DEVELOPING EVALUATIVE TOOL FOR ONLINE LEARNING AND TEACHING PROCESS

Assist. Prof. Dr. Fahriye A. Aksal
Faculty of Education, Near East University, Northern Cyprus
Email: fahaltinay@gmail.com

ABSTRACT
The research study aims to underline the development of a new scale on online learning and teaching process based on factor analysis. Further to this, the research study resulted in acceptable scale which embraces social interaction role, interaction behaviour, barriers, capacity for interaction, group interaction as sub-categories to evaluate online learning and teaching process. The Statistical Package for the Social Sciences **(**SPSS) was employed for the purpose of data entry, manipulation, and analysis. Factor analysis was employed to reveal validity and reliability of items related to online learning and teaching process. Within the process of developing scale, whole items were constructed through dense literature and reviewed by two experts on the filed of online education. As there is little attention on choosing a right tool to evaluate the practices of online education in the literature, this research study puts forward by revealing alternative evaluative tool as a scale in order to examine the social interaction role, interaction behaviour, barriers, capacity for interaction, group interaction in online learning and teaching process within higher education practices.
Keywords: barriers, online learning, online teaching, scale, social interaction

INTRODUCTION

Online interaction provides negotiated, social learning situation that traditional instruction was transferred to online learning environment (Swan, 2002). As online instructions rely on the theoretical stance of socio-constructivism, collaborative mode of learning is taken place in order to create desirable learning outcomes in online context (Gazi A, 2010). In this respect, online interaction plays a great role to maximize learning opportunities in online context as a social context (Brignall, Valey, 2005; Tu, Corry, 2003). Social presence is essential that online interaction can facilitate this presence for creating collaborative, negotiated, reflected learning (Tu, McIsaac, 2002; Wallace, 2003). In online learning environments, negotiating social information and maintaining social interaction is fostered by having conscious on roles within learning, teaching process (Alvarez, Guasch, Espasa, 2009; Patricia, Tryon, Bishop, 2009). The study of Slagter van Tryon, Bishop (2009) gives insights on the theoretical framework for online instruction as the combination of social information processing and group structure theories.

The adoption of a social-constructivist approach to online teaching and learning and the integration of online collaborative learning in online environment in higher education, paying attention to social interaction, roles in learning, teaching and barriers in online learning, teaching has intensified need (Zhu, Valcke, Schellens, Li, 2009). In this respect, the transition to online teaching and learning makes new challenges that roles, barriers become essential to be considered for having real social interaction in online context (Bennett, Lockyer, 2004). As the study of Maor (2001) stated the roles of tutors as pedagogical, social, managerial and technical actions, making a general evaluation for social interaction based on these roles provided insights to realize the online learning, teaching process. Further to this, considering both merits and pitfalls of online learning, teaching process enriches constructing knowledge in online context.

Engaging learners and tutors in online interaction has been the focus of many studies in the recent decade (Alvarez, Guasch, Espasa, 2009; Swan, 2002; Bryun, 2004; Wallece, 2004). This is so important that active participation enhances learning and also engaging learners and tutors in online interaction provides actively contribute to a group learning experience (Mason, 2002). There are many studies in the literature highlighting the emerging importance of tutors in creating active and collaborative learning environments (Coppola et al., 2002; Easton, 2003; Lim and Cheah, 2003; Sims, 2003; Pan and Sullivan, 2005). Salmon (2002) has framed the roles for online tutors that gaining insights on these roles is essential for quality of online education to l barriers and enhancing to construct knowledge. This is, however, a field of research that has yet to produce further insights into the role of tutors in facilitating communication to overcome barriers in constructing knowledge. Further to this, Berge (1995), Maor (2003), Aksal A (2010) provided a theoretical framework on online interaction, roles. Although many studies pay attention to the roles, barriers and social interaction in online learning teaching process, less attention was drawn to reveal evaluative tool for roles, barriers and social interaction in online learning teaching process (Aksal A, 2009). Therefore, this research study aims to examine the development and validation of a scale in online learning and teaching process based on factor analysis of items within the scale.

METHODOLOGY

The research study employs the development of a new scale on online education. The research study stresses the validity and reliability evaluation of 164 items from the scale based on factor analysis. In this respect, developing a questionnaire as a scale depending on social interaction, roles, barriers in online learning and teaching process is aimed in the research study to fill the gap in the literature.

Participants

The scale was conducted to online learners in the 2010-2011 Spring Semester. The research study covered 62 undergraduate students as research participants. Research participants were selected voluntarily from one of the higher education institutions in Turkey. 23(37, 1%) of the participants were female and 39(62, 9%) were male students. Further to this, Table I in below indicates gender and department of participants as demographic information in the research process.

Table I. Gender and Department of the Research Participants

Profile of the participants	Frequency	Percent (%)
Gender		
Female	23	37.1
Male	39	62.0
Total	62	100
Age		
17-20	47	75.8
21-24	13	21.0
25-29	2	3.2
Total	62	100
Department		
BOTE	62	100
Course		
EB	56	90.3
Other	6	9.7
Total	62	100

Instrument

In the research study, questionnaire was used that consists of demographic information, items and consent form. Demographic information provided an insight on determining independent variables which are gender, department. Further to this, consent form provided to make a bridge of confidentiality among researcher and participants. This made voluntarism for research participants and increase the validity, reliability of the research findings. 164-itemed questionnaire was conducted to create a new scale for online learning and teaching process.

Developing a scale consists of the five steps. In the first step, dense literature was done about online learning and teaching process. The next step is that item pool was created in the scale. In addition, draft of the scale was evaluated and reviewed by two experts in order to make content validity. After that the statistical analysis of the items was done and sub-categories were set as the last step of the process (Namlu, Odabasi, 2007).

The literature provided an insight on the great impact of social interaction for desirable learning outcomes within online learning environments. In constructing knowledge, there is an intensified need to focus on negotiation, reflection and collaborative efforts. In this respect, it is vital to consider the role of social interaction and roles of both learners and tutors within online learning, teaching process. Although online learning, teaching process has merits, it has challenges as barriers to minimize the practices of online pedagogy. Therefore, in online pedagogy, considering social interaction, learning, teaching in online and barriers in online context is crucial. Developing a scale as an evaluative tool for online pedagogy is intensified need that literature stays partial. In this respect, this research study aims to reveal evaluation tool for online learning and teaching process with categories as social interaction role, interaction behaviour, barriers, capacity for interaction, group interaction through statistical analysis.

RESULTS AND DISCUSSION

As this new developed scale is significant for developing evaluative tool for online learning and teaching process, the scale had examined over 164 items. The calculation of the mean and the standard deviation of each item were done by pre-analysis for the scale. Total analysis of the items was done. Then, from the 85 items which total correlation was under 0.20 and test-retest correlation was insignificant on the level of .05 were removed from the scale. Therefore, analysis was done again with the remaining 79 items (Chu, 2006).

Normal distribution analyses of the score were made. This underlined that the minimal score is 98 and the maximum possible score is 280. 182 is the expected range for the scale from the lowest to the highest the range. In this respect, analysis of this scale revealed the highest score as 280 and the lowest as 98 and the range as 182. What is significant in here is that new scale embraced the expected range. The mean of the scores for this scale was as 192.38, the median as 194, the standard deviation as 45, 79. The Skewnes value, as it was calculated for distribution as it was -0.23 and Kurtosis value was 0.599. Therefore, the distribution was normal (See Appendix I for Table 2).

With 79 items covered in this scale, principal component analysis was done. Kaiser- Meyer-Olkin (KMO) value was 0.69 in the analysis. In order to reveal the result of partial correlations as low and distribution for factor analysis as enough or not sufficient, KMO tests were applied. As KMO value needs to be over 0.60, it could be accepted as sufficient as it is close to 0.90 (Nunnally, 1978). Therefore, the KMO value is acceptable for this research (See Appendix II for Table 3).

Barletts' test of sphericity (BTS) which tests correlation matrix = unit matrix of the hypothesis was considered for the study as well. Correlation between the variables as it is different from 1 and also the factor analysis as it is appropriate for the variables were revealed from the result of the rejection of the hypothesis. In addition, v^2 value for BTS was determined as 1444.919 ($p < 0.0001$) for this study. Nunally and Bernstein (1994) paid attention that limit for factor loading need to be 0.40 as cutoff value for the new scale (Nunally, Bernstein, 19948). Therefore, 0.40 value is accepted for this study.

8 factors with eigenvalue of over 1, out of 79 items were resulted by total variance. The percentage of variance for factors of which eigenvalue is over 1 was determined as 70.89%. 5 factors were determined since 8 factors embraced a large number of sub dimensions and there is a need to take the limit to the first decreasing difference point. The Explained Total Variance is shown in Table 4 (See Appendix III for Table 4).

As seen in Table 4, the cumulative explanation percentage for the 5 factors is 61.294%. The results showed that total and loadings percentage of variance are: first factor as 10.390 and 31.484%, second factor as 3.391 and 10.277%, third factor as 2.499 and 7.574%, fourth factor as 2.173 and 6.586%, fifth factor as 1.773 and 5.373%. It is better to reach the higher variation for the better result of factor analysis and also stronger for the structure of the scale. In addition, variance in between 40% and 60% is sufficient. Therefore, variance percentage as over 50% is acceptable range for the study.

Churchill (1980) and Parasuraman et al. (1991) supported the idea that refinement of the instrument needs to deal with the computation of Cronbach's alpha coefficient, exploratory factor analysis, and item-to-total correlation. In this respect, Varimax rotation was done and results revealed the percentage of variances by 5 factors as: 16.321% for the first factor, 14.514% for the second factor, 13.746% for the third factor, 8.938% for the fourth factor and 7.774% for the fifth factor. In there, factor loads represented values between 0.50 and 0.86. Table 5 reflects the items which they included in the factors after the varimax rotation. The result and the outcome of the varimax rotation revealed how items were within the appropriate parameters. In this respect, remaining items represented the mean as in between 2.69 and 1.98 and the standard deviations as in between .80 and 1.27. Further to this, item total correlations were as in between 0.43 and 0.79. This shows us how it is accepted level as the correlation is over 0.20. In addition, Total cronbach alfa was 0.91. As a result of all analysis, online learning and teaching process can be summed under five titles according to the results of the factor analysis. Considering the related literature, these titles are social interaction role, interaction behaviour, barriers, capacity for interaction, group interaction (Gazi A., Aksal A., 2011).

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APPENDICES

APPENDIX I

Table 2:
Normal distribution analyses

Statistics		
N		
	Valid	62
	Missing	0
Mean		192.3871
Standard error of mean		5.81617
Median		194.5000
Mode		161.00
Standard deviation		45.7965
Variance		2097.323
Skewness		0.023
Standard error of skewness		0.304
Kurtosis		0.653
Standard error of kurtosis		0.599
Range		182.00
Minimum		98.00
Maximum		280.00
Sum		11928.00

a Multiple modes exist. The smallest value is shown.

APPENDIX II

Table 3:
KMO and Bartlett_s test

Kaiser–Meyer–Olkin Measure of sampling Adequacy		0.689
Bartlett's test of Sphericity	Approximate v2	1444,919
	df	528
	Sig.	000

APPENDIX III

Table 4
The results of factor analysis total variance explained

Component	Initial Eigenvalues			Extraction sums of squared loadings			Rotation sums of square loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative%	Total	% of Variance	Cumulative
1	10.390	31.484	31.484	10.390	31.484	31.484	5.386	16.321	16.321
2	3.391	10.277	41.761	3.391	10.277	41.761	4.790	14.514	30.836
3	2.499	7.574	49.335	2.499	7.574	49.335	4.536	13.746	44.528
4	2.173	6.586	55.920	2.173	6.586	55.920	2.949	8.938	53.520
5	1.773	5.373	61.294	1.773	5.373	61.294	2.565	7.774	61.294
6	1.334	4.043	65.336						
7	1.225	3.711	69.074						
8	1.031	3.124	72.172						
9	0.997	3.022	75.193						
10	0.917	1.941	63.004						
11	0.903	2.735	80.708						
12	0.763	2.313	83.021						
13	0.644	1.951	84.972						
14	0.602	1.823	86.796						
15	0.551	1.670	88.466						
16	0.478	1.476	89.942						
17	0.474	1.436	91.378						
18	0.410	1.244	92.622						
19	0.379	1.150	93.772						
20	0.315	0.955	94.726						
21	0.290	0.880	95.607						
22	0.272	0.825	96.431						
23	0.228	0.692	97.123						
24	0.186	0.565	97.688						
25	0.169	0.512	98.200						
26	0.132	0.400	98.601						
27	0.118	0.359	98.960						
28	0.087	0.264	99.224						
29	0.079	0.240	99.464						
30	0.065	0.198	99.661						
31	0.046	0.140	99.80						
32	0.034	0.104	99.906						
33	0.031	0.094	100.000						

Extraction method: principal component analysis

APPENDIX IV

Table 5

Mean standard deviation, item total, factor analysis and factor loading

Items and factors	Mean	SD	Item total	Varimax factor load
Social interaction role*: α=0.89*				
76. Make participants comfortable with the technology and ultimately to make the technology transparent	2.3387	1.07037	0.531	0.761
80. Encourage the on-line group to develop its own life and history Welcome shared language, metaphors, rituals and jokes	2.2903	1.09225	0.604	0.755
94. Be reflective to understand how their students learn, adapt the teaching environment	2.4516	1.05080	0.433	0.661
81. Encourage group members to question theory and practice	2.2903	1.03047	0.550	0.656
18. Social relationship, friendly attitudes must be encouraged, collaborative work should be done to increase learners' interaction and instructors must assist students	1.9839	0.98334	0.536	0.617
82. Encourage group members to lead discussions	2.5645	1.04992	0.753	0.613
111. Flexibility of Time and Location	2.4516	1.21030	0.602	0.612
78. Lead a round of introductions with perhaps, an on-line ice-breaker	2.3871	1.06131	0.656	0.610
93. Feedback and motivational skills	2.5806	1.12422	0.705	0.566
32. Collaborative learning strategies require more interaction	2.0323	0.84868	0.556	0.502
Interaction behaviour*: α=0.92*				
101. Facilitator contribute to build up a positive, constructive,	2.3871	1.07665	0.446	0.744
100. Be flexible to adapt new learning style	2.4194	1.18111	0.594	0.707
66. Encourage discussions	2.3226	0.90126	0.589	0.651
162. Online courses do not exist in isolation	2.1290	0.91408	0.484	0.630
103. Lecturers presence in online groups is important to students that active participation is the most important factor influencing the success of online groups	2.4032	1.06293	0.614	0.602
116. Promote human interaction	2.6129	1.10668	0.466	0.588
64. Assign roles and responsibilities	2.1129	0.85132	0.554	0.584
89. Establish an online identity as e-moderator	2.3065	1.08021	0.618	0.568
91. Build online teams	2.5161	1.06728	0.719	0.535
Barriers*: α=0.89*				
123. There is the lack of support for the changing roles of students	2.6452	1.10285	0.507	0.861
121. There is lack of technological assistance	2.7097	1.21988	0.520	0.823
122. There is lack of adequate time-frame	2.6935	1.15359	0.645	0.817
124. Tension between teacher and student control of the online	2.4677	1.01977	0.413	0.815
120. Be a team player, communication skills, and deliver mechanism.	2.5484	1.00290	0.621	0.617
Capacity for interaction*: α=0.73*				
47. Students expect an e-learning system to be dependable and user friendly	2.3387	1.10057	0.311	0.846
29. Understanding of the attitudes, experiences and dynamics of interaction of students is considered by highlighting the significance	2.2258	1.12234	0.326	0.846
48. Availability and access to a common ground in a computer -mediated discussion is necessary to sustain instructional interaction over the entire length of the discussion. Instructional dialog takes	2.6290	1.07481	0.374	0.629
27. Students' collaborative engagement with new technologies heighten understanding of influential factors shape the effectiveness of peer interactions, learning contexts and computer interfaces for enhancing learning from a socio-cognitive perspective	2.3226	1.14196	0.233	0.603
8. A capacity for relationship building	2.4194	1.10955	0.483	0.557
Group interaction*: α=0.68*				
55. Participants learning require two kinds of interaction with course content and other participants	2.1452	0.80667	0.336	0.761
54. Online learning groups often can develop their strong identity	1.9677	0.92271	0.356	0.722
158. Absence of real-time feedback	2.2581	1.07025	0.456	0.536