	43	20.04	20	6.183	-0.3992	-0.704
		Post	43	26.67	28	7.456	-0.1246	-1.002

From the aforesaid observations it is concluded that;

- a) At the outset, the mean values of both the groups show enhancement implying gain in achievement of the students. A careful observation reveals that the change in mean values is different for these groups, there is more change in experimental group as compared to the control group. In the context of control group, the observed gain in achievement, (indicated by increase in the mean value from 20.04 to 26.67) can be considered to be 'natural', as these students were subjected to the traditional teaching. The significant increase in mean value of the experimental group (from 19.64 to 36.98) is certainly due effect of the BBL intervention programme. Therefore, it is concluded that the BBL intervention programme has affirmative influence on student's achievement in science subject.
- b) Skewness and Kurtosis are measures of distribution of students around the mean value. The '-ve' value of skewness indicates more individuals in the group have higher scores than the mean value, whereas its '+ve' values implies less number individuals have higher score than the mean value. Similarly, '-ve' value of Kurtosis indicates flatter distribution, whereas '+ve' Kurtosis refers to more peaked distribution. The flatter distribution indicates very few individuals near to the mean value, whereas in 'peaked' distribution, many individuals have scores near the mean value.

In case of experimental group, Skewness values of pretest and posttest exhibit change from '+ ve' to '- ve'. This change clearly indicates that in post-test, more number of students have scores greater than the mean value, and there is gain in the achievement. In case of control group, the Skewness value of posttest exhibits slight positive shift with respect to the pretest value, indicative of small rise in the number of students scoring around or more than the respective mean value. Thus the Skewness values clearly reveal that BBL intervention programme has affirmative influence on the achievement of students.

Similarly, in the context of experimental group, the pretest and posttest Kurtosis values show change from ‘-ve’ to ‘+ve’, indicative of more number of students having scores about the mean value in posttest (peaked distribution). Thus the peaked distribution of scores around the mean value in posttest clearly suggests gain in the achievement of experimental group students, which is attributed to positive effect of BBL intervention programme. In the case of control group, the values of pretest and posttest Kurtosis are observed to be ‘-ve’, (flatter distribution) indicative of no significant increase in students achievement.

### Inferential statistical analysis

The inferential statistical analysis was performed to test following hypothesis.

H1: There is significant difference in achievement of the students of experimental and control groups.

H0: There is no significant difference in achievement of the students of experimental and control groups.

‘Paired t-test’ method was used for testing the hypothesis. The paired t-test explores the relationship between experimental and control groups, and one can statistically conclude whether or not the ‘treatment’ has improved the performance. The Tables 3 and 4 depict the relevant statistics of experimental and control group’s achievement.

**Table 3**  
**Paired sample statistics of pre- and post-test scores**

Group	Test	N	df	Mean	SD	Std. error mean	r	L.O.S
Experimental	Pre	43	42	19.69	6.3865	0.973	0.837	0.01
	Post	43		36.98	6.8155	1.039		
Control	Pre	43	42	20.04	6.1835	0.943	0.750	
	Post	43		26.67	7.4569	1.137		

**Table 4**  
**Paired sample test of experimental and control groups**

Pairs	Mean	SD	Std. Error Mean	99%Confidence interval of the Difference		t	df	Significance (2-Tailed)
				Lower	Upper			
Experimental Post-Pre A	17.28	3.788	0.577	16.113	18.44	29.91	42	0.000
Control Post-Pre B	6.63	4.966	0.757	5.0993	8.156	8.751	42	0.000

In case of the experimental group, the obtained t-value of 29.91 is greater than the table t-value of 2.71 at 0.01 level of significance. Similarly, for control group the obtained t-value of 8.156 is greater than the table value 2.71 at 0.01 level of significance. This indicates that there is increase achievement of students of both the groups. However, from the ‘Significance (2-Tailed) value’ being less than 0.5, it is inferred that there is statistically significant difference between the



achievement of experimental and control groups (post- and pretests). Therefore, in order to reveal the effect BBL intervention programme on student's achievement, gain score analysis was carried out and is presented in Table 5.

**Table 5**  
**Statistics of gain scores of experimental and control groups**

Group	N	Gain score mean	SD	SE <sub>D</sub>	Df	t ratio	L.O.S
Experimental	43	17.28	3.788	0.538	42	19.77	0.05
Control	43	6.63	4.967				

As seen from the table, there is significant difference in the gain scores of experimental and control groups. Interestingly, the gain score of experimental group is more than that of control group. Furthermore, the obtained t-value of 19.77 for achievement is greater than the table t-value 2.02 at 0.05 level of significance, indicating that the gain score of experimental group is more than that of control group. Hence, the null hypothesis was rejected. Moreover, as the observed t-ratio of gain scores for achievement was found to be significant,  $\omega^2$  estimate was calculated.

$$\omega^2 = \frac{(t^2 - 1)}{N_1 + N_2 + (t^2 - 1)} = \frac{389.85}{475.85}$$

$$= 0.81927 \cong 0.82$$

The calculated values of  $\omega^2$  indicates 82% of the variance in achievement due to the BBL intervention programme.

## Conclusions

The results of descriptive statistical analysis in terms of mean, Skewness, and Kurtosis indicate that there is increase in the achievement of students of both groups. However, relatively more enhancement is observed in experimental group students as compared to the control group, reflected as a larger difference in the mean values. Interestingly, the inferential statistical analysis in terms of paired t-test, and gain scores, clearly reveals significant enhancement in achievement of experimental group students, which is attributed to affirmative effect of the BBL intervention programme. In nut shell, implementation of the BBL intervention programme leads to measurable increase in the student's achievement in science subject.

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### About the authors:

**Kalpana M. More** is working as Assistant Professor and has teaching experience of more than 15 years. She has been teaching Science, Maths and Psychology at undergraduate (B. Ed.) and postgraduate (M. Ed.) levels. Her research interest is in the field of Brain Based Learning (BBL) and Adolescent Psychology. She has actively participated in various state and national level seminars/symposia/workshops. She has served as Resource Person in 'Special Coaching Workshop for SET and NET'.

[kalpamdev001@gmail.com](mailto:kalpamdev001@gmail.com)

**Ashok R. Rane** is Principal at Khandesh College Education Society's College of Education, Jalgaon-425001, India. He has shouldered the responsibility of Chairman, Board of Studies (BOS) and member of Research and Recognition Committee (RRC) in Education of North Maharashtra University (NMU), Jalgaon, He is recognized Ph. D. guide of NMU and 15 students had been awarded Ph. D. degree under his guidance.

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**Editor's Note:** Instructional design is facilitated by planning where "learning architecture" provides a blueprint for course objectives, design, development, implementation and evaluation.

## Taxonomy and technology in today's interactive classroom

Gena D. Lewis and Kathleen Liace  
USA

### Abstract

In today's classroom it is important to use interactive techniques and clarity of purpose to plan lessons that align to standards and enhance academic achievement. In this process the authors promote the use of domains of learning taxonomy as a reference for planning technology implementation. Matching the verb of the student learning objective will allow for the best alignment with appropriate technology-centered learning applications. Using a tool called TOIL, Taxonomy-Based Interactive Online Learning, the authors suggest a process that will help to enhance the aforementioned planning format. TOIL tool is designed to connect new technology verbs with the Bloom's taxonomical verbs for learning. The tool will assist with adding in the co-collaboration processes that newer applications and online tools now incorporate. Educators should no longer just include technology at the final phases of planning but should create technology centered planning learning experiences that promote student interaction and yield critical thinking for our 21st century world. TOIL helps teachers to focus on technology planning, interaction, and clarity of purpose to promote highest levels of thinking and interaction.

**Keywords:** Technology, taxonomy, domains, interactive learning, objectives, classroom, instructional planning, clarity, standards, online, applications, verbs, assessment, engagement.

### Introduction

Today, classroom teachers are not just expected to incorporate technology in their lessons as personal choice but as part of the mandates of standards throughout the world (Leu, Forzani, Timbrell, Maykel, p. 142). Technology-centered learning is part of mandated state standards and is an assumed majority method for differentiation, inclusion, teaching strategies and techniques (Hattie, 2012, Daigle, 2017 & DeBruyckere, P, Kirschner, P & Hulshof, C, 2016). If you are fully implementing best practices for technology-centered learning then this will be part of instruction and assessment. A brief from the National Educator's Association (2008) regarding technology accounts that, "Researchers are finding a clear link between technology, achievement, and motivation" (p. 2) and most experts agree and there is little debate in the value of technology in the classroom. Students and teachers tend to be more engaged and interested when technology is an integral part of teaching and learning (DeBruyckere, et al. 2016) and there is likewise little debate on the fact that technology is being used in elementary and secondary classrooms. To this point, Culp, Honey, Mandianach (2005, p. 299) articulate that, "We have gone from having little Internet access in schools (35% of schools and 3% of classrooms connected in 1994) to having 99% building-level penetration and 77% of all classrooms in the country connected to the Internet". This data supports the high utility of technology in today's classroom and the need to ensure there are guidelines for planning this technology integration in an effective manner.

Technology is underpinned by the curriculum and curriculum is pervaded by classroom technology. In a study by Hudson, Kadan, Lavin & Vasquez, (2010), they found 99% of respondents replied that they use technology on a daily basis in their classroom to support student learning.

When analyzing the literature review for technology and taxonomy-based learning the research was plentiful. However, there was a great void of literature in the areas of interactive technology use in the classroom. Given this void, the authors analyzed articles in the literature review for taxonomy, interactive learning and technology and performed separate literature reviews for interactive technology instruction. Though technology in and of itself is not sufficient for meeting content standards (Partnership for 21st Century Skills, 2016), we must rethink the way we use technology within content and where we put it in the planning process and this strategy of intentional planning is very important for technology integration to be successful. We also need to ensure that technology is used as a vehicle for high-level discourse and interaction, thus the rationale for adding interactive techniques to the instructional planning process. In today's applications of technology a new process is possible whereas students are enabled the task of co-collaboration. Meaning that students are electronically interactive in the highest levels of Bloom's application in an asynchronous manner – planning, ideating, authoring, creating and such at the same time in the same tool. This new manner of using online tools in a co-collaboration phase is how interactive learning can be met and facilitated with today's advances in technology. (See table 1.2) This new level of technology is a great way to create a purposeful group interaction effort and higher taxonomical levels that are visible for all members of the group at the same time. This is how interaction allows for the group to see all individuals creating, applying and evaluating “out loud”. When giving careful consideration to the kind of technology to use, how it will be used, and why it will be used, instructional planning should focus on providing students with meaningful learning experiences, supported by technology and interaction (Fisher, Denning, Higgins, & Loveless, 2012).

A recent review article (DeBruyckere, Kirschner & Hulshof, 2016) in *American Educator* states a few cautions for classrooms as we move into instructional planning with technology. Educators must look closely at how technology is used in classrooms as the technology is not the tool making the gains for students, but the teaching that is entwined with the technology. Hence the need to focus on how the teacher will plan and maintain high levels of interaction within the model to maintain the level of impact on instruction. The *American Educator* (NEA, 2008) states that, “even Microsoft cofounder, Bill Gates—whom you would hardly suspect of being against technology in education—summarized his view on the matter as follows: “Just giving people devices has a really horrible track record (pg 16).” National Educators Association (2008) purports that the use of intentional planning and a device to help integrate the technology in a meaningful manner will be the best asset for planning. Knowing the success and hard core following in the educational community of Bloom's Taxonomy and Anderson's Taxonomy revised, the authors recommend an instructional planning method that involves integrating technology and interactive learning as a manner to effectively plan instruction, inclusive of high levels of engagement and guided by clarity through standards. The use of both interaction and technology guided by taxonomy is a very different manner of planning effective instruction.

There are a number of studies mentioned here that point to a positive gain in learning, with the statement that positive learning may also result from the good use of technology with good teaching. The crucial factor for learning improvement is to make sure that the teacher is the instrument of instruction. Technology should amplify what the teacher does and promote interaction within the classroom. The use of engagement is needed to help students feel a better sense of ownership and investment in the curriculum. The work of Daugherty (2014) states that the use of interactive techniques showed a positive effect on student learning. Student attitudes reflected in the surveys showed improvement in the amount and quality of work completed throughout the study. Daugherty reports that off-task behaviors were also lowered by incorporating interactive learning in the classroom. Many things improved greatly due to the use of interactive techniques. To fully engage students in today's classroom, teachers need to be using the most interactive methods to keep engagement as the central focus when planning instruction.

Children of today are seamless users of technology and have the internet right in their hands at any moment. Educators need to harness the power of this integrated knowledge and use it to gain access to great tools and students' lives that make instruction more impactful. Technology tools need to be made clear at the planning phase to educators. All educators need to know when and where to enhance instruction by seeing technology as a learning strategy and not a physical object. By matching the technology tools with the taxonomy of learning domains (Bloom, Engelhart, Furst, Hill & Krathwohl, 1956; Anderson & Krathwohl, 2001) it will be easier to view these tools as a way to serve a Student Learning Objective.

The attachment of technology tools to knowledge domains will help educators to serve taxonomical verbs within lesson plans and apply those learning verbs (Anderson revised verb-based domains) to best help plan a more meaningful learning experience. As instructional planning incorporates technology, consideration needs to be given to how it can be used to enhance the following: co-ideating, unanimous and evaluative voicing, presenting, co-authoring, correspondence, group tasking and sharing, corresponding.







In this article the authors will examine a model for planning for instruction by matching the intended student learning objective (SLO) with the taxonomy-based verb that is being blended for use in the assessment and instruction for planning interactive lessons or units. The teacher will need to focus the instruction on the verb within the standards and or SLOs being used to create a meaningful match in the intended activity to enhance interactive technology implementation. There are many types of technology that can be chosen today so making the best decision for the situation will be a more difficult unless there is a way of sifting through the focus of the objective as a way to target an appropriate technology tool (Ruggiero & Mong, 2015). There are many new forms of technology within 1-1 and 1-many classroom modalities. Whether the classroom has desktops, laptops, tablets or phones at their disposal these ideas of technology focused management and organization will help any elementary or secondary teacher become adept at planning with technology at the center. This can be achieved by viewing lesson planning with technology as part of the initial planning and not at the end of planning. See the Taxonomy-based Online Interactive Learning (TOIL) tool below. Also below you will find a tool (Table 1.2) that depicts the direct relationship between Blooms/Andersons verbs and the application of interactive technology verbs to better visualize the connection to their application in planning.

For example, if the teacher is planning on having the students engage in co-writing or co-ideation for the objective purpose of writing arguments with support from research, then using tools to plan these electronically can be more effective by employing the direct link between the verb write and aligning it to the TOIL section of co-write. This link can then bring the teacher to a list (see below) of co-writing tools to choose from to make the tech tool selection more efficacious. The area of match between Bloom's Taxonomy and the task performed by the technology apps and tools available today are as follows:

**Table 1.1**  
**Taxonomy-based Online Interactive Learning - TOIL**  
**Technology Task (Taxonomy)**

<b>Taxonomy-based Online Interactive Learning – TOIL</b>
<b>Technology Task (Taxonomy)</b>
<b><u>II. Co-ideating (Creating), Unanimous Voicing (Evaluating), Evaluative Voicing (Evaluating), Presenting (Analyzing),</u></b> <b><u>I. Co-authoring (Applying), Group Tasking &amp; Sharing (Understanding), Corresponding (Remembering)</u></b>
<b><u>Co-ideating: (Applying, Evaluating, Creating):</u></b> Question And Answering, Virtual Visits, Field Trips Through AR And VR, Streaming, Word Processing, Annotating, Categorizing, Tweeting, Subscribing, Explaining, Advanced Searches, Commenting, Video Conferencing, Filtering And Finding Answers Search For Information, Build Background, Mind Mapping, Searching, Listing, Tagging, Bookmarking, Describing, Social Networking, Reviewing, And Or Practicing Tools: ThingLink, Google Documents and Draw, Writeboard, Writewith, Bubbl.U.s, Comapping, Gliffy, Mind42 , Mindmeister, Mindomo, Thinkature, Writemaps, Piktochart, Chatterpix, Explain Everything
<b><u>Unanimous Voicing: (Applying, Evaluating, Creating):</u></b> Advising, Debating, Critiquing, Networking, Posting, Collaborating, Conferencing, Moderating, Blogging, Reviewing, Simulation, Commenting, Monitoring, Wiki-ing, Distributing Tools: Wordle, WordCloud, Plickers, ClassKick, Socrative, Verso, Flipboard, Goodreads, HootSuite, Instapaper
<b><u>Evaluative Voicing: (Applying, Evaluating, Creating):</u></b> Depicting, Surveying, Structuring, Mashing, Deconstructing, Outlining, Organizing, Linking, Media Clipping, Video Conferencing, Relationship Mapping, Mind Mapping, Graphing, Word Clouding, Summarizing Tools: Fotobabble, Vi, Skype, Flipgrid, Zite, Google Forms, Screencastify, Imovie, Explain Everything, Wunderlist
<b><u>Presenting: (Applying, Evaluating, Creating):</u></b> Share Your Learning, Present Your Findings, Take Action About Your New Ideas, Advocate, Start A New Initiative Tools: Slidrocket, Prezi, Slideshark, Haiku Deck, Slidedog, Slide Bureau, Powtoon, Keynote, Mediashout, Kineticcast, Knowledgevision, Goanimate, Wink, Snagit, Camtasia, Camstudio, Articulate Presenter, Windows Movie Maker, Slideshare, Visualbee, Projqt, Emaze, Preseria, Reallusion, Google Slides, Youtube, Blogger, Nearpod
<b><u>Co-authoring: (Remembering, Understanding, Analyzing):</u></b> Animating, Videocasting, Storytelling, Video Editing, Podcasting, Collaborating, Audio Recording/Editing, Publishing, Filming, Programming, Directing, Writing Tools: Book Creator, Buncee, Kahoot, Wiggio, Powtoon, Quickcast, Explain Everything, Nearpod, Voxer, Comment Now, Story Wars
<b><u>Group Tasking and Sharing (Remembering, Understanding, Analyzing):</u></b> Labeling, Listing, tasking, assigning, reporting, selecting, classify, define, locating, storing, organizing, learning management organizing Tools: G Suite, D2L, Blackboard, Engage, Google Classroom, Todoist, Wunderlist, Bear, Ike, Habitica, Schoology, Chatterpix
<b><u>Corresponding : (Remembering, Understanding, Analyzing)</u></b> Emailing, Texting, Messaging, Interviewing, Illustrating, Editing, Demonstrating, Sharing, Replying, Podcasting, Talking, Meeting Tools: Quizizz, Wakelet, Google Messenger, Twitter, Evernote, Bloggy, eClicker, ClassDojo, Bloomz, SeeSaw, Kidblog

**Table 1.2 Bloom’s Taxonomy to Tech Taxonomy**


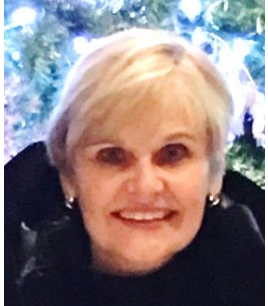
Blooms/Anderson	Tech Action Verb with Co-interaction	Visual
<b>Creating</b>	<b>Co-interacting by:</b> Co-Ideating	
<b>Evaluating</b>	<b>Co-interacting by</b> Unanimous Voicing Evaluative Voicing	
<b>Analyzing</b>	<b>Co-interacting by:</b> Presenting	
<b>Applying</b>	<b>Co-interacting by:</b> Co-authoring	
<b>Understanding</b>	<b>Co-interacting by:</b> Group tasking & Sharing	
<b>Remembering</b>	<b>Co-interacting by:</b> <b>Corresponding</b>	



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## About the authors

	<p><b>Dr Gena Lewis</b> is a professor of Education at Benedictine University in Lisle, Illinois. She teaches in the Language and Literacy, Reading Specialist and Graduate Education programs. She has research interests in the areas of curriculum implementation, student learning objective instruction and assessment, balanced literacy instruction, technology implementation and also bilingual education.</p> <p><a href="mailto:glewis@ben.edu">glewis@ben.edu</a></p>
	<p><b>Dr. Kathleen Liace</b> is currently an Assistant Professor in the College of Education and Health Services at Benedictine University, Lisle, Illinois. She has been in her current position since 2014. Formerly, Dr. Liace worked as a district curriculum coordinator, reading specialist, and special education teacher in the public school system. Dr. Liace was also a Project CRISS Trainer (<b>CR</b>reating <b>I</b>ndependence through <b>S</b>tudent owned <b>S</b>trategies). In this role Dr. Liace provided numerous literacy workshops and trainings for disciplinary teachers and administrators to help teacher learn how to incorporate literacy str</p> <p><a href="mailto:kliace@ben.edu">kliace@ben.edu</a></p>

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**Editor's Note:** For many organizations, videotaping lectures is a first step to rapidly transfer lessons for use in distance education. Television has visualization capabilities far beyond the "talking head" approach.

## **Lecture capture system: bringing the most out of face-to-face learning**

**Shavneet Sharma, Jashwini Narayan and Rashmini Lata**

### **Abstract**

This study recognises and addresses a deficit in research on lecture capture system for higher institutes in the Pacific. The purpose of this paper is to examine and better understand student views and feedback of the lecture recordings. This paper argues several factors that determine the usefulness of the system. This study is useful in setting the premise for future large scale empirical research. Tertiary institutes, scholars and educators will benefit from the suggested model.

**Keywords:** University. Fiji, higher-education, lecture capture system, Pacific, developing

### **Introduction**

Many universities, [including The University of the South Pacific] are increasingly utilizing the lecture capture technology and video storage to their courses (Williams, et al., 2016). The perusal of literature indicates that the terms 'lecture capture,' 'podcast,' 'webcast,' and 'm-learning' can be used interchangeably to describe the digital video lecture recordings (Williams, et al., 2016).

"Recording classes for consumption outside of the lecture hall is not a new idea in academia" (Mallinson and Baumann, 2015, p. 478). Previously, such podcasts were particularly used for either revision materials or supplementary material (Fernandez, et al., 2009; Leijen, et al., 2009), however, given the ease of recording and delivery software of recent years, other options have become feasible (Williams, et al., 2016). 'Lecture capture' is the use of digital video in archiving live lectures in higher education, which students can access and review at their convenience (Educause, 2008; Lane, 2006; Malan, 2007; Mallinson and Baumann, 2015). "While lecture capture has a relatively long history, it is an emergent priority for educators and education leaders" (Kinash, et al., 2015, p. 130).

Our research was conducted in 2 large undergraduate second and third year marketing courses to investigate a regional university's students' perception and use of lecture recordings. "Students are important stakeholders in the higher education context and their perceptions [should be] valued" (Kinash, et al., 2015, p. 130).

The lecture capture videos at our university are called lecture capture and these recordings are done during face to face lecture sessions but these are not automatically distributed but uploaded later by the IT department on course MOODLE shells. Students need to visit the course MOODLE shells and then need to click the 'lecture recording link' that will then take them to the respective recording of each lecture session.

### **Literature review**

According to Mayer (2002), it is evident that the visual and audio stimulus enhances learning. Students make use of lecture recordings for study purpose (Chandra, 2007; Gosper, et al., 2007), to catch up on what they miss (Gosper, et al., 2007; von Konsky, et al., 2009) and to review what they find difficult (Green, et al., 2012; Owston, et al., 2011).

Various studies have investigated the impact of lecture podcasts on student attendance and learning but with inconclusive results, questioning the efficacy of lecture recordings (Mallinson and Baumann, 2015). For instance, some studies indicate little to no effect (Bollmeier, et al., 2010,

Chandra, 2007; Franklin, et al., 2011, Leadbeater, et al., 2013, Hadgu, et al., 2016; von Kinsky, et al., 2009), Some found a positive impact on student grades (Hove, et al., 2008, Terry, et al., 2015; Traphagan, et al., 2010), some mention a modest decline in student attendance (Billings-Gagliardi and Mazor, 2007), some others found that if given a choice, only about a third of students would prefer video-only lectures (Lauer, et al., 2004) and some even mention negative side effects (Johnston, et al., 2013, Williams, et al., 2010). What is a concern is that whereas students approve of archiving classes for later use, the impact on grades is minimal (Mallinson and Baumann, 2015). Some say that while video recordings of lectures are popular with students and studying from lecture capture videos appear more effective than re-reading the text or notes, it is often found to lower attendance of students in lectures with just a slight increase in performance, without increasing exam averages (Williams, et al., 2016). In contrast, as per Kinash et al. (2015, p.133), ‘the argument that lectures should not be provided online because students will stop coming on-campus is [also] largely unsubstantiated’ and there are ‘inconclusive areas [which] continue to be of a concern to many researchers’ (Joseph-Richard, et al., 2016).

Not every student watch recordings regularly. Williams et al.’s (2015) study confirms that only a small percentage of students watch podcasts on a regular basis. According to Mallinson and Baumann’s (2015), higher usage may also not translate into better grades since just viewing lectures will not substantially improve individual performance. Research of Billings-Gagliardi and Mazor (2007), Chandra (2007) and Mallinson and Baumann (2015), imply that most non-user argue that they learn better from the textbook and/or attending class and do not believe recordings enhance their understanding.

Thus far, most of the studies examining the impact on lecture capture have focused on specific disciplines such as communications (Dupagne, et al., 2009), nursing (Kemp, et al., 2010), geology (Traphagan, et al., 2010), pharmacology (Bollmeier, et al., 2010), medical (McNulty, et al., 2011), psychology (Ford, et al., 2012), political science (Mallinson and Baumann, 2015) and biology (Williams et al., 2016). Amongst these studies, a recent study by Williams et al. (2016) is amongst the very few that investigated how student use varies by demographic group. As per Kay (2012), a review of podcast related papers from 2001 to 2011 does not indicate podcast use differences by way of gender or ethnicity. Williams et al.’s (2016) study found that the use of podcast varied largely with gender and ethnicity and that women and Asian students were the heaviest users (Williams et al., 2016). As per Williams et al. (2016), for some groups, lecture podcasts are particularly beneficial (Williams, et al., 2016). However, as common in most studies, they found that, above all, even for regular students and heavy users, there is no particular increase in learning (Williams, et al., 2016). According to some researchers (Mallinson and Baumann, 2015; Owston, et al., 2011; Pinder-Grover, et al., 2011), it is the low-performing students who watch the recordings while the high-performers view only specific portions.

As Williams et al. (2016) state, online resources are newer and have not been studied extensively. While lecture recordings have failed to achieve statistical significance and results do not appear to have a substantive impact on student performance (Mallinson and Baumann, 2015), lecture capture studies ‘can provide valuable feedback to the instructor about the parts of the lecture that were found most confusing by students’ (Williams, et al., 2016: 10).

Our study contributes to podcast literature in the area of unresearched discipline of marketing management. “Solutions must be developed within particular disciplines and with unique student cohorts” (Kinash, et al., 2015, p.136). In addition, like Williams et al.’s (2016) study, we also look at student subgroups of ethnicity and gender and added age group to the same. This is the first of such research in The University of South Pacific which is unique on its own since it is a regional university. As it is, podcast literature is inconclusive, the more the reason to keep such research ongoing.

## Results and discussion

### ***Demographic profile of students***

Of the 291 respondents, 46.55 percent were male (n=135) and 53.45 percent were female (n=155). Of the total respondents, 78.35 percent (n = 228) were full-time and 21.65 percent (n = 63) were part-time students. 9.28 percent of the respondents were less than 20 years old, 63.92 percent were between 21 and 30 years old, 20.62 percent were between 31 and 40 years old, and the remaining 6.19 percent represented age groups older than 40.

Of the 291 respondents 52.57 percent (n=153) were from Fiji, 5.15 percent (n=15) were from Kiribati, 19.59 percent (n=57) were from Solomon Islands, 3.09 percent (n=9) were from Tonga, 7.21 percent (n=21) were from Tuvalu, 8.24 percent (n=24) were from Vanuatu, 3.09 percent (n=9) were from Samoa and 1.03 percent (n=3) were international students

### ***Popularity of lecture capture recordings***

97.9 percent (n=285) of the students indicated that they listened to/viewed the lecture capture recordings from their course, while 2.1 percent (n=6) did not. Looking at the students that viewed the recordings, 30.9 percent of the students indicated that they listened to all the recordings from the course, 37.1 percent of the students viewed most of the recordings, 24.7 percent viewed some of the recordings while the remaining 7.2 percent of the students viewed just a few recordings. These results show that the lecture capture recordings are very popular among students.

### ***Types of listening and viewing habits***

Looking at the 291 students that participated in the survey, 16.5 percent (n=48) students listened to/viewed the entire recordings one time, 35.1 percent (n=102) listened to/viewed the entire recording multiple times, 36.1 percent (n=105) listened to/viewed the entire recording once and certain parts of the recording multiple times, 2.1 percent (n=6) skipped to certain parts of the recording and listened to/viewed them once while 10.3 percent (n=30) fast-forwarded to certain parts of the recording and listened to/viewed them multiple times. From this it can be seen that students often like to go over certain aspects of the recordings multiple times. This can be for concepts they deem important or find difficult to understand.

### ***When do students listen to/view the recordings***

29.9 percent (n=87) view the recordings in the same week it is made available, 30.9 percent (n=90) view the recordings a few days/weeks after it was made available, 6.2 percent (n=18) view the recording while doing their assignments, 33 percent (n=96) view it while revising for their exams. This shows that the majority of the students listen to the recordings when preparing for their exams. This would enable students to go over the important points highlighted by the lecturer which would not be possible in the absence of recordings.

### ***Student activities while listening to/viewing the recordings***

8.2 percent of the students (n=24) listening to lecture capture recordings while doing other tasks such as running or commuting, 6.2 percent (n=18) annotate their existing course notes while listening to the recordings while 85.6 percent (n=249) students followed along with notes from lectures or Power Point slide while listening to the recordings. This shows students that lecture recordings help students better understand topics and concepts with explanations and examples provided by the lecturer.

### ***Quality of lecture recordings***

As the responses, students have given positive feedback for all factors relating to the quality of lecture recordings apart for availability within an acceptable timeframe. Recordings are processed and by the IT department at USP and uploaded by Educational Technologist on the respective

MOODLE shells. According to students this process is likely taking too long. Issues can emerge for students when assignments are due or examination covers topics for which lecture recordings are not made available for an appropriate amount of time.

Statement	Count					Mean
	SD	D	N	A	SA	
I could easily access and download the lecture recordings.	12	12	60	102	105	3.94845
I could clearly hear the lecturer's voice in the lecture recordings	3	18	42	120	108	4.07216
The picture quality of the lecture recordings was good.	3	15	75	114	84	3.89691
I could access all lectures for my course through the lecture recordings	12	30	66	96	87	3.74227
The lecture recordings were made available within an acceptable timeframe.	9	42	87	114	39	3.45361
The lecture recordings made sense alone, without visual aids (e.g. slides or notes).	42	39	57	102	51	3.27835

### Use of lecture recordings

Statement	Count						Mean
	SD	D	N	A	SA	Total	
Lecture recordings are a convenient way to access course materials.	3	6	57	111	114	1200	4.123711
Lecture recordings are more convenient for me than face-to-face lectures.	9	21	78	72	111	1128	3.876289
Lecture recording helped me catch up when I missed class.	3	3	18	93	174	1305	4.484536
Lecture recordings helped me prepare for assignments and exams.	3	3	21	87	177	1305	4.484536
Lecture recordings clarified concepts discussed in class.	3	3	24	129	132	1257	4.319588
I learned more using the lecture capture recordings than I would have if they had not been available	3	9	60	111	108	1185	4.072165
I found listening/viewing the lecture to be helpful to my learning.	3	0	42	102	114	1107	3.804124
Listening/viewing the recording allowed me to make sure my own notes were correct and complete.	3	3	48	90	147	1248	4.28866
I think reading from my notes is an effective way to revise	3	12	69	129	78	1140	3.917526
I think reading from the textbook is an effective way to revise	3	27	81	111	69	1089	3.742268
I think listening to/viewing lecture recording is an effective way to revise	3	0	48	114	126	1233	4.237113
I feel I can relate to the instructor in a traditional lecture	9	12	87	102	81	1107	3.804124
I feel I can relate to the instructor in a lecture capture	6	18	72	132	63	1101	3.783505

Looking at students' responses pertaining to the use of lecture recordings, majority of the students have agreed to all the advantages emerging for the use of the recordings. This reaffirms the success of the system

### **Lecture recordings and student attendance**

48.5 (n=141) percent of the respondents indicated that the availability of lecture recordings had no effect on their attendance in lectures, 5.15 percent (n=15) indicated that their attendance had increased while 46.39 percent (n=135) indicated that there was a decrease in attendance because of the lecture capture system. These results show that the lecture capture system may result in a decrease in student attendance in lectures.

### **Continuation of the lecture capture system**

When participations of this survey were asked "should the University continue with lecture capture?", all 291 students indicated "yes". This affirms the success and usefulness of the lecture capture systems for students at the University of the South Pacific.

### **Conclusion and future research**

This study shows compelling evidence of the benefits associated with the lecture capture system. These are important findings as many universities are adopting to use the lecture capture system for their courses. Future studies need to be carried out with a larger sample on its impact on students' performance, class attendance and potential of copyright violation

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### About the authors:

**Mr. Shavneet Sharma** is also an academic in the School of Management & Public Administration in the above university. He graduated from USP in March 2015 with a BCOM in Accounting and Management. He worked for KPMG as an auditor prior to joining USP as a tutor from 2016. He is a Certified Fraud Examiner (CFE) and during his studies at USP, he was a Senior Peer Mentor. Email: [shavneet.sharma@usp.ac.fj](mailto:shavneet.sharma@usp.ac.fj);

**Dr. Jashwini Narayan** is an academic (currently at lecturer position) in the School of Management & Public Administration at the University of South Pacific since January 2006. Prior to joining USP, she worked at Carpenters Morris Hedstrom, Cost-U-Less, ANZ Bank, Reserve Bank of Fiji and HFC Finance. Email: [narayan\\_ja@usp.ac.fj](mailto:narayan_ja@usp.ac.fj);

**Ms. Rashmini Lata** is in the private sector working for Australia New Zealand Bank (ANZ Bank). She is a Human Resources Practitioner and has been in the field for over 4 years. Previously, she was employed by PriceWaterhouseCoppers as a Human Resources Consultant where she worked for various organisations in both private and public sectors. Rashmini graduated from USP in March 2015 with BCOM in Human Resources Management and Information system. She has also completed her post-graduate studies and is currently pursuing Master in Commerce in Management and Public Administration. Email: [rasharies93@gmail.com](mailto:rasharies93@gmail.com)

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**Editor's Note:** There are numerous ways of providing corrective feedback during and at the conclusion of a learning experience.

## **The impact of computer-mediated vs. traditional corrective feedback on Iranian EFL Learners' IELTS writing accuracy**

**Seyed Behrooz Hosseini**

Iran

### **Abstract**

This study aims at investigating the effect of explicit/implicit computer-mediated and paper-based corrective feedback on Iranian EFL learners' writing accuracy. To this end, eighty (N=80) participants were identified and randomly assigned to four experimental groups. Each group included twenty (N=20) participants. Two groups received explicit and implicit computer-mediated corrective feedback. Two groups received explicit and implicit paper-based corrective feedback. The results of the analyses through two separate independent samples t-tests revealed that there was no statistically significant difference between those who received explicit computer-mediated and paper-based corrective feedback in terms of the accurate use of subordinating conjunctions in their writing. In addition, the participants who received implicit computer-mediated corrective feedback significantly outperformed those received implicit paper-based corrective feedback in terms of the accurate use of subordinating conjunctions in their writing.

**Keywords:** computer-mediated communication, corrective feedback, IELTS, accuracy, SCMC, ACMC, Noticing Hypothesis, explicit, implicit, interaction, chat, e-mail

### **Introduction**

Communication is central to the exchange and sharing of information. Today, technology and its various forms are being extensively used to carry out a wide variety of activities in such areas as business and education. Recently, language teachers and educators have begun to introduce computers as an effective means of communication into their language classes to facilitate language learning and teaching. Computer-mediated communication is a newly-introduced form of interpersonal interaction which encompasses all the features of traditional classroom communication.

“Computer-mediated Communication (CMC) is defined as any communicative interaction that occurs through the use of two or more networked computers. Popular forms of CMC include email, video, audio or text chat, bulletin boards, list-services and MMOs” (Yu, 2011, p. 532).

These areas are changing rapidly with the development of new means of technology-based communication tools. According to Barnes (2002), CMC is defined as a wide variety of technologies that facilitate both interpersonal communication and the interactive sharing of information via computer networks such as e-mail, discussion groups, newsgroups, chat, instant messaging and web pages. Barnes also adds that “Behind all Internet communication is people communicating with others, either directly or through software design. Internet interactivity occurs as interpersonal interactivity, informational interactivity, and human-computer interaction” (p. 2).

CMC in educational environments is primarily concerned with connecting learners through computer for communication purposes. According to Fey (1998), “computer networks are allowing students to transcend boundaries of classroom walls and to learn in new ways” (p. 86).

Reid (1991) classifies CMC into three categories: First, *e-mail, or electronic mail*, permits the Internet users to send messages to each other. Second, *News* gives users the permission to send messages to multiple users on diverse subjects. Finally, *chat programs* send one person’s typing directly to the monitor of another person or group of people without storing the messages.

According to Nguyen (2008), CMC can be divided into two modes: “Synchronous (SCMC) and asynchronous (ACMC) communication capacity with high and multiway interactivity” (p. 26). In this sense, learners can communicate through “either synchronous formats (real-time, i.e. immediate communication) or in asynchronous ones (delayed communication, i.e. students being able to access and respond to messages at their leisure)” (Hirvela, 2006, p. 233). Warschauer (2001) defines different modes of CMC as:

- a) Synchronous computer-mediated communication, whereby people communicate in real time via chat or discussion software, with all participants at their computers at the same time;
- b) Asynchronous computer-mediated communication, whereby people communicate in a delayed fashion by computer, e.g. by e-mail; and
- c) The reading and writing of on-line documents via the internet. (p. 207).

According to Lee (2001), SCMC allows learners to communicate with others in the same ways as they communicate in Face-to-Face (FtF) situations. Sykes (2005) also points out that SCMC provides communicators with the opportunity to monitor their language use which results in more accurate language production. On the other hand, as states by Heisler and Crabill (2006), ACMC provides the learner with the opportunity to contemplate, revise, edit, or even cancel the communication; this gives the sender ample time to be more accurate and considerate about their communication which increases their mental processing, critical thinking (Lee, 2004), and problem solving (Jonassen & Kwon, 2001) abilities.

The application and effectiveness of ACMC and SCMC technologies in pedagogical environments have been extensively researched and positive outcomes have been reported. Warschauer (1995) emphasizes the role of e-mail and states that e-mail is one of the most crucial and frequently used communication applications on the Internet. Sotillo (2000) also refers to the delayed nature of communication through ACMC and maintains that communication via e-mail enables learners to produce more accurate language.

Concerning SCMC, research evidence indicates that real-time communication through text may help learners develop their speaking ability (Abrams, 2003; Payne & Whitney, 2002). Researchers have also studied the comparison between SCMC and FtF discussions with SCMC as a prerequisite for FtF communication. The findings from these studies corroborate the effectiveness of SCMC both over FtF and in promoting FtF discussions.

Through technology, Learners are not limited to classroom activities that they may find unattractive and boring; they can experience new and more effective communicative activities with the result that language learning becomes an interesting and smooth undertaking.

In order for learners to communicate more effectively and accurately, it is of utmost importance that they be provided with appropriate corrective feedback (CF) on their output; “such feedback draws learners’ attention to mismatches between input and output, that is, causes them to focus on form, and can induce noticing of the kinds of forms for which a pure diet of comprehensible input will not suffice” (Long & Robinson, 1998, p. 23). According to Long (1990), CF draws the

learner's attention to the discrepancies between what they receive as input and what they produce as output.

In literature, there has been a great deal of controversy over the effectiveness of CF in language learning. Sheen (2007) and Lee (1997) corroborate the effectiveness of teacher-provided CF in promoting language learning. In contrast, Truscott (1996) claims that feedback in counterproductive in language learning. Truscott maintained that "grammar correction has no place in writing courses and should be abandoned" (p. 328). With regard to more recent literature, a host of evidence suggests that "CF provides learners with clues indicating what is wrong and draws their attention to erroneous forms resulting in better learning" (Hosseini, 2015, p. 24).

Rezaei, Mozaffari, and Hatef (2011, p. 22) refer to Schmidt's (1990) Noticing Hypothesis and state that "noticing is a prerequisite of learning, continuing that conscious attention must be paid to input in order for L2 learning to proceed." Therefore, CF helps learners to notice what mistakes they have made and encourages them to produce more accurate language.

Hosseini (2012, p. 24) cites Ashwell (2000) and maintain that "Grammar accuracy and writing improvement have also been shown to benefit from CF. Application of CF on learners' writing will help them avoid the possibility of future errors and promote accuracy of their writing with more focus on meaning." Ferris (2010) also maintains that "the studies on written CF ... examine whether written CF facilitates long-term acquisition of particular linguistic features and if so, how" (p. 188).

Erel and Bulut (2007) point out the motivating and encouraging effects of written CF on learners and say that "it is believed ... that if a teacher indicates a written grammatical error on a student's paper and provides the correct form in one or another way, the student will realize the error and will not repeat it in his/her future writings"; as a result, "the ability of writing accurately will be improved" (p. 398). Erel and Bulut cite numerous studies (see Ferris & Roberts, 2001; Ashwell 2000; Chandler, 2003) in support of the effectiveness of CF in promoting writing as well as grammatical accuracy of learners by saying that

Teachers believe that correcting the grammar of student writers' work will help them improve the accuracy of subsequent writing. Research evidence on error correction in L2 writing classes shows that students who receive error feedback from teachers improve in accuracy over time (Ferris & Roberts, 2001). There is also research evidence which proves that students want error feedback and think that it helps them improve their writing skill in the target language. (p. 398)

According to Kaweera and Usaha (2008), it is also noteworthy that "many scholars and researchers agree that feedback is essential and has a positive effect on students' writing. Thus, feedback on writing can be selected as a means of helping students to make revision and can help students improve their writing skills" (p. 85).

With respect to the aforementioned research studies and findings, it is clear that in spite of the earlier controversy over the effectiveness of CF on learners' writing accuracy, the role of teacher provided CF in promoting language learning and eliminating learners' structural inaccuracies is undeniable. Teachers should also be aware of learners' needs as the basis for providing appropriate feedback; this is especially crucial as there are different types of feedback ranging from explicit to implicit. This is because learners possess varying knowledge of the language and levels of proficiency and therefore, "can benefit from different ways of providing corrective focus on form" (Guenette, 2007, p. 47).

Having discussed the benefits of computer technologies in language learning and the importance of corrective feedback in grammar accuracy, it can be claimed that research on learning outcomes on the impact of computer-mediated corrective feedback is still limited (e.g., Loewen & Erlam, 2006; Sachs & Suh, 2007) and to the best of our knowledge, no attempt has ever been made,

especially in Iran, to compare the effects computer-mediated and traditional, i.e., paper-based, corrective feedback in Iranian EFL learners' writing accuracy. Therefore, the present study was undertaken with the hope that its findings might help to enhance the practices of TEFL in terms of technology and language learning in general and writing accuracy in particular.

### Brief review of the related literature

In literature, technology-based instruction has been proved to be more effective than face-to-face instruction; this can be due to the fact that “the positive ‘distancing effect’ afforded by electronic communication which lends itself to increased student empowerment and increased desire to express oneself in the target language because the computer seems to minimize the risks involved in communication in a foreign language” (Hirvela, 2006, p. 234). According to Warschauer and Healey (1998), most studies in CMC have been concerned with the active participation of language learners in inter-personal communication and the accuracy of their writing.

Payne and Whitney (2002) identify the major findings with regard to research into CMC and its benefits for language learners:

- a) students tend to produce more complex language in chatrooms than in face-to-face settings . . .
- b) participation increases online with ‘quieter’ students participating as much or even more than those individuals who normally dominate classroom discussion . . .
- c) attitudes toward the target language were reported to improve. (p. 14)

Kern (1995) also showed that grammatical accuracy of English language learners significantly increased in CMC environments. Studies conducted by Faghieh and Hosseini (2012) and Hosseini (2012, 2013) also corroborated the effectiveness of CMC in improving certain grammatical aspects for learners.

Grammar and writing accuracy have also been shown to benefit from corrective feedback (CF). According to Ashwell (2000), the use of CF on learners' writing will help them avoid the likelihood of future mistakes and increase their writing accuracy. As stated by Ferris (2010), “the studies on written CF . . . examine whether written CF facilitates long-term acquisition of particular linguistic features and if so, how” (p. 188). Soori and Abd. Samad (2011) also cite Russell and Spada (2006) and say that they “investigated the impacts of corrective feedback on second language grammar learning. The outcome of this study revealed that corrective feedback was helpful for L2 learning.” (p. 350).

“Numerous studies have examined corrective feedback in face-to-face interactions, and yet other studies have examined language produced in CMC environments, no study has observed corrective feedback provided by instructors to students in . . . asynchronous and synchronous foreign language contexts” (Castañeda, 2005, p. 4).

In addition, despite the aforementioned studies and the effectiveness of corrective feedback in the writing accuracy of learners of English language in various contexts, Dabaghi Varnosfadrani (2006) cites numerous studies (e.g., Havranek & Cesnik, 2003; Muranoi, 2000) and maintains that not enough studies “have investigated the effectiveness of error correction in EFL contexts” (p. 35). Therefore, the present study aims at investigating the effectiveness of computer-mediated vs. traditional (paper-based) corrective feedback—explicit/implicit, in Iranian intermediate EFL learners' IELTS writing accuracy. As a result, the following research questions are intended to be addressed:

- Q1. Is there any statistically significant difference between *explicit* computer-mediated and paper-based corrective feedback in terms of the correct use of subordinating conjunctions?

Q2. Is there any statistically significant difference between *implicit* computer-mediated and paper-based corrective feedback in terms of the correct use of subordinating conjunctions?

## Method

This study is a true experimental research and has the pretest-posttest equivalent-groups design.

## Participants

The participants of this study were chosen randomly from among adult female intermediate EFL learners at Iran Language Institute (the ILI) in Tehran whose age was 17 or more. In order to make sure of the participants' homogeneity, Preliminary English Test (PET, 2006) developed by Cambridge was administered prior to the treatment. Out of the subject pool, eighty students (N=80) were identified and assigned randomly to four experimental groups. Each group included twenty (N=20) participants.

## Materials and instruments

The participants were taught their regular intermediate coursebooks compiled and designed by the senior decision makers at the ILI. Six IELTS writing topics were chosen from *Cambridge Practice Tests for IELTS* by Jakeman and McDowel. Enough sheets of paper and pens were provided for the participants of the paper-based groups to use and write their paragraphs. In addition, the participants of the technology-based groups were required to bring their tablets or laptops to the class; if they failed to do this, the researcher would provide them with the necessary equipment.

## Data collection procedures

After making sure that the participants were homogeneous, the four experimental groups were given an IELTS writing topic in the first session of every week and asked to write a paragraph or two of about 150 words or more on which they received explicit and implicit computer-mediated, and paper-based corrective feedback. The teacher-provided feedback was on the correct use of subordinating conjunctions. Other grammatical mistakes were corrected.

The treatment for the four experimental groups was as the following:

***Explicit computer-mediated group:*** after typing their paragraphs, the researcher collected their files and provided feedback by highlighting the erroneous part(s) and clearly explaining what the mistake was and providing the correct structures in parentheses. The following session, they were given back the same files and were required to retype the paragraphs by taking into account the teacher-provided CF. After retyping their paragraphs, the researcher collected their retyped writing files.

***Implicit computer-mediated group:*** after typing their paragraphs, the researcher collected their files and provided feedback by underlining the erroneous part(s) without providing any further explanation. The following session, they were given back the same files and were required to retype the paragraphs by taking into account the teacher-provided CF. After retyping their paragraphs, the researcher collected their retyped writing files.

***Explicit paper-based group:*** after writing their paragraphs, the researcher collected their papers and provided feedback by underlining the erroneous part(s) and clearly explaining what the mistake was and providing the correct structures in parentheses above the erroneous parts. The following session, they were given back their papers and were required to rewrite the paragraphs by taking into account the teacher-provided CF. After rewriting their paragraphs, the researcher collected their papers.



**Implicit paper-based group:** after writing their paragraphs, the researcher collected their papers and provided feedback by underlining the erroneous part(s) without providing any further explanation. The following session, they were given back their papers and were required to rewrite their paragraphs by taking into account the teacher-provided CF. After rewriting their paragraphs, the researcher collected their papers.

This treatment lasted for 6 weeks and a total of 6 IELTS writing topics were provided for the participants. After the treatment, the number of correctly used subordinating conjunctions was counted and compared to assess the effectiveness of corrective feedback in different teaching environments.

## Data analysis

After collecting the required data, independent samples t-tests were run to analyze the data at the alpha level of significance of .05.

## Results

In order to answer the research questions, the descriptive analyses of the four groups were carried out. The following table shows the results of the descriptive analyses.

**Table 1**  
**Descriptive analyses of the groups**

Groups	N	Min	Max	ean	Std. Deviation
Computer-mediated group 1: Explicit	20	33	51	43.50	4.525
Computer-mediated group 2: Implicit	20	39	53	46.60	3.619
Paper-based group 3: Explicit	20	35	53	42.85	4.603
Paper-based group 4: Implicit	20	33	52	43.20	4.786

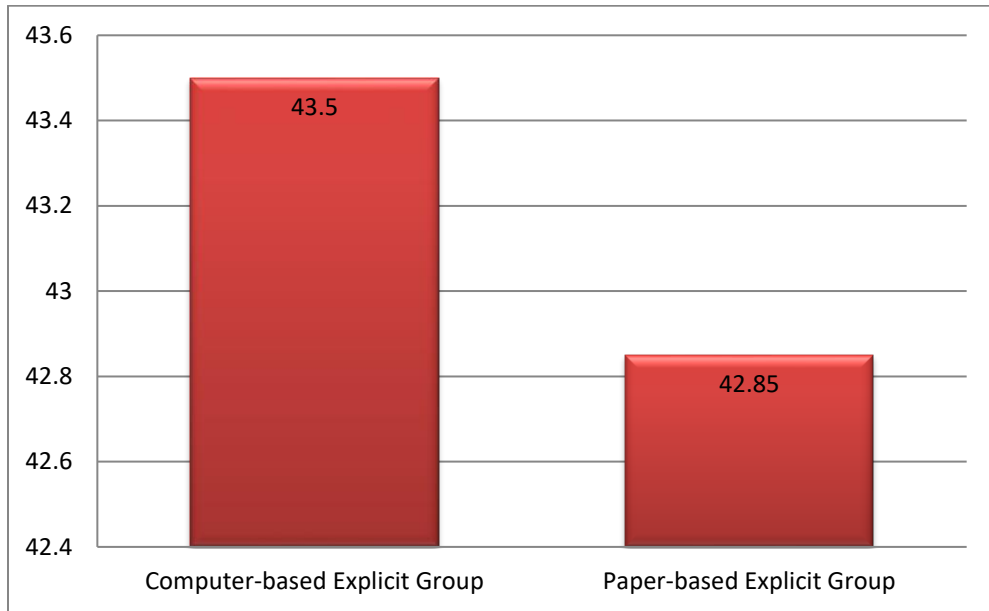
The results of the analyses for the first research question are provided in the following table.

**Table 2**  
**Independent samples T-Test for the explicit groups**

Explicit Groups	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Equal variances assumed	.062	.805	.450	38	.655	.650	1.443
Equal variances not assumed			.450	37.989	.655	.650	1.443

The results of the independent samples t-test reveal that the alpha level of significance for the Levene's test is .805; this means that the assumption of equal variances has not been violated. By looking at the first line of the reported results, it is found out that the alpha level of significance is .655 which is greater than .05. Therefore, it can be concluded that there is no statistically significant difference between the two groups who received explicit computer-based and paper-based CF in terms of the accurate use of subordinating conjunctions.

The following figure shows the differences between the explicit groups' mean scores.



**Figure 1. Explicit groups' mean scores**

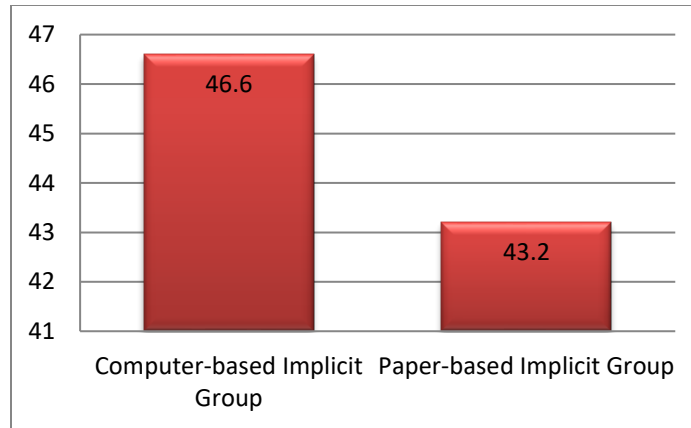
The results of the analyses for the second research question are provided in the following table.

**Table 3**  
**Independent samples T-Test for the implicit groups**

Implicit Groups	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F	Sig.	df	t	Mean Difference	Std. Error Difference
Equal variances assumed	1.083	.305	2.534	.016	3.400	1.342
Equal variances not assumed			2.534	.016	3.400	1.342

The results of the independent samples t-test reveal that the alpha level of significance for the Levene's test is .305; this means that the assumption of equal variances has not been violated. By looking at the first line of the reported results, it is found out that the alpha level of significance is .016 which is less than .05. Therefore, it can be concluded that there is statistically significant difference between the two groups who received implicit computer-based and paper-based CF in terms of the correct use of subordinate conjunctions.

The following figure shows the differences between the implicit groups' mean scores.



**Figure 2. Implicit Groups' Mean Scores**

## Discussion

*Q1. Is there any statistically significant difference between explicit computer-mediated and paper-based corrective feedback in terms of the correct use of subordinating conjunctions?*

The results of the analyses revealed that there was no statistically significant difference between explicit computer-mediated and paper-based corrective feedback in terms of the participants' accurate use of subordinating conjunctions.

The reported results seem to be in line with the view held by Truscott (1996) that teacher-provided feedback is not effective in increasing learners' accurate use of grammar in their language production. In addition, Hosseini's (2013, 2014) studies on the impact of corrective feedback on learners' linguistic accuracy revealed that different types of feedback did not lead to an increase in the accurate use of certain linguistic structures.

Despite this, there is a large body of research and studies which corroborates the effectiveness of feedback in language learning and accuracy. Recent studies conducted by Chandler (2003), Bitchener (2008), Sheen (2007), and Hosseini (2012, 2013, 2014, 2015) confirm the positive contributions of feedback to language learning and teaching.

*Q2. Is there any statistically significant difference between implicit computer-mediated and paper-based corrective feedback in terms of the correct use of subordinating conjunctions?*

The results of the analyses revealed that there was statistically significant difference between implicit computer-mediated and paper-based corrective feedback in terms of the participants' accurate use of subordinating conjunctions. It was found out that implicit computer-mediated CF was statistically more effective than paper-based CF in increasing the accurate use of subordinating conjunctions.

The results are in line with Schmidt's (1990) Noticing Hypothesis which claims that in order for learners to acquire the language, they should notice the grammatical characteristics of that language. Accordingly, Campillo (2003) confirms the superiority of implicit CF in increasing the correct use of certain grammatical structures. Leeman (2003) also found out that implicit corrective feedback resulted in producing more accurate language.

## Conclusion

In this study, the effectiveness of explicit/implicit computer-mediated and paper-based corrective feedback in Iranian EFL learners' correct use of subordinating conjunctions was investigated. Based on the reported results, it was found out that the participants who received explicit

computer-mediated corrective feedback were not statistically different from those who received explicit paper-based corrective feedback in terms of the accurate use of subordinating conjunctions.

With regard to implicit corrective feedback, the participants who received computer-mediated corrective feedback significantly outperformed those who received paper-based corrective feedback in terms of the accurate use of subordinating conjunctions.

The findings of the present study are believed to be enlightening to language researchers and educators likewise; this can be due to the fact that as technology has become an inseparable part of everyday life and educational system, it is merited to delve deeper into the appropriate ways to implement and integrate technology into teaching environments as a probable substitute for traditional means of teaching and learning.

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## About the Author



**Seyyed Behrooz Hosseini** holds an M.A. in TEFL from IAU South Tehran Branch. He also holds a B.Sc. in software engineering. He has published numerous articles at different international journals. He has been teaching English as a foreign language in Iran for many years. His main areas of interest include CMC, CALL e-learning and related fields.

E-mail: [behroozhosseini@gmail.com](mailto:behroozhosseini@gmail.com)

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