

# E-LEARNING: GENDER ANALYSIS IN HIGHER EDUCATION IN NORTH INDIA

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## **ABSTRACT**

*E-Learning is an adaptable technology that can be used to cover different areas of interactive or live learning as well as training needs. It makes skills available through newer technologies and reduces the learning time even for complex topics. E-Learning is a changing trend in education that no longer limits the education to the four walls of a class room. Measuring the efforts to improve the learning skills with technology is utmost essential in order to effect any change in the education policies. This paper focuses on the analysis of the genders' interest in e-Learning in higher education in the northern part of India. A questionnaire survey designed for the purpose gathered information on students participation and opinions about the use of e-Learning in higher education. The analysis of the data thus collected shows that there is a definite change in trend among genders as far as the regular participation in e-Learning components are concerned.*

## **KEYWORDS**

*e-learning, learning styles, attitudes of a learners, software engineering experience, software project management.*

## **1. INTRODUCTION**

E-Learning is a concept derived from the use of Information and Communication Technologies (ICT) to deliver teaching and learning both. A common definition states that e-Learning in higher education is a technique to enhance learning and teaching experiences and is used to educate students with or without their instructors through any type of digital media [1]. It can be used to replace traditional face-to-face teaching either completely or partially, as in some cases, the use of ICT is introduced as an additional resource along traditional teaching and learning methods. A major advantage of ICT is that accessing online learning resources is flexible and fast and has no geographical barriers [2][3].

The higher education sectors have been concentrating on increasing the use of online applications of e-Learning by using the internet to enhance education [4]. With the rapid growth of e-Learning, computers are now being used increasingly by students in many different educational processes and are considered to be valuable tools to enhance learning in higher education. The motivation behind this study is to try to determine if particular groups of students are learner or making sufficient use of online learning, so that these groups of students may be further encouraged to use online activities so as to enhance their overall learning experience.

The aim of this study is to assess the usage of e-Learning activities/components in higher education by the students (male and female) of a Northern part of India.

The rest of the paper has been organized into different sections: section 2 presents a brief introduction to e-learning and section 3 provides an account of attitude of learners in e-learning. Section 4 presents the methodology used for deriving the results whereas section 5 provides a brief introduction about the questionnaires used for the collection of the data from the sample targets. Section 6 highlights how various statistical analyses techniques have been used to analyze the data collected through the questionnaires, most of the data having been presented in tables in summarized form. This section also sums up the finding and section 7 presents the conclusion of the work of the authors.

## **2. E-LEARNING**

Latest trend in the education sector is E-learning [5], with the help of which a student can process more control over his learning process [6]. The definition of E-learning, however, is still in vague terms but the augmentation of the same, has been documented well [7]. A few attempts have been made to define e-learning like in [8], where it has been proposed that e-learning has four parts; learning with the help of computers, online learning, learning in classroom through virtual set-up and digital world. E-learning is basically nothing but a set of pre defined applications, and the services of same can be provided via internet, intranet, interactive TV and satellite.

Another definition has been given in [9], according to which, any learning guidance that is provided through a medium of extranets, or internets or even through mediums like audio/video tapes, interactive television, of CD's. All kinds of electronic medium are used to suit the students' needs and make them understand the concepts. Pollard and Hillage in [10] gave a lengthy explanation by saying that e-learning comprises of learning opportunities with the help of computers, networks and web-based technologies, that can help in the development of any individual and his performance. Sambrook in [11] and Homan & Macpherson in [7] suggest that e-learning basically comprises of electronic learning material which can be acquired in the form of CD's, that is PC friendly, or can even be downloaded via internet/ intranet. These are basically the interactive study material.

Any learning process carried out with the help of computers and web-based facility like intranet/ Internet is e-learning [12]. Torstein and Svein in [13] propose that e-learning is basically interactive learning, and all the study material is available online. This system gives an automatic feedback to its students as well.

## **3. ATTITUDES**

E-learning is extremely helpful to the students stationed in remote locations especially in rising economies among developing countries like India. It has been found to be a promising alternative when compared to its counter-part [14]. Parker in [15] claims that students who have computer based know-how, have a positive approach towards e-learning and achieve more success in it. Shashaani in [16] suggests that there is a positive co-relation between experience in computers and attitude related to it. Woodrow in [17] states that it is very important to know the mind-set of students, related to the computers, as any computer based course and its development will be based on the attitude of the students. When learning becomes e-centric, a student is able to exercise greater control over his own learning process and will be empowered to learn more. It will provide him with time flexibility, place and mode flexibility, and will enhance the group

interaction among students, peers and teachers. It will also make institution like universities more accessible to students.

Link & Marz, in [18] and Hayashi et al. in [19] have pointed out that despite all the growth in the technology for higher education, there are many student who do not possess the skills required to handle technology. This group of student is handicapped, in terms of technology usage. Jones and Jones in [20] discuss about a study carried out by them, wherein a comparison between the outlook of learners and teachers on usage and effectiveness of the web-based management software has been presented. The results have been found to be in favor of teachers for being a greater supporter of web based learning as compared to students. To summarize, teachers believed in the positive help that technology brings in student communication and students did not. Guruajan and Low in [21] further highlighted that the learners took ICT as a convenient tool and not as a substitute tool. The learners still believed more in in-person learning through lectures given by teachers, and ICT was found to be helpful in the rare absence of a teacher's lectures. The main source of knowledge was still the text books and references, and web-based learning was analyzed to be second to text books.

#### **4. METHODOLOGY**

The authors of this paper have designed a questionnaire survey for gathering information on student experiences and opinions on the use of e-Learning components. The survey was conducted on a group of 392 people involved in higher education in Chandigarh (northern part of India) and surrounding areas. The group was a heterogeneous one and consisted of students in the fields related to Information Technology at the college and university level. The students targeted were the ones who were enrolled in different streams (related only to the field of IT) at under graduate and post graduate levels for studying in various colleges as well as in the university affiliating these colleges. The target groups were contacted during the months of October and November 2011 to participate in the survey. The survey responses collected over a period of five weeks were tabulated and then subjected to various statistical analysis techniques as described in section 4. The results thus obtained were analyzed further to find out the conclusion.

#### **5. QUESTIONNAIRE**

The first part of the questionnaire focused on collecting some demographic information about the respondents, such as age, gender, and some details regarding their streams of studies and type of degree etc. The questionnaire next, included a section on computer use, consisting of questions asking respondents to respond to the questions like whether they have access to a computer and a high-speed internet connection outside their college/ university. Next, the respondents were asked to provide an estimated number of hours spent per week on computer and internet. The next section on the questionnaire asked the respondents to provide details on how often they used a computer/ Internet for various tasks related to their studies, e.g. for preparing study material or using certain types of software, and how often they used the internet for contacting faculty members and tutors or to participate in online discussions etc. The responses for these questions were collected using a five-point scale having options never, occasionally, sometimes, quite often and regularly.

The results presented in this paper are part of a larger questionnaire study which also gathered information on informatics skills, satisfaction with college/university ICT provision, and opinions on the use of E-Learning etc.

## 6. STATISTICAL ANALYSES

Summary statistics has been presented in this section to depict the responses of respondents to the questions posed to them through the questionnaire. This summary includes breakdown of inputs from the respondents according to their gender i.e. male and female. The results are presented in the form of Frequency Distribution tables depicting numbers along with percentage differences among gender levels on various issues of research study.

Chi-Square test of proportionality has been applied on approach to E-Learning, Software Engineering Experiences in our case to investigate if any significant difference exist in this area among the proportion differences among male and female respondents.

Mann-Whitney non-parametric statistics has been used to test the significant differences in average score (median score) among male and female respondents on pre test and post test components.

Chi-Square test of associations has been used to statistically analyze the significant difference in number of male and female respondents by finding out the association between parameters of Knowledge about typical patterns observed in Software Projects & Software Project Management Literature.

### 6.1 RESULT ANALYSIS

The research was conducted on 392 respondents, among that 222 (56.6%) were male and 170 (43.4%) were female respondents. The majority of the respondent students i.e. 320 were in their third year of study and among them 57.2% were male and 42.8% were female respondents. Respondent student from 2nd year were 45 and among them majority were female respondents i.e. 33 (73.3%) and students from 1st year were all 27 male respondents.

#### 6.1.1 PRACTICAL SOFTWARE ENGINEERING EXPERIENCE

Respondent students were further analyzed on their practical experiences in software engineering. Among 392 respondents 356 (90.8%) students have written software program and the proportion of the male (43.8%) and female (56.2%) respondent student differ significantly with  $p = 0.002$ . The practical experience in SE work of 369 respondents' trend was reversed among gender level in comparison to software program written as 53.9% (199) male respondents were having practical experiences as compared to 46.1% (170) female respondents and their proportion was statistically significant with  $p = 0.003$ . The major issue which came to the surface regarding big team work (team > 4 members) was quite unexpected, as 18.4% respondents had participated in bigger teams and among them 55.6% were male as compared to 44.4% were female respondents. Also, there was no significant difference (with  $p = 0.78$ ) found among male (50.4%) and female (49.6%) respondents concerning their industrial exposure among total of 238 (60.7%) respondents.

#### 6.1.2 SOFTWARE PROJECT MANAGEMENT LITERATURE

On literature issue respondents were first analyzed on number of references books respondents had used in their practical experience. The data collected from the respondents on this issue has been presented in a summarized form in table 1. The majority respondents (54.8%) preferred 3 – 5 books as compared to 24% respondents those preferred 1 – 2 books. Among male respondents 38.3% preferred 3 – 5 books and those who preferred to read 1 – 2 books or < 5 books were in the range of 21 – 24 % male respondents.

Table 1: Learning Styles

<b>Books Read</b>	<b>0</b>	<b>1 – 2</b>	<b>3 – 5</b>	<b>&gt; 5</b>	<b>Total</b>
<b>Male</b>	36 (16.2%)	54 (24.3%)	85(38.3%)	47 (21.2%)	222
<b>Female</b>	0 (0%)	40 (23.5%)	130 (76.5%)	0 (0%)	170
<b>Total</b>	36 (9.2%)	94 (24.0%)	215 (54.8%)	47 (12.0%)	392
<b>Learning Style</b>	<b>Reading Text books</b>	<b>Class lecturers</b>	<b>Group Work</b>	<b>Web Based</b>	<b>Total</b>
<b>Male</b>	43 (19.4%)	16 (7.2%)	10 (38.3%)	153 (21.2%)	222
<b>Female</b>	2 (1.2%)	9 (5.3%)	9 (5.3%)	150 (88.2%)	170
<b>Total</b>	45 (11.5%)	25 (6.4%)	19 (4.8%)	303 (77.3%)	392

16.2% male respondents do not preferred to read any references book as E-Learning methodology. Female respondents were in majority (76.5%) reading 3 – 5 reference books while rest of the female respondents preferred 1 – 2 books. The chi square test with  $p = 0.0026$  suggests that there were no significant association present among the gender level and the number of references books preferred.

In order to comment on the learning styles of the respondents, the questionnaire obtained the most preferred learning style among the choices from them. The most preferred style (77.3%) was web based learning style among both female (88.2%) and 2nd most for male respondents (21.2%) was the class lectures (6.4%). Group work (4.8%) was the least preferred style of learning overall but among those who preferred group work, 38.3% were male respondents. Reading textbooks (11.5%) was not significantly popular among females (1.2%) as compared to males (19.4%). The chi square test with  $p = 0.00$  suggests that there was no significant association present among the gender level and the learning style.

### 6.1.3 PRE – TEST ANALYSIS: INTEREST IN SOFTWARE PROJECT MANAGEMENT

Respondents were pre test analyzed on likert scale about interest in software project management. The significant differences were statistically evaluates on  $p$  – values of Mann – Whitney test. Both male and female respondents were found to agree with no significant differences on Important to know about Software Project Management (SPM) ( $p = 0.284$ ), Like to participate in Seminar on SPM ( $p = 0.807$ ) & Important for software engineers to know about SPM ( $p = 0.259$ ). Both genders with no significant differences were neutral on Like to get more information on SPM ( $p = 0.634$ ) and Like to learn more about SPM ( $p = 0.969$ ). Please refer to table 2 for the related data.

Table 2: Interest in Software Project Management (SPM)

	<b>Male</b>	<b>Female</b>	<b>p-value</b>
<b>Important to know about SPM</b>	2.03	2.10	0.284
<b>Like to get more information on SPM</b>	3.13	3.18	0.634
<b>Like to participate in Seminar on SPM</b>	2.00	2.04	0.807
<b>Important for software engineers to know about SPM</b>	2.00	2.13	0.259
<b>Like to learn more about SPM</b>	2.98	3.01	0.969

Respondents in this section were evaluated on the parameters of their knowledge about typical patterns observed in software projects. Please refer to the data given in table 3. 69.6% respondents (males 78.9%, females 57.6%) believed that finding and fixing any software problem after delivery was 5 times costly as compared to 30.4% respondents (males 21.2%, females 42.4%) believed that it was just 3 times. The addition of manpower compressed 25% of nominal schedule was assumed by 58.2% respondents (males 74.85, females 36.5%) as compared to 41.8% respondents (males 25.2%, females 63.5%) who assumed it to be at 10%.

#### 6.1.4 KNOWLEDGE ABOUT TYPICAL PATTERNS OBSERVED IN SOFTWARE PROJECTS

Majority of respondents (76%) among both sexes (male 75.5 %, female 76.5% ) believed that software development cost is primarily due to tool usage as compared to those 24 % respondents who believed it to be the product quality. On the issue of comparing software development process (SDP), majority of male respondents (69.8%) thought that it is the people skills that matters whereas female respondents thought that it is the programming language (47.6%) that matter. ‘Programming style brings variations in software development process’ was believed by 20.7% of respondents (male 24.3%, female 15.9%). 71.2% of male respondent thought that software inspection detects 60% of defects whereas 47.6% female respondents thought it to be 25% of detections.

Table 3: Knowledge about Typical Patterns Observed in Software Projects

Finding & Fixing a software problem after delivery is costlier by about		<b>3 times</b>	<b>5 times</b>
<b>Male</b>		47(21.2%)	175(78.9%)
<b>Female</b>		72(42.4%)	98(57.6%)
Nominal Schedule of typical SDP can be compressed up to		<b>10%</b>	<b>25%</b>
<b>Male</b>		56(25.2%)	166(74.8%)
<b>Female</b>		108(63.5%)	62(36.5%)
Software Development cost is primarily a function of		<b>Tool Usage</b>	<b>Product Quality</b>
<b>Male</b>		168(75.7%)	54(24.3%)
<b>Female</b>		130(76.5%)	40(23.5%)
On comparing SDP, variations between	<b>Programming Language</b>	<b>Programming Style</b>	<b>People Skills</b>
<b>Male</b>	13(5.9%)	54(24.3%)	155(69.8%)
<b>Female</b>	81(47.6%)	27(15.9%)	62(36.5%)
Software Inspection detects about	<b>25%</b>	<b>40%</b>	<b>60%</b>
<b>Male</b>	13(5.9%)	57(23.0%)	158(71.2%)
<b>Female</b>	81(47.6%)	32(18.8%)	57(33.5%)

## 7. CONCLUSION

As an effort to assess the gender participation in E-Learning activities among the students of higher education in the field of Information Technology, a questionnaire survey was conducted by the authors on a population of 392 students. This sample of students was drawn from different streams related to Information Technology to represent a cross section of the students enrolled in different courses at different undergraduate and postgraduate levels in various colleges and universities in the northern part of India. The analysis of the results clearly indicate that the E-Learning patterns are not gender sensitive as far as the web-base learning style is concerned. Similarly, it has been found that there is no significant gender sensitivity in the area of interests in software project management. But as far as the issues of 'knowledge about the typical patterns observed in software projects' is concerned, the various parameters have been found to be significantly gender sensitive.

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