

1 The Effect of E-Learning Approach on Students' Achievement in
2 Fraction Math Course Level 5 at Yemen's Public Primary School

3 Tareq Saeed Ali Thabet¹ and Dr.N.V.Kalyankar²

4 ¹ S.R.T.M. University

5 *Received: 10 December 2013 Accepted: 2 January 2014 Published: 15 January 2014*

7 **Abstract**

8 E-learning (EL) is widely used in school and other organizations all over the world, because of
9 difficulties in math skills (Remembering , understanding , application). There have not been
10 any major surveys in the Yemen Public Primary School (YPPS) in that regard. This is the
11 driving question behind this research: What is the effectiveness and usefulness of using
12 e-learning approach in teaching the fraction math course for students of level 5 in the republic
13 of Yemen on (Remembering , understanding , application) skills ? In this study, an
14 experimental group of (30) students studying a course using e-learning approach. The control
15 group (30) students they studying a course traditional learning, experimental design approach
16 were used. The students? achievement was examined between two groups. The research
17 results proved that there is a significant increase in gain in achievement, The EL has achieved
18 efficiency greater than traditional learning in (Remembering, understanding, application)
19 skills.

21 **Index terms**— control group, e-learning, experimental group, pre-test, post-test, students? achievement,
22 t-test.

23 **1 Introduction**

24 L is the use of Information and Communication Technology e.g. Internet, Computer, Mobile phone, Learning
25 Management System (LMS), Televisions, Radios and others to enhance teaching and learning activities. E-
26 learning is a unifying term used to describe the fields of online learning, web-based training and technology
27 delivered instructions (Oye, Salleh, & Iahad, 2010). EL has become an increasingly popular learning approach in
28 higher educational institutions due to vast growth of internet technology. Nowadays Elearning has a competitive
29 advantage and many universities have implemented it and this has impacts on students' performance or GPA.
30 However, still there are other universities and academic institutions that use very low interactive E-learning which
31 is not enough to contribute to the performance of the students. In contrary to that, other higher educational
32 institutions use highly interactive E-learning which directly improves students' performance in general (Rodgers,
33 2008).

34 Today technology is a tool used to remove geographical barriers and facilitates everybody to learn anytime
35 and anywhere without the presence of the lecturer. The main purpose of E-Learning is to increase accessibility of
36 education and reducing costs and time as well as improving Students' academic performance. This approach of
37 learning facilitates different students at different continents to attend the same classes almost at the same time.
38 Nowadays, technology is becoming the medium for teaching and learning without being at university campuses.
39 This technology enabled instructional method is aimed to improve quality of education and student academic
40 performance. It has been found that students in higher educational institutions that engaged in E-Learning,
41 generally performed better than those in face-to-face courses. (Holley, 2002) found that students who participate
42 in online/ EL achieve better grades than students who studied traditional approach. As result of this finding EL
43 is growing very fast and become popular and that is why many higher educational institutions are adopting to

2 INTERNET,

44 virtual learning system. E-Learning is widely used in many universities in the world today. In some universities,
45 their EL does not add any value to the teaching and learning activities of the University and perhaps they do
46 not investigate the impact of E-learning on student academic performance. Much research has not been done
47 on the relationship of E-learning use and student academic performance. (EL) is the use of Information and
48 Communication Technology e.g.

49 2 Internet,

50 Computer, Mobile phone, Learning Management System (LMS), Televisions, Radios and others to enhance
51 teaching and learning activities. E-learning is a unifying term used to describe the fields of online learning, web-
52 based training and technology delivered instructions (Oye, Salleh, & Iahad, 2010). It is widely used in schools
53 and other organizations all over the world, either to support classroom learning or on its own. The Yemen's
54 public primary school (YPPS) is no exception. Usually, a special kind of Computer Aided education (CAE)
55 content management system is used for running e-learning courses. These systems hold the fraction unit content
56 and information of the students and also provide the interactive tools to support learning process. While using
57 such systems makes the e-learning experience much easier, it also induces some problems like the heterogeneous
58 previous knowledge of the students. In many cases, this can be an obstacle, especially in such courses, where
59 the students are from different faculties, or in adult learning situations. This is also a problem in the regular
60 classroom education, but even more so in e-learning, where the participants can be from all over the world. The
61 attitude of students towards e-learning or learning content management systems is also an important factor in
62 e-learning. There have not been any major surveys in the YPPS in that regard.

63 According to (Bonk and Reynolds, 1997), to encourage thinking on the e-learning, challenging activities that
64 enable learners to link new information to old, and acquire meaningful knowledge must be created; hence, it is the
65 instructional strategy and not the technology that influences the quality of learning. Kozma (2001) argues that
66 the particular attributes of the computer are needed to bring real-life models and simulations to the learner; thus,
67 the medium does influence learning. However, it is not the computer per se that makes students learn, but the
68 design of the real-life models and simulations, and the students' interaction with those models and simulations.
69 The computer is merely the vehicle that provides the processing capability and delivers the instruction to learners
70 (Clark, 2001). In 1997 and after the yemen authority had been established, There is a need for e-learning with
71 the advent of the Internet, and have seen this technology in recent years, a significant development with the
72 evolution of the network itself, and made sure the world to benefit from the application of e-learning in the
73 development of primary and secondary education alike, and provided different countries experiences distinct in
74 this area deserve to be studied and analyzed to draw conclusions and then build on it in the development of an
75 integrated system of e-learning in the Republic of Yemen, commensurate with the nature of Yemeni society and
76 capabilities available, as there is an urgent need and rationale for the Republic of Yemen, and like other countries
77 to introduce a system of elearning, most notably :

78 ? Geographical Justifications: Is the distances between the learners and educational institutions, and the
79 presence of isolated areas and remote geographically, which leads to the difficulty of access to students of
80 educational institutions of formal and informal to the rugged roads or lack thereof sometimes.

81 ? Social and Cultural Justifications : Is the spread of education and increase the ability to absorb the social
82 and cultural changes and technological developments, and the trend towards education and empowerment of
83 women, and traditional literacy and informatics.

84 ? Geographical Justifications: Is the distances between the learners and educational institutions, and the
85 presence of isolated areas and remote geographically, which leads to the difficulty of access to students of
86 educational institutions of formal and informal to the rugged roads or lack thereof sometimes.

87 ? Social And Cultural Justifications: Is the spread of education and increase the ability to absorb the social
88 and cultural changes and technological developments, and the trend towards education and empowerment of
89 women, and traditional literacy and informatics.

90 ? Economic Rationales: Is to provide educational services to the disadvantaged segments of the poor and others
91 in the community, on the grounds that the e-learning system less expensive, and the possibility of teaching large
92 numbers of students at a lower cost. Justifications for psychological and health : is that e-learning offers programs
93 that take into account individual differences among learners, and remove the psychological barrier between the
94 learner and the teacher, as well as met the aspirations of all individuals in the education and development of
95 feelings of delivery capacity and contribute to the growth of self and community and continuous improvement.
96 There is almost a consensus among educators and politicians all over the world that the gap tomorrow will be
97 between rich and poor, but between the actors in the field of e-learning and among the recipients of this act,
98 and like any system it relates to cultural heritage and institutional need of e-learning in our country to the time
99 is short so settles determined constants, the application of e-learning Bmnzawmth integrated in the learning
100 environment has become an urgent requirement dictated by the need for qualitative development required for the
101 science content of the curriculum and the most appropriate method to be presented interactively take into account
102 the many educational standards and technical, and perform my work to learning outcomes and educational level
103 scientific prepares students to enter into the realm of practical life worthily and effectively. Had turned our
104 eyes to the experiences of countries in the field of e-learning, it can realize that there is an international trend
105 towards e-learning due to its effectiveness in improving the educational process and flexibility of the obvious being

106 that includes multimedia and super-enrichment activities, interactive, and provides the opportunity to achieve a
107 partnership between the teacher and the students, parents, and society as a whole, and that this international
108 trend vary justifications and images from country to country depending on the economic and social conditions
109 and geographic each state, The Research Problem May be Defined in the Following Questionadings

110 **3 Global**

111 What is the effectiveness and usefulness of using e-learning approach in Fraction math course for students of level
112 5 in the Yemen's Public Primary school?

113 a) The Research Importance This study is an important contribution to the research of understanding how
114 to use e-learning. School is using the computer more and more to deliver instruction, and instructors and
115 courseware designers need to have valid information on what technologies are available and how to use them to
116 improve student learning. Students of the "computer Generation" expect and demand high quality. Decisions
117 to purchase e-learning and multimedia software by ministry of education can be justified through this research.
118 Software companies would gain feedback about the usefulness of their products in an educational setting. The
119 fraction course is one of the essential program requirements for fraction. Using e-learning approach to teach this
120 course is the first attempt to engage the YPPS. The efficiency of the suggested program will be determined. The
121 student's attitudes toward this technology will be studied. Student's feedback will be analyzed to determine future
122 plans concerning this type of learning. YPPS technological facilities and educational development strategies may
123 be changed according to the research results.

124 **4 III.**

125 **5 Experimental Design**

126 I have used a pretest for two group to determine if they equal in Achievement -posttest for same group to compare
127 the Achievement. Experimental design. One experimental group and one control group with pretestposttest. Test
128 questions on pre-and post-tests were identical. Test answers were not revealed on the pretest. The test questions
129 were derived from a pool of questions bank designed by the researcher. After review of arbitrators teachers.
130 and e-learning included all phases of basic education, secondary and university and others, and that the role
131 and efforts in the field of e-learning is not shortened to official bodies, but also extended to community-based
132 organizations and the private, but the field of supervision remains the official bodies, in addition to engaging in
133 e-learning needs to infrastructure is the technical aspect associated with equipment, systems, software, networks,
134 etc., and the human side goal of rehabilitation administrators, technicians, designers and specialists, and before
135 that the training of teachers involved in the educational process in the the use of modern techniques, all of which
136 must be in accordance with the successive stages of each phase is based on its predecessor, and according to
137 the plans very carefully thought out. Yemen public primary school (YPPS) in capital sana'a, established to
138 teach by e-learning in 20 school. This course (Normal Fractions). The course includes the following subjects: 1-
139 Review Fraction, 2-Compare and order fractions, 3-Add fractions, 4-Sub fraction, 5-Multiply fraction, 6-Dividing
140 fractions.

141 **6 Global Journal of Computer**

142 Instrumentation course in YPPS many times, and I have noticed the difficulty for students to achieve good scores
143 and to be interactive in the classroom during the lectures. As an example, some students can't imagine how the
144 fractions operation done, because the role of math changing for them like $1/4+1/4$ they thinking the result is $2/8$,
145 Add numerator to numerator and denominator to denominator, I tried to make imaging of fraction to them and
146 show them how $1/4+1/4 = 2/4$ not $2/8$ do not Add denominator. For answering, to draw, to show animation. I
147 am phd student in e-learning, I am programmer and teacher in Aden University, I make the program by use VB
148 6, and comtasia program (Video), I tried to solve the problem by used computer program to make learning is
149 easy and fun, the computer-based learning to overcome these problems. All of them agree that e-learning using
150 computer tools, internet and, interactive multimedia based on instructional computer will enhance the education
151 process and increase the efficiency especially if designed under the control of the Instructional System Design
152 theory.

153 **7 b) The Research Hypothesis**

- 154 i. There are significant differences at level of ? (0.05) between the mean scores of the achievement of experimental
155 group and control in remembering skill .
- 156 ii. There are significant differences at level of ? (0.05) between the mean scores of the achievement of
157 experimental group and control in understanding skill .
- 158 iii. There are significant differences at level of ? (0.05) between the mean scores of the achievement of
159 experimental group and control in application skill.

160 **8 c) The Research Methodology**

161 The research was carried out using the experimental methodology in which the 30 student were treated as an
162 experimental group and 30 students as control groups. This experimental group had studied the course of
163 fraction instrumentation being programmed using e-learning, the control group had studied the course of fraction
164 by traditional way.

165 **9 a) Variables Calculations and Statistical Processing Research
166 Importance**

167 After completing the experiment, I have collected the data to be analyzed used SPSS -18, program, two
168 independent groups. The following relations were used in this research to measure the students' gain in
169 achievement after studying fraction course using the e-learning approach and student studying by traditional
170 way, to compare between them, IV.

171 **10 Results**

172 Use In order to apply parametric tests, the data was firstly investigated for normality distribution using
173 Kolmogorov-Smirnov statistic. In Kolmogorov-Smirnov statistic, the data is assumed to be normal if the
174 significance level is greater than (.05). As shown in table (1), the data was confirmed to be normally distributed.
175 Therefore the t-test was used since the sample size is small (n=30), all the population) and the data was normally
176 distributed.

177 **11 a) Two independent samples statistics of pretest 1: Remem-
178 bering**

179 To check the equivalent between experimental group and control group in achievement (remembering skill) we
180 make pretest exam, we collected the data and make processing of two independent samples t-test was run on
181 the SPSS-18 program to determine the equivalent between experimental group and control group, the result
182 are shown in the table (2). It is clear from this table and table (1) that the mean in the scores is (3.0667)and
183 ??3.2333). the computer t value equal (-0.504) at the degree of freedom equal (58) with statistical significant
184 (0.616). this is greater than the claimed level of significance ? (0.05), therefore the two groups are equivalent
185 in Achievement (Remembering) i.e. there is no significant differences at level of ? (0.05) between the mean
186 score of the Achievement (Remembering) pretest of two samples. To check the equivalent between experimental
187 group and control group in achievement (Understanding skill) we make pretest exam, we collected the data and
188 make processing of two independent samples t-test was run on the SPSS-18 program to determine the equivalent
189 between experimental group and control group, the result are shown in the table (4). It is clear from this table
190 and table (3) that the mean in the scores is (3.2667) and (3.8000). the computer t value equal (-1.730) at
191 the degree of freedom equal (58) with statistical significant (0.089). this is greater than the claimed level of
192 significance ? (0.05), therefore the two groups are equivalent in Achievement (understanding) i.e. there is no
193 significant differences at level of ? (0.05) between the mean score of the Achievement (Understanding) pretest of
194 two samples. To check the equivalent between experimental group and control group in achievement (application
195 skill) we make pretest exam, we collected the data and make processing of two independent samples t-test was
196 run on the SPSS-18 program to determine the equivalent between experimental group and control group, the
197 result are shown in the table (6). It is clear from this table and table (5) that the mean in the scores is (3.3667)
198 and (3.3000). The computer t value equal(D D D D D D D D)

199 Year 2014 (0.177) at the degree of freedom equal (58) with statistical significant (0.860). This is greater than
200 the claimed level of significance ? (0.05), therefore the two groups are equivalent in Achievement (Application)
201 i.e. there is no significant differences at level of ? (0.05) between the mean score of the Achievement (application)
202 pretest of two samples. To check the validity of the first hypothesis that stated (There are significant differences
203 at level of ? (0.05) between the mean scores of the achievement of experimental group and control in remembering
204 skill), the two independent samples t-test was run on the SPSS-18 program to determine any significant differences
205 between experimental group and control, the result are shown in the table (8). It is clear from this table and
206 table (7) that the mean in the scores is (5.2667) and (4.2667). The computer t value equal (3.015) at the degree
207 of freedom equal (57.899) with statistical significant (0.004). this is less than the claimed level of significance
208 ? (0.05), therefore the hypothesis is Accepted and the alternative hypothesis is rejected i.e. there is significant
209 differences at level of ? (0.05) between the mean score of the Achievement (Remembering) posttest of two samples
210 Favoring the experimental group. To check the validity of the first hypothesis that stated (There are significant
211 differences at level of ? (0.05) between the mean scores of the achievement of experimental group and control
212 in understanding skill), the two independent samples t-test was run on the SPSS-18 program to determine any
213 significant differences between experimental group and control, the result are shown in the table (10). It is clear
214 from this table and table (9) that the mean in the scores is (6.9000)and (5.3667). The computer t value equal
215 (4.319) at the degree of freedom equal (55.293) with statistical significant (0.000). this is less than the claimed
216 level of significance ? (0.05), therefore the hypothesis is Accepted and the alternative hypothesis is rejected i.e.
217 there is significant differences at level of ? (0.05) between the mean score of the Achievement (Understanding)

218 posttest of two samples Favoring the experimental group. To check the validity of the first hypothesis that stated
219 (There are significant differences at level of ? (0.05) between the mean scores of the achievement of experimental
220 group and control in Application skill), the two independent samples t-test was run on the SPSS-18 program to
221 determine any significant differences between experimental group and control, the result are shown in the table
222 (12). It is clear from this table and table (11) that the mean in the scores is (7.4000) and (5.4667). The computer
223 t value equal (4.709) at the degree of freedom equal (57.295) with statistical significant (0.000). This is less than
224 the claimed level of significance ? (0.05), therefore the hypothesis is Accepted and the alternative hypothesis
225 is rejected i.e. there is significant differences at level of ? (0.05) between the mean score of the Achievement
226 (Application) posttest of two samples Favoring the experimental group.

227 **12 Conclusion**

228 The goal of any learning activity is for learning to take place. A common way to measure the effectiveness of
229 instruction is to measure learner achievement. When examining the descriptive data concerning the achievement
230 pretest and posttest scores for experimental and control groups, it was found that there is an increase in the mean
231 of experimental after the application of the EL of the course. Also, the standard deviation in the posttest of
232 experimental group is reduced compared to the standard deviation in the posttest of control group which means
233 less data variations and pointed out that the student's scores are around the mean. Therefore the first hypothesis
234 stated that (There are significant differences at level of ? (0.05) between the mean scores of the achievement
235 (Remembering) of posttest for experimental and control groups) was Accepted. The second hypothesis stated that
236 (There are significant differences at level of ? (0.05) between the mean scores of the achievement (understanding)
237 of posttest for experimental and control groups) was Accepted. The third hypothesis stated that (There are
238 significant differences at level of ? (0.05) between the mean scores of the achievement (Application) of posttest
239 for experimental and control groups) was accepted.

240 From this discussion, it is clear that EL approach has good efficiency in learning and improves the students'
241 achievement and attitudes toward this new systematic way of learning using the new technology based on
242 computer and multimedia tools.

243 **13 VI.**

244 **14 Acknowledgements**

245 After the results of the research have been lighted, the researcher would like to suggest the following points:
246 ? Expansion in the computerization of mathematics curriculum because of its impact on student achievement.

247 **15 ? Work on the provision of computers in all schools**

248 with Data show. ? The need for training and rehabilitation of mathematics teachers in the use of computer. ?
249 The need for a teacher who specializes in computer technician in addition to the computer lab in each school. ?
250 Provide incentives and support for teachers who are doing the role of computers in the educational process. ?
251 Hold contests on the level of the Republic of programming modules in Mathematics ? The e-learning approach
252 should be used in our Schools, ? Execute practical sessions for students of all levels concerning use of LMS.

253 ? Encourage instructors to practice the e-learning approach and use LMS. ? Establish an authoring unit
254 for e-learning of different courses with different experts. acknowledgement section may be presented after the
255 conclusion, if desired.

1



Figure 1:

1

(Remembering) , pretest Test	N	Mean	Std. deviation
Experimental	30	3.0667	1.38796
Control	30	3.2333	1.16511
Table 2 : Achievement (Remembering) independent two samples t-test , pretest			
Achievement	T-value	df	P-value
Experimental	-	58	0.616
Control	0.504		
b) Two independent samples statistics of pretest 2: Understanding			

Figure 2: Table 1 :

3

Test	N	Mean	Std. deviation
Experimental	30	3.2667	0.98027
Control	30	3.8000	1.37465

Figure 3: Table 3 :

4

Achievement (Understanding) independent
two samples t-test, pretest

	T-value	df	P-value
Achievement	-1.730	58	0.089

Experimental

Control

c) Two independent samples statistics of pretest 3:
Application

Figure 4: Table 4 :

5

Table 6 : Achievement (Application) independent two
samples t-test, pretest

	Achievement	T-value	df	P-value
Experimental	0.177		58	0.860
Control				
(Application), pretest				
Test	N	Mean	Std. deviation	
Experimental	30	3.3667	1.58623	
Control	30	3.3000	1.31700	

Figure 5: Table 5 :

7

(Remembering), posttest.

	N	Mean	Std. deviation
Experimental	30	5.2667	1.58623
Control	30	4.2667	1.31700

Figure 6: Table 7 :

8

: Achievement (Remembering) independent two
samples t-test, posttest.

	T-value	df	P-value
Achievement	3.015	57.899	0.004
Experimental			
Control			
e) Two independent samples statistics of posttest 2: Understanding			

Figure 7: Table 8

9

(Understanding), posttest			
Test	N	Mean	Std. deviation
Experimental	30	6.9000	1.21343
Control	30	5.3667	1.51960

Figure 8: Table 9 :

10

: Achievement (Understanding) independent
two samples t-test, posttest
Achievement
Experimental
Control
f) Two independent samples statistics of posttest 3:
Application

Figure 9: Table 10

11

(Application), posttest			
Test	N	Mean	Std. deviation
Experimental	30	7.4000	1.49943
Control	30	5.4667	1.67607

Figure 10: Table 11 :

12

: Achievement (Application) independent two
samples t-test, posttest
Achievement
Experimental
Control

Figure 11: Table 12

256 [Oye et al. ()] , N D Oye , M Salleh , N A Iahad . 2010.

257 [Clark (ed.) ()] *A summary of disagreements with the "mere vehicles" argument*, R E Clark . <http://homepages.hvu.nl/ilya.zitter/References.htm> R. E. Clark (ed.) 2001. Greenwich, CT: Information Age Publishing Inc. p. . (Learning from media: Arguments, analysis, and evidence)

258

259

260 [Schramm ()] *Big media, little media*, W Schramm . 1977. Beverly Hills, CA: Sage.

261 [Tombkin ()] *Biomedical Signal Processing*, by PRT Prentice-Hall. A division of Simon & Schuster Englewood Cliffs, New Jersey 07632, ' Tombkin , WJ . 1993.

262

263 [Alhawery (2013)] *E-learning in Yemen Reality and Ambition*, Abdulmalek Alhawery . <http://www.algomhoriah.net/articles.php?id=42892> 2013. Feb 2. 2014.

264

265 [Hall (2001)] *e-learning: Building competitive advantage through people and technology. A special section on e-learning by Forbes Magazine*, B Hall . <http://www.forbes.com/specialsections/elearning/> 2001. January 24. 2014. (Retrieved)

266

267

268 [Holistic E-learning in Nigerian Higher Education Institutions Journal of Computing] 'Holistic E-learning in Nigerian Higher Education Institutions'. *Journal of Computing* 2 (11) p. .

269

270 [Carr and Brown ()] *Introduction to Biomedical Equipment Technology*, Jacobson Carr , M Brown . 1993. Prentice Hall Inc. (2nd edition)

271

272 [Bonk and Reynolds ()] 'Learnercentered Web instruction for higher-order thinking, teamwork, and apprenticeship'. C J Bonk , T H Reynolds . *Web-based instruction*, B H Khan (ed.) (Englewood Cliffs, NJ) 1997. Educational Technology Publications. p. .

273

274

275 [Kozma (ed.) ()] *Learning from media: Arguments, analysis, and evidence*, R B Kozma . R. E. Clark (ed.) 2001. Greenwich, CT: Information Age Publishing Inc. p. . (Counterpoint theory of "learning with media")

276

277 [Math for level 5 second semester , normal fraction ()] *Math for level 5 second semester , normal fraction*, 2008. p. .

278

279 [Clark ()] 'Reconsidering research on learning from media'. R E Clark . *Review of Educational Research* 1983. 53 (4) p. .

280

281 [Rodgers ()] 'Student Engagement in the Elearning process and impact on their Grades'. T Rodgers . *International Journal of Cyber Society and Education* 2008. 1 (2) p. .

282

283 [Simmons (ed.) ()] *The forum report: Elearning adoption rates and barriers*, D E Simmons . A. Rossett (ed.) 2002. New York: McGraw-Hill. p. . (The ASTD e-learning handbook)

284

285 [Khan ()] 'Web-based instruction: What is it and why is it'. B Khan . *Web-based instruction*, B H Khan (ed.) (Englewood Cliffs, NJ) 1997. Educational Technology Publications. p. .

286

287 [Webster ()] Webster . *Medical Instrumentation Application and Design*, 1995. John Wiley& Sons, Inc. ISBN. p. 471124931. (2nd edition)

288

289 [Holley ()] 'Which room is the virtual seminar in please?'. D Holley . *Education and Training* 2002. 44 (3) p. .

290