The Interaction between the Source and the Level of Feedback in Blended Courses and Its Impact on Achievement and Self-efficacy

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Abstract: The purpose of this study was to investigate the impact of the interaction between the source and the level of feedback in blended learning courses on students’ self-efficacy and achievement. To achieve this goal, the researcher conducted a quasi-experimental study on a sample consisted of 34 graduates students enrolled in a master program in distance teaching and training at the Arabian Gulf University. They were divided into two groups: pair+ feedback and focus group+ feedback. A framework for the interaction between the source and the level of feedback was developed and applied on a mixed assessment technique that combined both formative assessment and summative assessment tasks. The comparison of pre-test post-test for each group revealed that both pair+ and focus group+ feedback in blended learning have a statistical and a practical impact on students’ self-efficacy and achievement when provided at multiple levels. Moreover, the comparison between groups in the post-test revealed that focus group+ feedback is more likely to improve students’ self-efficacy and academic achievement much better than pair+ feedback specially when provided at multiple levels. The results of this study also revealed that feedback source when delivered at multiple levels could be a supporting metaphor for cognitive, psychosocial and affective scaffoldings through a combination of pedagogical, social and mental presence.

Key words: Blended learning, distance learning, feedback sources, feedback levels, formative assessment.

1. Introduction

Education is facing a paradigm shift in its content, delivery methods, and assessment techniques. This shift is taking place because of the increasing demand on ICT (information and communication technology) and social media network applications. ICT and social media network are the main learning themes in current age which can be identified as the third renaissance age. Continuous innovations released every year or month in ICT and social media network represent a double load on the current and the future learners and educational systems. This shift is pushing us to think about an answer to the following question: How can we prepare the third renaissance learner?

Third renaissance learners are having collective minds that are diverse, distinct, and dynamic. Thus, they need a diverse, distinct, and dynamic learning ecology. The previously mentioned attributes are long-term characteristics of the future learners’ mind. Third renaissance learners are born in more completely different educational environment than their past generation had. This environment is highly affected by Web 2.0 applications and social media networks. In such learning ecology, learning is occurring much faster than time. The third renaissance learners are divers in their learning styles and preferences. They need teaching styles, curriculum frameworks and assessment and feedback activities and sources that fit with their collective minds and daily habits [1].
Web 2.0 and social media applications have the deep secret to make the third renaissance learner more distinct. These tools have multitasks and authentic learning objects that support building human ecology through multimodal assessment interactivities. Such tools help in connecting the current and the future learners’ mind throughout connected ideas. Connected ideas build bridges and loops of mind that increases the probability of social, cognitive, psychological and mental presences among learners [2].

In the meantime, the third renaissance learning ecology is dynamic, that is, it helps in exchanging creative ideas and solutions between learners regardless of their nationality or even the time zone they belong to. Dynamic learning is an attribute that governs future learners’ interactions. It helps in building mind nodes that are adaptive and concurrent. It gives learner what s/he needs of elasticity and passion to direct generating ideas and solutions and share them with others [3].

Education is all about communication and interaction between teachers and students in a learning context. The presence of interaction between teachers and students are mostly affected by the dominant forms or types of instructional media. Rapid developments in social media network and in ICT are having a great impact on education in general and online and eLearning in specific. Its wide use in teaching, learning, and assessment may enhance educational effectiveness and certainly form a central place in ongoing educational transform [4].

Third renaissance learning may also be defined as “third generation learning” [5]. Third generation learning is a mode of learning that “places greater emphasis on the learner forming understanding largely through a process of social negotiation” [5]. Online and eLearning through social media and ICT are contemporary mirror of the third renaissance and the third generation learning since most of the higher education institutions are adapting its curriculum and courses to be delivered online. Online and eLearning have specific attributes. They are: learner-centered, knowledge-centered, assessment centered, and community-centered [6].

Each of the previously mentioned attributes of e-Learning needs special tools to grantee its effectiveness, efficiency and quality of preparing the third renaissance learners. For example, assessment-centered attribute needs: (1) collaboration learning environments that students create to document and assess their own learning in virtual group; (2) students agents who facilitate and monitor peer activities to allow students to informally assess and aid each other through effective feedback [6]. In online and e-Learning courses, learner must be provided with feedback so they can watch how they are doing and take corrective action if needed.

Feedback in online and e-Learning courses is a great bridge to support the power of reasoning or “discourse”. Discourse not only facilitates the creation of the community of inquiry and practice, but also is the means by which learners develop their own believes and epistemological concepts, through a process of expressing and transforming their ideas to/with other students [7].

Nicol and Milligan [8] placed a depth importance on designing technology-based assessment and feedback practices to enable students to become self-regulated learners and be able to monitor and evaluate the quality and the impact of their own work and that of others. Gibbs and Simpson [9] has also provided a list of conditions under which assessment supports students’ learning. Examples of these conditions are: (1) Sufficient assessed tasks are provided for students to capture sufficient study time; (2) these tasks are engaged by students, orienting them to allocate appropriate amounts of time and effort to the most important aspects of the course; (3) tackling the assessed task engages students in productive learning activity; (4) the feedback focuses on students’ performance, their learning and actions
under the students’ control; (5) feedback is appropriate, in relation to students’ understanding of what they are supposed to be doing.

Feedback provided in online courses and e-courses is the most effective in building motivation and developing strong mental image about learning context and delivered content. It has been mentioned by many pedagogical literatures and studies [6, 10-12] that good practice in online learning and eLearning should: (1) encourage interaction between students and instructors; (2) develop collaboration and cooperation among students; (3) use active learning techniques; (4) give prompt feedback; (5) emphasize time on task; (6) communicate high expectations; (7) respect divers talents and ways of learning; (8) use scaffolding principles to encourage cognitive elaboration; (9) create opportunities of high level of interaction and (10) integrate formative assessment during the instruction times.

To sum it up, future assessment ecology of online and eLearning should be diverse, distinct, and dynamic to overcome future learners’ mental, affective and social needs. Diverse, distinct, and dynamic learning ecology helps in promoting deep rather than surface learning.

Third renaissance learners need to learn in a learning context that emphasizes multimodal of developmental assessments that are followed by multiple sources and levels of feedback such as pair, peer and focus group feedback, in addition to instructors’ or experts’ feedback. Thus, the current paper purpose is to shed light on assessment of eLearning and blended learning throughout an investigation of the interaction between the sources and levels of feedback in blended courses and measuring its impact on achievement and learners’ self-efficacy. It is expected that this study will add new dimensions to the body of knowledge about different sources and levels of feedback that can be applied in eLearning environments too.

2. Literature Review and Theoretical Background

2.1 Assessment of Online, Blended and E-Learning

Assessment of student performance in online learning, blended learning, and eLearning is one of the most presented issues in recent national and international conferences and symposiums on distance education. According to Ref. [12], the purpose of assessment is to provide support and feedback to enhance ongoing learning and report on what student knows and can do. In order to apply effective assessment techniques in online and blended learning environments, assessment must be embedded into the design of the course. “Effective classroom assessment has a number of characteristics: It is learner-centered, instructor-directed, mutually beneficial, formative, context-specific, ongoing, and firmly rooted in good practice” [6].

Assessment of student performance in online and eLearning courses should also focus on authentic assessment tasks. When online learners engage in authentic assessment tasks, they think individually and collaboratively to make personal and shared meaning of learning tasks. They can also connect their prior knowledge and experience to learn tasks at hand. Effective, assessment of online and e-courses should also be formative. The goal of formative assessment is to gain an understanding of what students know and do not know in order to make responsive changes in learning [13].

Palloff [14] suggested some major principles of effective online assessment. These principles should guide students’ assessment in online courses: (1) design learner-centered assessments that include self-reflection; (2) include collaborative assessments through public posting of papers, along with comments from students to students; and (3) encourage students to develop skills in providing feedback by providing guidelines to good feedback and by modeling what is expected. Thus, feedback in
The Interaction between the Source and the Level of Feedback in Blended Courses and its Impact on Achievement and Self-Efficacy

online courses and e-courses is a vital condition to course success. Feedback activities personalize the course and enhance learner-centered activities that are embedded in the course.

Web 2.0 and other ICT tools provide unlimited sources and materials for online learning. This requires special design of e-courses that combined both formative and summative assessment techniques in a collaborative learning environment. Integrating formative assessment in online and blended learning environment is a pathway to shift our assessment practices from being judgmental (front-end) to be developmental (ground-up) process.

The purposes of formative assessment in online and blended learning environments are to provide feedback, motivate students to learn, diagnose students’ strength and weaknesses, and help students to develop self-awareness [15]. “Formative assessment seems to be more supportive if it produces rich and detailed qualitative information about strengths and weakness, not merely a mark or a grade” [16].

The third renaissance assessment design needs a shift from aptitude-treatment-interaction to attribute-treatment-interaction [17]. In attribute-treatment-interaction, assessment is a kind of collaborative effort that helps learners achieve a deeper level of knowledge generation while moving from independence to interdependence, thus, strengthening the foundation of an online learning community. In the third renaissance learning model, students are learning together in a learning community. They have the opportunity to extend and deepen their learning experience, examining new ideas by exchange them with a supportive group seeking for receiving constructive and elaborated feedback [14].

Formative assessment also enhances learning-oriented attribute of online learning. Carless [18] stated that “LOA (learning-oriented assessment) is guided by three main principles: (1) Assessment tasks should be designed to stimulate sound learning practices amongst students; (2) assessment should involve students actively in engaging with criteria, quality, their own and/or peers’ performance and (3) feedback should be timely and forward-looking so as to support current and future student learning”.

With the increasing demand on online learning and e-Learning, there is a need to re-engineer the assessment practices of online and blended learning. Therefore, the online and blended learning assessment design should: (1) empower online learners to actively engage in participation; (2) facilitate opportunities for self-assessment and reflection; (3) deliver feedback that helps students self-correct; (4) provide opportunities for feedback dialogue (pair, peer and group) and (5) engage students in deep not just shallow learning activities.

2.2 Feedback in Online, Blended and E-Learning Courses

Of the many components that enable the third renaissance learner to learn in a social negotiation learning environment is feedback. A piece of online and e-course material is only as good as its assessment activities and feedback. Online instructor should assess students’ performance through intensive regime of giving and taking feedback. Feedback could be defined as all kinds of directive and non-directive information that online learner need to know about his progress in assessment tasks or assignments. “Online learners should be provided with feedback so that they can observe and monitor how they are doing and take a corrective action if needed” [19]. Thus, the purpose of feedback is to give written and/or verbal information to students regarding their strengths and weaknesses in the areas covered by the formative assessments. Therefore, feedback is one of the most critical factors in which we can shift our assessment practices to be developmental rather than judgmental ones. Boston [13] reported that feedback given as part of formative assessment helps learners become aware of any gaps that exist between their desired goal and
their current knowledge.

Feedback in online courses and e-courses is a critical factor to learners’ success. Feedback activities personalize the course and enhance learner-centered activities that are embedded in the course. It can create a sense of caring and social presence on the part of instruction. It also motivates students regarding assignment and fosters their self-monitoring abilities [20]. Feedback is also considered as a fundamental component for supporting and regulating learning processes especially in computer-based and self-regulated learning environments [21].

2.3 Forms of Feedback

The importance of feedback for improving knowledge and skill acquisition has been discussed in many educational researches [21-24]. Widely accepted forms of feedback include, but not limited to: (1) knowledge of result; (2) knowledge of correct result; (3) knowledge of performance; (4) answer until correct; (5) knowledge of task constraints; (6) knowledge about concepts; (7) knowledge about mistakes; (8) knowledge about how to proceed and (9) knowledge about metacognition. Chase [25] presented two other forms of feedback: “basic feedback and elaborated feedback. Basic feedback was defined as numeric feedback (i.e., 100% or 0%) as to whether students answered a given question correctly”. Whereas elaborated feedback is a written or verbal feedback delivered to students about their performance in an assessment task. Elaborated feedback is written and verbal feedback delivered electronically after the submission of a quiz or assignment. Chase [25] revealed that elaborated feedback in online courses was found to be beneficial in general and particularly for questions that were determined to be difficult.

In addition, traditional feedback theorists provide two primary forms of feedback, directive and facilitative [26]. Directive feedback focuses on just what needs to be fixed, whereas facilitative feedback focuses on offering suggestions to guide learner to build their own conceptions of the tasks or situations. Hattie [27] suggested four other types of feedback: (1) task-specific; (2) process-specific; (3) self-regulatory and (4) person-specific. Feedback can also be classified based on six dimensions: (1) timing of the feedback; (2) the sign of the feedback; (3) the frequency of the feedback; (4) The specificity of the feedback; (5) the type of feedback and finally, (6) the source of the feedback [22]. The scope of the current study focuses only on the sources and suggested levels of feedback in online and blended courses.

The researcher believes that the forms and sources of feedback depend on the types or the levels of interaction that are adopted and allowed in online pedagogical and assessment practices. Moore [28] presented three main types of interaction in distance learning ecology: (1) student-content interaction; (2) student-instructor interaction and (3) student-student interaction. Based on these interaction types, the sources of feedback in online courses and e-courses ecology can be classified into four types: (1) one-alone feedback or learner-led feedback (e.g., learner-interface/content interaction); (2) one-to-one feedback (e.g., learner-to-learner or instructor/expert-to-learner feedback); (3) one-to-many feedback (e.g., peer-to-peer feedback) and (4) many-to-many feedback (e.g., group-to-group feedback).

Learning communities that encourage collaborative activities should incorporate multi-sources of feedback. Multi-sources of feedback in online and blended learning courses will increase the probability of applying multiple presences as a supporting discourse through a variety of scaffoldings. Fig. 1 presents the expected connection between the types of presence and the expected scaffoldings that may be supported by feedback in online and blended learning ecology.

The source of feedback influences the quantity and the quality to which the content of the feedback is
perceived, interpreted and accepted by the learner/s. The reason of applying multi-source of feedback is to maximize the interaction between learners in online learning. In addition, multi-source feedback has been evaluated in the role of assessment such as 360-degree feedback. According to Ref. [29], the 360-degree feedback provides perspectives from multiple sources including but not limited to supervisors (instructors), peers, and external customers. Hafford [30] also used a tailor-made multi-source feedback such as line manager, peer of inside and outside agencies, mentor, people whom person manages, and users.

2.4 Sources of Feedback

The source of feedback influences the quantity and the quality to which the content of the feedback is perceived, interpreted and accepted by the learner/s. The reason of applying multi-source of feedback is to maximize the interaction between learners in online learning. In addition, multi-source feedback has been evaluated in the role of assessment such as 360-degree feedback.

In this study, the sources of feedback depend mostly on the levels of interaction that are allowed in online, blended and e-Learning environments. According to Ref. [19], there are four levels of interaction in online learning: (1) learner-interface interaction; (2) learner-content interaction; (3) learner-support interaction, which includes three sub-levels (learner-learner, learner-instructor and learner-expert) and (4) learner-context interaction.

For the purposes of the current study, these levels will be adjusted to cover the sources of the feedback that the researcher examined. For example, learner-content interaction will be called “student-led interaction”, the learner-learner interaction will be called “pair interaction”, learner-expert/instructor interaction will be called “learner-instructor interaction”, and finally, learner-context interaction will be named as “focus group interaction”. Thus, the sources of the feedback applied in this research are: (1) student-led or demand-led feedback; (2) pair or peer feedback; (3) instructor-led feedback and (4) focus group feedback.

2.4.1 Student-Led/Demand-Led Feedback

In this research, student-led feedback refers to the
amount of information that students gained while or after doing assessment task or a piece learning activity. It is a self-regulated process, which reflects the students’ epistemological belief and efficacy about the content. It is also the first hand production of student work which may be correct or wrong. Self-regulated feedback focuses on self-evaluation and confidence to move forward on the task at hand. According to Ref. [27], self-regulation is the interplay between commitment, control, and confidence.

It is worth mentioning that student-led or demand-led feedback can occur during and after conducting an assessment task, that is, learner can ask for help or support from instructor or e-course mediator during solving each assignment of even after turning it in. Student, in this case, is asking for cognitive scaffoldings. According to Ref. [22], self-regulated or student-led feedback is powerful since it allows for deeper information processing and mastery of learning tasks.

The researcher believes that online courses should give great consideration for students’ self-regulated feedback to overcome the freeload issue raised in online learning and eLearning. Asking online learner to solve each assigned assessment task independently before sharing it with others may increase the degree of engagement and deep learning. Student-led or demand-led feedback also reflects the students’ self-efficacy. However, student-led feedback is not enough in online learning class that depends mostly on communities of learning because student may acquire or build misconceptions or negative epistemological belief about the content. This is one reason, between many, of why we should use multi-source feedback in online learning and eLearning classes.

2.4.2 Pair/Peer-to-Peer Feedback

Pair or peer-to-peer feedback refers to the amount of positive or negative information that online learner can provide or get from his classmate/s or partner/s. In online learning environment, pair feedback establishes the foundation for guiding collaborative thinking and encouraging each pair to construct a shared understanding of the content being engaged. According to Ref. [31], constructivist learning requires learner to exchange, share, and negotiate knowledge with knowledgeable individuals in a social context. Pair feedback in online learning environment increases the level of partnerships between learners. This, in turns, helps in establishing what the researcher call “shared responsibility of learning”.

Pair or peer-to-peer feedback is the most appropriate for online learning and training for several reasons. First, because of the pair focus, physical presence of instructor is decreasing. The instructor role will be shifted from classroom director to facilitator. Second, there are multiple media formats available for the learners (pairs) to engage in and develop their skills and knowledge. The learner role in pair feedback will be shifted from knowledge consumer to knowledge mediator and provider. Pair can replace the physical presence of instructor by social media tools such as, email, file sharing, chat, wikis, blogs, etc. [22, 32].

Pair feedback encourages learners to build circles of trust throughout online collaboration dialogue, which may help in adopting creative solutions of learning tasks or problems. Pair feedback works as a metaphor to increases the awareness of the learning process. Liu et al. [33] evaluated the perceptions of students of peer feedback and assessment of third-year computer science majors. During their evaluations of the course, the participants not only mentioned that peer feedback was an effective method of learning, but also noted that by reading other peer’s work, it allowed them to gain awareness of their own personal strengths and weaknesses.

2.4.3 Instructor-Led Feedback

Instructor-led feedback refers to the amount of positive or negative information that online learner can get from instructor during or after accomplishing assignment task/s. Instructor feedback lays the
The Interaction between the Source and the Level of Feedback in Blended Courses and Its Impact on Achievement and Self-Efficacy

430

foundation of implementing pedagogical scaffoldings in online learning environments. Online instructor can provide immediate or delayed feedback. Immediate feedback assists learner to stay on track during conducting assessment task/s. Instructors’ immediate feedback prevent learner of building misconceptions about the content and context of learning. Ackerman [34] reported that students and instructors both agree that feedback is an important function in the classroom. Students learn more efficiently when the instructor of the course is an active feedback giver.

Feedback from the instructor’s perspective was interpreted by student as being too discouraging [22]. This was previously confirmed by Ref. [35]. The reasons for why instructors’ feedback was seen not useful ranged from being too general, too vague, too basic, to biased, or too subjective. According to Ref. [36] there was no significant difference between plain peer feedback when compared with teacher feedback. Thus, we can say that peer feedback is not a substitute for teacher feedback. This result raises an important question regarding feedback design in online learning environment. An adequate assessment strategy is needed to search for the balance of self, pair or peer, instructor and focus group assessment and feedback. This issue is covered in present study.

2.4.4 Focus Group Feedback

Focus group feedback refers to the amount of positive or negative information that online learner can get from his innate group during or after accomplishing assignment task/s. It is worth mentioned that in the focus group feedback, face-to-face and online collaboration is a key factor to success in learning community. Focus group feedback increases the power of “we”. Focus group feedback is maximizing the social presence which can be considered as one key mechanism of cognitive and affective elaboration in online learning environments. Collaboration between students in the focus group work is the backbone for the third renaissance learning. The focus group feedback is an important element to increase the ZPD (zone of proximate development).

Vygotsky [37] introduced the ZPD, which is the difference between what a learner can do without help and what a learner can do with help from others. Thus, the focus group feedback in online and eLearning classes acts as social scaffoldings through a process of social mediation and presence. It is encouraging high rate of social engagement between learners. Providing feedback through focus group is also one way to change our assessment practices to focus on a culture of value instead of being a culture of testing.

Roschelle et al. [38] compared group and individual feedback using two technologies: (1) TechPALS (technology-mediated, peer-assisted learning) such as wireless handheld technology and (2) a popular desktop technology, which provides feedback to individual students as they solve fractions problems individually. They found that students in the TechPALS condition learned more than the control group students did, with effect sizes ranging from $d = 0.14$ to $d = 0.44$. Analysis of observational data confirmed that students in the TechPALS condition participated socially in questioning, explaining and discussing disagreements, whereas students in the individual condition did not.

Hwang [39] also conducted a study to test the effects of cooperative and competitive attitudes on face-to-face and virtual feedback interactions, and their consequent impact on multiple-choice test performance in a sample of students from a north-eastern university. The classes were hybrid classes, with about half the time spent in traditional classrooms and the other half in Web-based interactions. They found that “feedback information from others helps an individual to develop a better overview of how one is performing with respect to different aspects of a task, and enables individual to see areas of inadequate performance for the next round of improvement.

Freeman [40] reported that the use of repeated
on-line self and peer assessment of group process variables as formative feedback during group work led to improvement both in group processes and in the quality of project outcomes.

It could be noticed from the previous studies that individual (student-led), instructor-led, pair, and focus group feedback are of the most important sources for formative assessment in online learning environment. These multi-source feedback need a well-designed strategy to maximize its benefit and quality in online and eLearning classes.

2.5 Levels of Feedback in Online and Blended Learning

Level of the feedback refers to the feedback specificity. It is the “level of information presented in feedback messages” [41]. The researcher believes that the level of feedback is the amount of cognitive, psychological and pedagogical scaffoldings that is provided by the source of the feedback while and after engaging in a learning or assessment task. Increasing feedback level is beneficial for learning what to do when things are going well or bad. Feedback specificity can decrease the cognitive load among learners when combined with multi-source of feedback.

The third renaissance learner and instructor should get involved in providing and receiving three levels of feedback. These three levels are: (1) Universal feedback; (2) Targeted feedback and (3) Intensive feedback. These levels must be provided in vertical and spiral order to maximize their benefits. For example, while online learner gets involved in doing assignment task, s/he may need to know if s/he is going in the right track (universal feedback). S/he may also need special type of information or cognitive scaffolding (more references, websites, or people) to overcome some difficulties that s/he is facing in the assignment or in the assessment task (targeted feedback). S/he may also need too specific type of information or cognitive, affective and psychological scaffoldings to maximize his or her performance and overcome learning difficulties (intensive feedback).

In online and e-Learning classes, feedback levels could be used as diagnostic tools or methods to overcome learning difficulties and/or disabilities. For example, instructor, pair, or focus group may discover some misconceptions in students’ work or product. They may guide each other to correct this misconception through a line of universal, targeted and intensive feedback in a learning context.

Traditional feedback theory and researches reported that when feedback becomes more specific, there can be an increased focus on particular behaviors that need to be corrected or rewarded. The intensive level of feedback may decrease the amount of cognitive interaction that has to be processed such as error diagnosis, encoding, and retrieval [42, 43].

Using multi-levels of feedback in online or e-Learning courses may work as a proactive technique to decrease the freeload issue, which could occur specifically in distance and open learning environments. A combination of feedback levels may also be used as a pedagogical metaphor to feed-forward. There is a need to encourage online learner to elaborate and extend his ability to be self-determined and life-long learner. Feed-forward is a future metaphor for self-determined learning attribute.

Last, but not least, the interaction between the sources and the levels of feedback in online learning and eLearning should be guided by three main principles reflecting the third renaissance learning attributes. These three principles are: (1) diversity; (2) curiosity; and (3) creativity.

3. The Conceptual Framework of the Feedback

Fig. 2 contains a suggested conceptual framework that is applied in current research. Based on this framework, providing or receiving feedback in blended and eLearning environment is a non-linear process in which the source of feedback (student-led, pair, focus
The Interaction between the Source and the Level of Feedback in Blended Courses and Its Impact on Achievement and Self-Efficacy

**Feedback Environment**
- Face-to-Face Learning
- Blended Learning
- eLearning & Online Learning

**Principles**
- Diversity
- Curiosity
- Creativity

**Feedback Source**
- Student-led
- Pair Feedback
- Focus Group
- Instructor-led

**Feedback Level**
- Intensive FB
- Targeted FB
- Universal FB

Scaffolding

**Fig. 2** The conceptual framework of the feedback.

Group, and instructor-led) must go in a spiral approach to maximize the specificity and intensity while giving and/or receiving feedback. It could be also noticed that designing feedback in blended and eLearning courses should ensure the diversity, curiosity, and creativity as design principles.

4. The Research Problem

The third renaissance learning paradigm needs to rethink and reimaging how we design new assessment and feedback models and strategies that can respond to the learning requirements and reflect the characteristics of knowledge and learning which are basically personal, social, distributed, dynamic and versatile in nature [44]. Source of feedback in blended and e-Learning environment has been giving considerable attention. And more recently, researchers have turned their attention to the role of multi-source of feedback such as, students, instructor, peer and group feedback. Unfortunately, the level of feedback in blended learning and eLearning did not get any attention in recent researches. With the increasing demand on online and distance learning programs, the issue of freeloading and misconception became a critical matter to be considered in designing, providing, and managing feedback in online course and assessment. Thus, there is a need to investigate the impact of the integration between the source and the level of feedback to solve the freeloading problem and to maximize the benefits of the feedback in online learning. Therefore, this study explores the impact of the interaction between the source and the level feedback on achievement and self-efficacy in blended courses.

5. Hypotheses

The following hypotheses have been tested:

- When provided at multiple levels, pair feedback combined with student-led and instructor-led feedback in blended courses improves students’ self-efficacy.
- When provided at multiple levels, focus group feedback combined with student-led and instructor-led feedback in blended courses improves students’ self-efficacy.

There is a significant difference in academic achievement between pair+ and focus group+ feedback in blended learning courses when provided at multiple levels.
There is a significant difference in self-efficacy between pair+ and focus group+ feedback in blended learning courses when provided at multiple levels.

6. Significance of the Study

The present study derives its significance from the fact that it is the first attempt, to the best of the researcher’s knowledge, to investigate the interaction between the source and the level of feedback in online learning and its impact on achievement and self-efficacy. More specifically, the study is expected to: (1) urge eLearning specialists to question the traditional models and strategies of feedback in the light of the proposed framework in this study; (2) guide designers and developers of the electronic content and materials in the selection and construction of feedback sources and levels that suit various e-courses; (3) help staff members using blended classroom to evaluate depth of meaning and generate retainable knowledge and cognition among learners; (4) shift attention from quality of technology to quality of pedagogy; (5) increase the power of “we” as a learning metaphor and supporting discourse.

7. Method and Procedures

To measure the impact of the interaction between the source and the level of feedback on achievement and self-efficacy, the researcher conducted an experimentation using a quasi-experimental method. The following is a description of the procedures used to validate the proposed model:

7.1 Population

The target population of this research was all available graduate students in the Arabian Gulf University during the fall semester, 2013-2014. The accessible population was all graduate students in Distance Teaching and Training Program at the time of conducting this research.

7.2 Sample

The sample consisted of 34 male and female students enrolled in the Distance Teaching and Training Program at the Arabian Gulf University. The sample was intentionally selected and stratified into two groups: pair+ feedback group and focus group+ feedback. The pair+ group consisted of 15 students enrolled in the program. The focus group+ consisted of 19 students enrolled in the program. Blended learning approach was applied on both groups.

7.3 Experimentation Setting

The targeted framework of the interaction between source and the level of feedback in blended learning (Fig. 2) was applied to students in the Distance Teaching and Training Program in the Arabian Gulf University. This program grants the certificate of higher studies diploma and master degree in distance teaching and training. This program was developed in collaboration with Sunderland University, UK. There is no similar program in all Arabic countries. It offers courses in the form of instructional modules using the blended learning strategy. The research was applied to students studying introduction to educational statistics module. This module is three credit hours course delivered in the fall and spring semester each year. This module is obligatory for master degree students.

7.5 Instruments

The dependent variables in this research were measured by: self-efficacy scale and a combination of formative and summative assessment tasks. What follows is a description of the procedures used to develop and validate those scales.

7.5.1 Self-efficacy Scale

The self-efficacy scale is a self-reporting scale consisting of 30 items. It was developed by the researcher to reflect the students’ self-efficacy before and after applying the feedback framework. In blended courses, the self-efficacy scale reflects students’
beliefs on how well s/he is at the task being learned or how well s/he will organize and perform the courses of action require to produce a given task. The self-efficacy scale depends on actual score of between 1 and 4 for each of the thirty statements. Entering a score of ‘4’ indicates that learner is always practicing the habit and the statement is completely applicable on him/her. Entering a score of ‘1’ indicates that the statement doesn’t apply on learner or learner never practices the habit. Self-efficacy depends on agreement to the positive statements and disagreement to the negative ones. It was applied on a pilot sample of 25 students to compute its reliability coefficient. A Cronbach’s Alpha of 0.945 was estimated for the self-efficacy scale.

7.5.2 Formative Assessment Tasks

Five formative assessment tasks were assigned to both pair+ feedback group and focus group+ feedback group. Both groups did five formative assessment tasks during the teaching times of the assigned instructional module “introduction to educational statistics”. Theses assessment tasks were: (1) daily worksheets, each worksheet has an authentic statistical problem in a micro level; (2) collecting and analyzing a published paper based on the information given in the course; (3) analyzing a real case study, which may include, but not limited to, analyzing a personal document such as educational certificate, invoice, ect.; (4) collecting and analyzing real data using SPSS software; (5) designing an instrument to measure attitudes or satisfaction, and computing items reliability for this instrument using SPSS software.

In addition to these five authentic assessment tasks, each group took a final exam consisted of 30 MCQs items. The final exam was used as a summative assessment technique to measure students’ intellectual ability about the knowledge delivered in the blended courses.

8. Procedures

To put the proposed framework into action, the researcher did the following procedures for both groups (pair+ feedback and focus group+ feedback):

When the course/module began, the pair/focus group were placed into team using the learning management system (MOODLE). With this
technology and the precise design of the module, interactions took place between the students in each group.

In the introduction of each course/module, students were informed about the nature of the feedback sources and levels and the cycle of feedback giving and taking.

They were introduced to the MOODLE, which illustrated technologically how to give pair or focus group feedback according to feedback cycle reflecting the interaction between the sources and the levels of feedback.

Students were then told to complete the self-efficacy scale.

Students were also told to do each assigned formative assessment task and deliver it to his/her partner or his focus group ahead of time to get/give feedback.

After taking feedback from his/her partner or from the focus group, the task is delivered to the instructor to give appropriate feedback based on the feedback cycle.

Students were told to submit any question or query to get instructor’s feedback based on student’s demand or need at any time.

This system of feedback was applied throughout the class time in face-to-face sessions and in online sessions in a blended strategy.

9. Results

Hypothesis 1: When provided at multiple levels, pair feedback combined with student-led and instructor-led feedback in blended courses improves students’ self-efficacy. To test this hypothesis, the researcher computed descriptive statistics and conducted a t-test for dependent samples. Table 1 presents the findings of descriptive and inferential statistics for this hypothesis.

Table 1 shows that students’ post-test mean score is higher than their mean score on the pre-test on the self-efficacy scale ($M = 85.80$ and $M = 102.80$ respectively). There were higher variations existing in pre-test ($SD = 12.15$) than pot-test ($SD = 8.82$) respectively. In addition, Table 2 shows that there was a significant difference between the post-test score and pre-test score on the self-efficacy scale. This difference was in favor of the post-test $(t, 14) = 4.99$; $p = 0.000$. Also, Table 2 shows that the amount of variance in the dependent variable (self-efficacy) that is accounted for by the independent variable (pair+ feedback) is 64%. Based on this finding, the first hypothesis is accepted.

Hypothesis 2: When provided at multiple levels, focus group feedback combined with student-led and instructor-led feedback in blended courses improves students’ self-efficacy. To test this hypothesis, the researcher computed descriptive statistics and conducted a t-test for dependent samples. Table 2 presents the findings of descriptive and inferential statistics for this hypothesis.

Table 3 shows that students’ post-test mean score is higher than their mean score on the pre-test on the self-efficacy scale ($M = 84.27$ and $M = 112.84$ respectively). There were higher variations existing in pre-test ($SD = 18.26$) than pot-test ($SD = 6.93$) respectively. In addition, Table 3 shows that there was a significant difference between the post-test score and pre-test score on the self-efficacy scale. This difference was in favor of the post-test $(t, 18) = 6.87$; $p = 0.000$). Also, Table 3 shows that the amount of variance in the dependent variable (self-efficacy) that is accounted for by the independent variable (focus group+ feedback) is 72%. Based on this finding, the second hypothesis is accepted.

Hypothesis 3: There is a significant difference in academic achievement between pair+ and focus group+ feedback in blended learning courses when provided at multiple levels. To test this hypothesis, the researcher computed descriptive statistics and conducted a t-test for independent samples. Table 3 presents the findings of descriptive and inferential statistics for this hypothesis.
The Interaction between the Source and the Level of Feedback in Blended Courses and Its Impact on Achievement and Self-Efficacy

Table 1  Descriptive and inferential analysis for the performance of pair+ feedback group.

<table>
<thead>
<tr>
<th>Test</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t-value</th>
<th>df.</th>
<th>Sig.</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>15</td>
<td>85.80</td>
<td>12.15</td>
<td>4.99</td>
<td>14</td>
<td>.000</td>
<td>.64</td>
</tr>
<tr>
<td>Post</td>
<td>102.80</td>
<td>8.82</td>
<td>4.99</td>
<td>14</td>
<td>.000</td>
<td>.64</td>
<td></td>
</tr>
</tbody>
</table>

Table 2  Descriptive and inferential analysis for the performance of focus group+ feedback.

<table>
<thead>
<tr>
<th>Test</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t-value</th>
<th>df.</th>
<th>Sig.</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>19</td>
<td>84.27</td>
<td>18.26</td>
<td>6.87</td>
<td>18</td>
<td>.000</td>
<td>.72</td>
</tr>
<tr>
<td>Post</td>
<td>112.84</td>
<td>6.93</td>
<td>6.87</td>
<td>18</td>
<td>.000</td>
<td>.72</td>
<td></td>
</tr>
</tbody>
</table>

Table 3  Descriptive and inferential analysis for the difference in achievement between pair+ feedback and focus group+ feedback.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t-value</th>
<th>df.</th>
<th>Sig.</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair+Feedback</td>
<td>15</td>
<td>88.27*</td>
<td>3.15</td>
<td>4.66</td>
<td>32</td>
<td>.000</td>
<td>.404</td>
</tr>
<tr>
<td>Focus group +feedback</td>
<td>19</td>
<td>93.89</td>
<td>3.74</td>
<td>3.72</td>
<td>32</td>
<td>.001</td>
<td>.302</td>
</tr>
</tbody>
</table>

Table 4  Descriptive and inferential analysis for the difference in post self-efficacy scale between pair+ feedback and focus group+ feedback.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t-value</th>
<th>df.</th>
<th>Sig.</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair+Feedback</td>
<td>15</td>
<td>102.80*</td>
<td>3.72</td>
<td>3.72</td>
<td>32</td>
<td>.001</td>
<td>.302</td>
</tr>
<tr>
<td>Focus group +feedback</td>
<td>19</td>
<td>112.84</td>
<td>8.93</td>
<td>3.72</td>
<td>32</td>
<td>.001</td>
<td>.302</td>
</tr>
</tbody>
</table>

Table 3 shows that students in the focus group+ feedback have higher mean than the pair + feedback students on the accumulated achievement (M = 93.89 and M = 88.27 respectively). There were slightly higher variations existing in focus group+ feedback (SD = 3.74) than pair+ feedback (SD = 3.15) respectively. In addition, Table 4 shows that there was a significant difference between the means on the accumulated achievement. This difference was in favor of the focus group+ feedback (t, 32) = 4.66; p = .000). Also, Table 4 shows that the amount of variance in the dependent variable (accumulated achievement) that is accounted for by the independent variable (assigned feedback & level) is 40%. Based on this finding, the third hypothesis is accepted.

Hypothesis 4: There is a significant difference in self-efficacy between pair+ and focus group+ feedback in blended learning courses when provided at multiple levels. To test this hypothesis, the researcher computed descriptive statistics and conducted a t-test for independent samples. Table 4 presents the findings of descriptive and inferential statistics for this hypothesis.

Table 4 shows that students in the focus group+ feedback have higher mean than the pair + feedback students on the self-efficacy scale (M = 112.84 and M = 102.80 respectively). There were slightly higher variations existing in focus group+ feedback (SD = 8.93) than pair+ feedback (SD = 8.82) respectively. In addition, Table 4 shows that there was a significant difference between the means on the self-efficacy. This difference was in favor of the focus group+ feedback (t, 32) = 3.72; p = 0.001). Also, Table 4 shows that the amount of variance in the dependent variable (self-efficacy) that is accounted for by the independent variable (assigned feedback & level) is 40%. Based on this finding, the fourth hypothesis is accepted.

10. Discussion

The results of the current study revealed that multi-sources of feedback when interacted or integrated with multi-levels of feedback messages in blended learning increases academic achievement and improves self-efficacy. More importantly, quality feedback increases the level of interaction between learner and instructor in blended courses. Providing a good quality feedback in blended learning depends on
feedback training especially when feedback is provided at multiple levels. This result supports study of Ref. [22].

A combination of pair, student-led and instructor-led feedback was found to be a significant strategy to increase self-efficacy in blended learning environment. Because pair shares knowledge through multi-levels of feedback, their ability to see the strengths and weaknesses of the assigned task is improved. Thus, pair feedback may increase and elaborate students’ regime needed to solve and deal with future problems. Pair feedback was perceived as more useful and increased the relevance of the course content [33]. The added value of the pair feedback when delivered at multiple levels in blended learning environment is that it will foster skills of cooperation and collaboration between student and instructor. It will also support the new role of instructor as a facilitator to help student building new meaning of knowledge being learned.

The benefits of pair feedback when combined with multiple levels of feedback is that students build connections and bridges to be used as affective and cognitive scaffoldings needed to increase the power of reasoning among each pair. The power of reasoning refers to supporting discourse that facilitates learners to develop their own believes and long epistemological background of the course content [7].

A combination of focus group, student-led and instructor-led feedback when delivered at multiple levels was found to be a significant strategy to improve self-efficacy and achievement in blended learning environment. Focus group feedback increase learners’ responsibility and ownership of learning. It is also a new technique to empower the collective mind of learners. By working together in an assigned assessment task, learners get into a social dialogue to deliver perfect solution to the problem at hand. It has been mentioned in several studies that social negotiation is the main theme of the third generation learning. Third generation learners use and apply ICT and social media to get their assessment task done collaboratively through a line of community of inquiry and practice [2, 45].

The results of the current study revealed that feedback quality depends on developmental (formative) assessment techniques much more than judgmental assessment techniques. The third generation assessment should be formative in which learner evaluation occurs through multi-sources feedback such as partners, groups and instructors. It is 360-degree of assessment. The benefit of focus group feedback when combined with multiple levels of feedback is that assessment practices must be changed from judgmental assessment to be developmental assessment since learners are expecting to give and take positive or negative feedback to increase the power of their collective mind.

The focus group feedback when combined with universal, targeted and intensive feedback in blended learning is considering one key mechanism to improve cognitive elaboration between learners. The learners’ academic achievement has significantly and practically increased in focus group feedback when compared with pair feedback. The findings of the current study provide initial insights on how focus group feedback may improve students’ self-efficacy and achievement. Feedback information from others helps each individual in the group to develop a better overview of how one is performing with respect to different aspect of assessment task. This finding supports the findings of Ref. [32]. Even though, when compared with individual feedback, group feedback was found to be less effective in increasing students’ achievement motivation and actual motivation [46].

Results from the current study showed that the interaction and integration between the source and the level of feedback in blended learning courses has an influence on self-efficacy and achievement. Focus group+ feedback was more effective than pair+ feedback in both self-efficacy and achievement. However, both groups have gained a significant
improvement in post-tests when compared with their pre-tests on self-efficacy and achievement. From this finding, we can conclude that focus group+ feedback when provided at multiple levels of feedback enabled learners to exchange and distribute their knowledge and experience regarding assigned assessment task/s much better than pair+ feedback group did.

The fact that focus group+ feedback did much better than pair+ feedback group is due to the development of ZPD and shared responsibility. This result supports social constructivist learning principles in which learner is depending on social mediator or facilitator to keep him/her motivated through social circles of trust. This finding also indicates that the most helpful type of feedback in blended learning environments is focus group feedback especially when provided as a part of formative assessment. In blended learning, not only instructors but also learners play an important role in formative assessment through focus group feedback. This finding supports Ref. [18], which reported that formative assessment helps learners become aware of any gaps that exist between their desired goal and their current knowledge.

11. Conclusion

The third generation learners (third renaissance learners) possess special mental and social characteristics. They are dynamic, distinctive, and divers by nature. They need special learning ecology to promote these characteristics. The learning ecology of the third generation learners will depend mostly on developmental assessment techniques in which feedback plays an integral role in supporting learning. Developmental assessment techniques in contrast with judgmental assessment techniques encourage dialogues around the learning experience and encourage motivation and confidence among the third generation learners.

It has been found in the current study that both pair+ and focus group feedback in blended learning ecology have positive impact on students’ self-efficacy and achievement especially when combined with multiple levels of feedback. Both pair+ and focus group feedback in blended learning environments have the power of synergy of knowledge sharing, expression and generating. They build circles of trust to get learners involved in a meaning making process.

Given the trust on focus group+ feedback in online and/or blended learning environments has become one of the most important factors to build three kinds of presence: pedagogical, social, and cognitive and mental presence. These three kinds of presences when provided along with multiple sources and levels of feedback in blended learning, yield three kinds of supporting scaffoldings: cognitive, psychological, and affective scaffolding. Therefore, the feedback source when delivered at multiple levels could be a supporting metaphor for cognitive, psychosocial and affective scaffoldings through a combination of pedagogical, social and mental presence.

Overall, this study was one of the first to investigate the impact of the interaction between the source and the level of feedback in blended learning on self-efficacy and achievement. The findings can act as a future basis to continue to test the quality of feedback in online and Web-based learning environments. Thus, this study needs to be replicated on much larger samples. It is also recommended to have online instructors and learners get trained on providing and receiving feedback at multiple levels to increase the learning discourse.

References

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