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Assessing Digital Literacy of First Year Students of Dhaka University: A Study

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Abstract **- The main aim of this paper is to assess digital literacy of fresher's of Dhaka University. A survey questionnaire was developed and used to collect data on students' personal and academic information, information on technology usage and skills on using technologies. In order to analyze the influence of students' demographic characteristics of their opinion on using ICT and multimedia and their opinion on skill or ability of using ICT and multimedia, Mann-Whitney and Kruskal-Wallis tests were carried out. The results showed that since those students lived in village their digital literacy is less than the students who lived in town. There are some differences in students' opinion and skill or ability on using ICT and multimedia. The paper suggested some guidelines for improving the digital literacy of the students of Dhaka University. This is the first time an effort has been made to assess 1st year students' digital literacy in Bangladesh. The authors feel this study may encourage more such research on digital literacy in Bangladesh and beyond.**
Keywords: **Digital literacy, Dhaka University, Bangladesh**

I. INTRODUCTION

We are living in 'digital era' where our day to day life is extremely depended on Information and Communication Technology (ICT). Now we are also in an ICT based society where online information is readily available and where all possible activities are performed using computer and internet. Internet use has increased exponentially since its inception due to personal computers and smart phones, which have made global communication accessible to billions. Information technology includes tools that store, receive and transmit information electronically. The use of emails, mobile phones, instant messaging, social networking applications and videoconferencing has simplified the way people and organizations communicate. Such tools allow people to communicate instantly with others from any part of the world at a relatively cheaper cost. Computers are machines that are designed for convenience and often eliminate the hassle that comes with everyday life. It can help students find everything they are looking for on a research paper and can allow families to stay connected over long distances. The social media have brought an immediacy to "news" that can be staggering if only in trying to find enough hours in the day to keep up on Facebook and Twitter. Because authors get immediate response to their posts, they are getting better feedback quicker. Their lives are in many ways more connected and visible. Web 2.0 technologies such as social networking sites also allow people to collaborate by sharing and editing online content.

The main aim of this research is to assess the first year students' digital literacy skills on general ICT and multimedia use. The objectives are to:

1. Identify the demographic characteristics of students using general technology.
2. Examine the digital literacy use and skills (such as ICT general and multimedia) by the first year students of Dhaka University.
3. Analyze the impact of using general ICT and multimedia.
4. Examine the effect of students' demographic characteristics such as gender and age on their opinions on various aspect of digital literacy use and skills; and
5. Suggest guidelines for fostering the skills of digital literacy of Dhaka University students.

II. BACKGROUND OF THE STUDY

Dhaka University (www.du.ac.bd), established in 1921 under the Dacca University Act 1920 of the Indian Legislative Council, is modelled after British universities. Academic activities started on July 1, 1921 with 3 faculties, 12 teaching departments, 60 teachers, 847 students and 3 residential halls (Dhaka University Academic Calendar, 2018). In 2018 the number of students and teachers has risen to 39,496 and 1,979 respectively (Dhaka University Convocation Prospectus, 2018). At present there are 83 departments within the fold of thirteen faculties in Dhaka University. Around 7500+ first year students admitted at Dhaka University in every academic year.

III. REVIEW OF RELEVANT RESEARCH

A. Digital Literacy (DL)

Defining digital literacy (or literacies) is difficult given the contested and common sense understanding of literacy and the host of competing terms in the arena of new technolog - these include information literacy, computer literacy, internet literacy and hyper-literacy. In addition, the object of

digital literacy is constantly moving; as Helsper (2008) comments, definitions keep changing because the digital and cultural environment keeps changing. This means there will always be a degree of ambiguity in the use of the term, what Zac and Diana (2011) refer to as the 'inherent squishiness' of digital literacy. The concept of digital literacy was introduced by Gilster (1997) in his book of the same name. Gilster took a broad approach to digital literacy defining it as 'the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers' (Gilster, 1997). He argued that literacy has always been more than simply being able to read and acknowledged cultural aspects in all forms of literacies. Although the narrow reference to 'computers' now sounds a little dated, Glister's definition is still useful, given that it goes well beyond a skills - based understanding of digital literacy . However, this definition pre-dated the emergence of Web 2.0 technologies. Nowadays, 'many time-honored distinctions such as between producer and consumer, writer and reader blur or virtually disappear as new syntheses emerge' (Gillen and Barton, 2010). This technological change and its social consequences are reflected in more recent definitions of digital literacy. Future lab reports on digital literacy have mapped and contributed to this development (Grant, 2009; Williamson and Hague, 2009; Hague and Payton, 2008). Digital literacy, they suggest, means: knowing how technology and media affect the ways in which we go about finding things out, communicating with one another, and gaining knowledge and understanding. And it also means understanding how technologies and media can shape and influence the ways in which school subjects can be taught and learnt (Williamson and Hague, 2009). The concepts of 'information literacy' and 'digital literacy' are summarized in a review of literature and subsequently analyzed. Definitions including computer literacy, library literacy, network literacy, internet literacy, and hyper literacy were also referred throughout the study.

Eshet's (2004) article focused to provide a terminology framework of digital literacy - or to disaggregate the meaning so that each described characteristic results in a cumulative definition of the term. According to Eshet (2004), the four components of digital literacy are:

1. Photo-visual literacy
2. Reproduction literacy
3. Lateral literacy and
4. Information literacy.

Additionally Eshet presented the results of a study that examined the extent to which learners effectively utilize digital literacy in educational contexts. Some of the findings suggest that younger (14-15 year old) participants were the best users of photo-visual information and showed the highest level of lateral literacy; older participants demonstrated a higher level of reproduction and information literacies. These studies were frequently consulted for analyzing the related skills and components of DL that are dealt with in this study.

B. Digital Literacy Skills

Ulicsak (2004) introduces the reader to key questions related to digital literacy, including assessing the skills needed to ensure competency. The study, an EU-funded project, looks at challenges within school practices and the new digital tools needed today. The author frames the study and article on a common understanding of digital literacy. Tuamsuk and Subramaniam (2017) showed that in Thailand 40.74 per cent of the universities establish digital literacy as the required graduates' trait, and 22.22 per cent establish it as a graduate's identity. According to Ulicsak (2004), digital literacy refers to proficiencies needed to utilize digital technology. A useful aspect of the author's research is a list of activities which require at least a modicum of digital literacy. These include:

1. *Modeling:* the creation of digital analogues of systems for analysis and experimentation;
2. *Knowledge Management:* conducting research, combining knowledge to create new knowledge, navigating through information structures;
3. *Multimodality and Hypertext:* new ways of creating communicative documents combining different modes and media and new ways of reading them;
4. *Electronic Communication:* not just e-mail but a whole panoply of ways in which inter-human communication is developing and how entry into communities of learners may be dependent on electronic communication;
5. *Game Play:* the ways in which playing digital games exemplifies ways of thinking and working in a digital domain, and is potentially a summation of the above activities.

Eshet (2004) has established a holistic conceptual model for digital literacy, arguing that it covers most of the cognitive skills that users and scholars employ in digital environments and, therefore, providing researchers and designers of digital environments with a powerful framework and design guidelines. The model consists of the five digital literacy skills:

1. Photo visual skills
2. Reproduction skills
3. Branching skills
4. Information literacy skills and
5. Socio-emotional literacy skills.

C. Digital Literacy of University Students

Quite a few numbers of studies were carried out to determine the technological usage by the students of this century. Some of which dealt with school students, elementary students and others. As this study is narrowed down to the digital literacy skills of University students, therefore only the related studies and literatures were consulted. Margaryan, Littlejohn and Vojt (2010) investigated the extent and nature of university students' use of digital technologies for learning and socializing. They

found that students use a limited range of mainly established technologies. Use of collaborative knowledge creation tools, virtual worlds, and social networking sites was low. 'Digital natives' and students of a technical discipline (Engineering) used more technology tools when compared to 'digital immigrants' and students of a non-technical discipline (Social Work). This relationship may be mediated by the finding that engineering courses required more intensive and extensive access to technology than Social Work courses. However, the use of technology between these groups is only quantitatively rather than qualitatively different. The study did not find evidence to support popular claims that young people adopt radically different learning styles. Their attitudes to learning appear to be influenced by lecturers' teaching approaches. Students appear to conform to traditional pedagogies, albeit with minor uses of tools delivering content. The outcomes suggest that although the calls for transformations in education may be legitimate it would be misleading to ground the arguments for such change in students' shifting patterns of learning and technology use. Sieberhagen and Cloete (2012) reported on the evaluation of a digital information literacy program (DILP) to determine the program's effectiveness in enhancing students' digital information literacy skills. The DILP was originally designed and developed for the South African student, as member of Generation Y, but was adapted after identifying the characteristics of Generation Z. New learning technologies were identified and incorporated in the DILP to enhance students' learning experience. An analysis of reported research indicated that there is a lack in the evaluation of programs to determine their effectiveness in enhancing the digital information literacy skills of students by using an outcomes assessment instrument. The development of an outcomes assessment instrument, which is based on internationally benchmarked information literacy competency standards and their outcomes, are presented. Evidence is provided of the effectiveness of the program in order to prove its worth as an instructional program. Recommendations are made on how digital information literacy programs may be improved to be more effective in enhancing students' digital information literacy skills.

Focusing on a pilot study in Oakville and a longitudinal research study in Sydney, Australia, Rowsell and Walsh (2011) compelled the readers to think about literacy in a new light. Without a push to redefine literacy, educators run the risk of teaching and learning language and literacy skill in anachronistic paradigms and frameworks. While research has not been able to fully establish the impact of multimodal communication, it is essential that educators learn to use these different modes of communication to teach literacy. They presented a theoretical overview of new fields of research, pedagogy, and practice in literacy education. In a digital, media-driven, globalized world, educators are faced with the challenge of mediating traditional notions of what it means to be literate (e.g., read and writing print-based texts) with new and ever-emerging skills and interests in technology and digital media.

The DigEuLit project, funded by the EC eLearning Initiative, has a task of defining digital literacy and developing a framework and tools for digital literacy development in European educational settings (Martin and Grudziecki, 2006). They have observed converging literacies which have gained new relevance in digital environments, and proposed a definition of digital literacy which focuses on the processes of using digital tools to support the achievement of goals in the individual's life-situation. In the e-permeated society, a society also increasingly unpredictable and uncertain, "digital literacy" becomes not only a key factor in enabling participation in education, as well as employment and other aspects of social life, but also a means of gaining some understanding of the world.

D. Digital Literacy in Bangladesh

Not much scholarly literatures relevant to the study topic could be retrieved for this section. The study was conducted by consulting the policy draft papers, some online materials, statistical reports and Government websites. Throughout the study some of the DL project initiatives were came across. The Intel Corporation signed a memorandum of understanding (MoU) with Bangladesh Institute of ICT in Development (BIID) for deployment of the Intel Easy Steps Program in Bangladesh. The Intel Easy Steps program offers adult learners the opportunity for enhanced social and economic self-sufficiency through digital literacy. The Intel Easy Steps materials use adult learning techniques to teach practical and applicable skills to people with minimum computer knowledge. The Intel Easy Steps program is being carried out by Intel in Asia to address the digital literacy needs of government employees, as well as adults in rural communities, women, unemployed youth, and other underserved populations. A government needs ICT-literate labor for a competitive workforce which would bring about a competitive economy. On the other hand participants have an opportunity to improve skills thus enhancing their employment prospects. The program includes instructions on running Internet searches, using email, using word processors for creating resumes and other documents, creating spreadsheets, and using multimedia tools to create brochures and posters to promote small businesses. Thus the trainees can develop literacy skills and immediately start applying them into their personal or professional lives. BIID will facilitate value added services for the trainees to end up with a job opportunity or get self-employed with support from relevant stakeholders.

In November 2009, Telenor mobile operator Grameenphone partnered with Microsoft to increase digital literacy among the rural people in Bangladesh. Microsoft's Digital Literacy Curriculum is a well-established e-learning module which teaches people basic computer skills, helping them to develop new social and economic opportunities for themselves, their families and their communities. All the content of the curriculum is in Bengali and aimed particularly at rural students, unemployed youth and women.

IV. METHODOLOGY

A questionnaire was used to collect data from various Departments/Institutes of Dhaka University. The questionnaire was distributed among 343 students in their residential hall, department, library etc. The questionnaire consisted of the following elements:

1. Demographic and academic information such as faculty affiliation, gender, age group, academic year and where lived before entering university;
2. Location of using computer with internet, experience of computer use, frequency of e-mail/internet use, ability of computer function customization and technology use in personal and social life;
3. Experience of using information, software, presentation, communication and mobile related technologies; and
4. Students' digital literacy survey (frequency and ability of technology use) on information and communication technology (ICT) and multimedia.

For the category (4) above, students were asked to evaluate each questionnaire item from 1 - 'lowest' to 5 - 'highest', corresponding to a 5-point Likert scale. In order to analyze the influence of students' demographic characteristics on information and communication technology (ICT) and multimedia related, Mann-Whitney and Kruskal-Wallis tests were carried out. Finally, some guidelines are suggested for improving the digital literacy of the students of Dhaka University.

V. RESULTS AND DISCUSSION

TABLE I AGE GROUP BY GENDER

	Male		Female		Total	
Age	**n**	**%**	**n**	**%**	**n**	**%**
Less than 18 years	4	1.17	1	0.29	5	1.46
18-19 years	74	21.57	50	14.58	124	36.15
19-20 years	80	23.32	69	20.12	149	43.44
More than 20 years	36	10.50	29	8.45	65	18.95
Total	194	56.56	149	43.44	343	100.00

A total of 343 students took part in this study. Among them 194 (56.56 percent) were male and 149 (43.44 percent) were female. This suggests a balance between male and female students as respondents for this survey. The age distribution of respondents is shown in Table I. The largest group of students (149, 43.44 percent) was comprised of those in the age group of 19-20 years. The smallest group of students (5, 1.46 percent) was aged between less than 18 years.

Table II indicates that 120 (34.99 percent) students were from village, 99 (28.86 percent) students were from small town, 82 (23.91 percent) students were from town and 42 (12.24 percent) respondents were from metropolitan city.

TABLE II LIVED BEFORE ENTERING UNIVERSITY BY GENDER

	Male		Female		Total	
Where have you lived before entering University?	**n**	**%**	**n**	**%**	**n**	**%**
Village	69	20.12	51	14.87	120	34.99
Small town	61	17.78	38	11.08	99	28.86
Town	37	10.79	45	13.12	82	23.91
Metropolitan city	27	7.87	15	4.37	42	12.24
Total	194	56.56	149	43.44	343	100.00

TABLE III EXPERIENCE OF COMPUTER USE BY GENDER

	Male		Female		Total	
Experience	**n**	**%**	**n**	**%**	**n**	**%**
Less than one year	49	14.29	64	18.66	113	32.94
1-2 years	45	13.12	15	4.37	60	17.49
2-3 years	38	11.08	11	3.21	49	14.29
3-4 years	24	7.00	17	4.96	41	11.95
4-5 years	16	4.66	13	3.79	29	8.45
5-6 years	5	1.46	10	2.92	15	4.37
6-7 years	4	1.17	5	1.46	9	2.62
7-8 years	2	0.58	5	1.46	7	2.04
8-9 years	5	1.46	1	0.29	6	1.75
9-10 years	3	0.87	2	0.58	5	1.46
More than 10 years	1	0.29	3	0.87	4	1.17
I do not know how to use computers	2	0.58	3	0.87	5	1.46
Total	194	56.56	149	43.44	343	100.00

Table III illustrates respondents' experience in using computers. The results suggest that the largest group of students 113 (32.94%) had less than one-year experience of computer usage. A moderate number of students (60) 17.49% students had 1-2 years, 49 (14.29%) students had 2-3 years, 41 (11.95%) students had 3-4 years, 29 (8.45%) students had 4-5 years, 15 (4.37%) students had 5-6 years, 9 (2.62%) students had 6-7 years, 7 (2.04%) students had 7-8 years, 6 (1.75%) students had 8-9 years, 5 (1.46%) students had 9-10 years and 4 (1.17%) students had more than 10 years' experience of computer usage. Only 5 (1.46%) students indicated that they do not know how to use computers.

The frequency of internet/e-mail use varies among students. Table IV shows that the largest group of students 197 (57.43%) use Internet/e-mail every day, 95 (27.70%) a few times in a week, 21 (6.12%) once a week and 20 (5.83%) a few times in a month. Only a few students 10 (2.92%) still do not use Internet/e-mail.

TABLE IV FREQUENCY OF INTERNET/E-MAIL USE BY GENDER

Frequency of Internet/ e-mail use	Male		Female		Total	
	n	%	n	%	n	%
Every day	110	32.07	87	25.36	197	57.43
A few times in a week	63	18.37	32	9.33	95	27.70
Once a week	11	3.21	10	2.92	21	6.12
A few times in a month	6	1.75	14	4.08	20	5.83
I do not use Internet/e-mail	4	1.17	6	1.75	10	2.92
Total	194	56.56	149	43.44	343	100.00

TABLE V MODE OF ACCESS TO A COMPUTER CONNECTED TO THE INTERNET BY GENDER

Mode of access to a computer	Male		Female		Total	
	n	%	n	%	n	%
At home	93	27.11	65	18.95	158	46.06
At residential hall/hostel	136	39.65	97	28.28	233	67.93
At Department computer laboratory	92	26.82	90	26.24	182	53.06
Cyber cafe	15	4.37	10	2.92	25	7.29
At university learning center	19	5.54	20	5.83	39	11.37
Others	16	4.66	13	3.79	29	8.45

Table V indicates that the mode of access to a computer connected to the Internet. The largest number of respondents 233 (67.93%) indicated that they accessed to a computer connected to the Internet from their residential hall/hostel, followed by 182 (53.06%) accessed from Department computer laboratory, 158 (46.06%) accessed from home, 39(11.37%) students accessed from university learning center and 29 (8.45%) accessed from others. A few students (25, 7.29%) noted that they accessed to a computer connected to the internet from cyber cafe.

Table VI shows customization ability of the computer functions by the 1st year students of Dhaka University. It reveals 244 (71.14%) students are capable to change profile image, 222 (64.72%) students know how to select language option, 192 (55.98%) students are able to use tool bar and menu items, 181 (52.77%) students know how to change background colors, 136 (39.65%) students are able to use print size of documents, 115 (33.53%) students know how to use icon size and 43 (12.54%) students have others ability of customization. Only 7 (2.04%) students do not have any customization ability of his/her computer.

TABLE VI CUSTOMIZATION ABILITY OF YOUR COMPUTER FUNCTIONS BY GENDER

Customization ability of computer functions	Male		Female		Total	
	n	%	n	%	n	%
Tool bar and menu items	118	34.40	74	21.57	192	55.98
Profile image	137	39.94	107	31.20	244	71.14
Background colors	97	28.28	84	24.49	181	52.77
Icon size	60	17.49	55	16.03	115	33.53
Print size	78	22.74	58	16.91	136	39.65
Language	129	37.61	93	27.11	222	64.72
Don't have customized	4	1.17	3	0.87	7	2.04
Others	24	7.00	19	5.54	43	12.54

TABLE VII TECHNOLOGY USED FOR PERSONAL NEEDED BY GENDER

Technology used	Male		Female		Total	
	n	%	n	%	n	%
Smart phone	180	52.48	145	42.27	325	94.75
Laptop/Desktop	120	34.99	70	20.41	190	55.39
Electronic book	13	3.79	8	2.33	21	6.12
Digital camera	41	11.95	20	5.83	61	17.78
Assistive technology: hardware, software	27	7.87	26	7.58	53	15.45
Tablet	42	12.24	21	6.12	63	18.37

Table VII shows that 325 (94.75%) respondents use smart phone, 190 (55.39%) use laptop/ desktop, 63 (18.37%) use tablet, 61 (17.78%) use digital camera, 53 (15.45%) use assistive technology such as hardware, software etc., and 21 (6.12%) use electronic book such as Kindle for their personal needed.

Table VIII illustrates that 311 (90.67%) students use social networking websites, 288 (83.97%) students use instant messaging or chat, 245 (71.43%) students use to upload video or photo content onto the internet, 168 (48.98%) students use both the advanced functions on their mobile phone and to participate in online discussion groups or chat rooms, 52 (15.16%) students take part in an online community, 34 (9.91%) students use blogging and 29 (8.45%) students use micro-blogging in their personal and social life.

TABLE VIII FUNCTIONS DONE IN PERSONAL AND SOCIAL LIFE BY GENDER

	Male		Female		Total	
Functions Done in Personal and Social Life	**n**	**%**	**n**	**%**	**n**	**%**
Use social networking websites	170	49.56	141	41.11	311	90.67
Use instant messaging or chat	156	45.48	132	38.48	288	83.97
Upload video or photo content onto the internet	146	42.57	99	28.86	245	71.43
Use advanced functions on my mobile phone	97	28.28	71	20.70	168	48.98
Participate in online discussion groups or chat rooms	98	28.57	70	20.41	168	48.98
Take part in an online community	43	12.54	9	2.62	52	15.16
Blogging	29	8.45	5	1.46	34	9.91
Micro-blogging	24	7.00	5	1.46	29	8.45

TABLE IX EXPERIENCE ABOUT INFORMATION, SOFTWARE, PRESENTATION, COMMUNICATION AND MOBILE PHONE

	Male		Female		Total	
Experience about Information	**n**	**%**	**n**	**%**	**n**	**%**
Using a search engine to find out about a subject	154	44.90	141	41.11	295	86.01
Using an online library catalogue to find information about a subject	83	24.20	32	9.33	115	33.53
Using web forums or social network group to find out about a subject	84	24.49	42	12.24	126	36.73
Using online learning materials	98	28.57	75	21.87	173	50.44
Apply for an admission online/scholarship application	144	41.98	102	29.74	246	71.72
Registering online - conferences/events/bookings	135	39.36	84	24.49	219	63.85
Experience about Software						
Using word-processing software (e.g. MS Word) to write an assignment	160	46.65	138	40.23	298	86.88
Using spreadsheets or data analysis software (e.g. MS Excel)	115	33.53	56	16.33	171	49.85
Using design tools e.g. graphic/animation/web design	50	14.58	29	8.45	79	23.03
Experience about Presentation						
Using a web page, wiki or blog to present information	71	20.70	32	9.33	103	30.03
Using MS PowerPoint to present information	159	46.36	135	39.36	294	85.71
Using an electronic whiteboard to present information	59	17.20	31	9.04	90	26.24
Experience about Communication						
Teacher communication via email	128	37.32	93	27.11	221	64.43
Using an online discussion forum to share ideas with other learners	86	25.07	51	14.87	137	39.94
Video or audio conferencing	86	25.07	74	21.57	160	46.65
Experience about Mobile Phone						
Learning via a mobile phone or device	151	44.02	117	34.11	268	78.13
Text messaging and social use	155	45.19	132	38.48	287	83.67
Access the internet for learning and social use	151	44.02	126	36.73	277	80.76

Table IX shows the students experience about information, software, presentation, communication and mobile phone. It illustrates that 295 (86.01%) students have experience to use a search engine (e.g. Google, Yahoo, Bing, MSN) to find out about a subject, 298 (86.88%) students have experience to use word-processing software (e.g. MS Word) to write an assignment, 294 (85.71%) students have experience to use MS PowerPoint to present information, 221 (64.43%) students have experience to use email for communicating with teachers and 287 (83.67%) students have experience on text messaging and social use via mobile phone.

TABLE X MEAN AND SD OF STUDENTS' OPINIONS ON USING ICT AND MULTIMEDIA

Students' Opinions on Using ICT	Frequency					Mean	SD
	1	2	3	4	5		
All the main features of MS Word	27	102	90	82	42	3.03	1.16
All the main features of MS Power Point	10	63	133	78	59	3.33	1.05
All the main features of MS Excel	15	45	95	102	86	3.58	1.13
Install software on a PC	32	61	71	87	92	3.43	1.30
Identify and sort out a computer virus	26	55	88	79	95	3.47	1.26
Using email to send messages and attachments	34	85	85	79	60	3.13	1.25
Printing documents/information	20	47	95	106	75	3.49	1.15
Overall						3.35	1.19
Students' Opinions on Using Multimedia							
YouTube account - upload, edit, caption, comment on others	38	75	65	90	75	3.26	1.32
Upload to the web (e.g. pictures/files/videos)	45	76	73	77	72	3.16	1.34
Skype (or similar alternative) - set up account, find friends, set up call	31	56	51	97	108	3.57	1.32
Mobile phones – navigate round functions, make calls, send/share texts/images	117	83	59	60	24	2.39	1.30
Use/download mp3 music files/sound files	115	101	74	43	10	2.22	1.13
Digital cameras taking/capturing photos/videos	79	84	78	72	30	2.68	1.28
Playing computer games online/with a console	41	58	84	101	59	3.23	1.26
Content creation multi-media tools (e.g.) Image editing, movie editing, web page software, quiz makers etc.	44	61	52	90	96	3.39	1.39
Adding keywords or tagging (metadata) to my online resources to make them visible in search engines	18	36	70	76	143	3.85	1.22
Overall						3.08	1.28

[Here, 1 = Almost every day; 2 = At least once/twice a week; 3 = At least once/twice a month; 4 = Hardly ever/ Never; 5 = Not sure what this is]

Table X shows the frequency, mean and standard deviations (on a 5-point scale) of students' opinion on using information and communication technology (ICT). It seems that the frequency of using above mentioned variables of digital literacy by the 1st year students is not satisfactory with using ICT as most ratings fell above 3 (i.e. the average score). The overall mean (3.35) and SD (1.19) reveals that students' opinion on using ICT is substandard.

Table X also indicates students' opinions on multimedia use. It shows the digital literacy of the students is not satisfactory with using multimedia as most scores fell above 3 on a 5-point scale which reveals that the digital literacy of the students requires improvement specially in terms of using multimedia. A few scores, however, fell below 3 which means the students are capable of using mobile phone functions, digital camera and downloading mp3 files. The overall mean (3.08) and SD (1.28) reveals that students' opinion on using multimedia is insufficient.

Table XI shows the frequency, mean and standard deviations (on a 5-point scale) of students' ability or skill of using information and communication technology (ICT). It seems the student's ability of using ICT technology is very poor and unsatisfactory as most ratings are above 3 (i.e. the average score). The rating of using email to send messages and attachments is below 3 (mean = 2.91) which indicates respondents are capable of using email only. The overall mean (3.22) and SD (1.26) reveals that students' ability or skill on using ICT is inadequate.

Table XI also indicates students' ability or skill on multimedia use. It shows that student's ability of using multimedia is not strong and satisfactory as most scores fell above 3 on a 5-point scale.

A few scores, however, fell below 3 which means using ability or skill of multimedia is comparatively not so weak i.e. use/download mp3 music files/sound files (mean = 2.39), mobile phones – navigate round functions, make calls, send/share texts/images (mean = 2.51) and digital cameras taking/capturing photos/videos (mean = 2.73). The overall mean (3.07) and SD (1.30) reveals that students' ability or skill on multimedia use is disappointing.

TABLE XI MEAN AND SD OF STUDENTS' ABILITY OR SKILL ON USING ICT AND MULTIMEDIA

Students' Ability or Skill on Using ICT	Frequency					Mean	SD
	1	2	3	4	5		
All the main features of MS Word	31	85	122	58	47	3.01	1.15
All the main features of MS Power Point	30	82	115	56	60	3.10	1.20
All the main features of MS Excel	15	45	113	74	96	3.56	1.16
Install software on a PC	39	73	95	47	89	3.22	1.34
Identify and sort out a computer virus	33	65	75	71	99	3.40	1.33
Using email to send messages and attachments	40	123	76	35	69	2.91	1.32
Printing documents/information	38	58	77	82	88	3.36	1.32
Overall						3.22	1.26
Students' Ability or Skill on Using Multimedia							
YouTube account - upload, edit, caption, comment on others	30	91	89	45	88	3.20	1.32
Upload to the web (e.g. pictures/files/videos)	40	79	94	43	87	3.17	1.35
Skype (or similar alternative) - set up account, find friends, set up call	30	65	83	48	117	3.46	1.36
Mobile phones – navigate round functions, make calls, send/share texts/images	75	111	97	26	34	2.51	1.20
Use/download mp3 music files/sound files	95	106	77	43	22	2.39	1.20
Digital cameras taking/capturing photos/videos	50	121	79	59	34	2.73	1.20
Playing computer games online/with a console	51	78	75	64	75	3.10	1.37
Content creation multi-media tools (e.g.) Image editing, movie editing, web page software, quiz makers etc.	38	58	85	59	103	3.38	1.36
Adding keywords or tagging (metadata) to my online resources to make them visible in search engines	27	56	54	62	144	3.70	1.36
Overall						3.07	1.30

A. Hypotheses

In order to analyze the digital literacy of 1st year students of Dhaka University, demographic characteristics of their opinion on using ICT and multimedia and their opinion on skill or ability of using ICT and multimedia, the following null hypotheses were tested:

H1. There is no significant difference between male and female students in terms of their opinions on using ICT and multimedia

H2. There is no significant difference between male and female students in terms of their opinions on skill or ability of using ICT and multimedia

H3. There is no significant difference among age groups in their opinions on using ICT and multimedia and

H4. There is no significant difference among age groups in their opinions on skill or ability of using ICT and multimedia.

The result of Mann-Whitney test results in Table XII showed that there were significant differences between male and female students in terms of their opinions on using ICT. The result of Mann-Whitney U test showed that there were significant differences between male and female students' opinions on YouTube account - upload, edit, caption, comment on others; upload to the web (e.g. pictures/files/videos); Skype (or similar alternative) - set up account, find friends, set up call; digital cameras taking/capturing photos/videos; content creation multi-media tools (e.g. Image editing, movie editing, web page software, quiz makers etc.); and adding keywords or tagging (metadata) to my online resources to make them visible in search engines. However, there was no difference in their opinions on mobile phones – navigate round functions, make calls, send/share texts/images; use/download mp3 music files/sound files; and playing computer games online/with a console.

In table XIII, the result of Mann-Whitney for gender and opinion on skill or ability of using ICT showed that there were significant differences between male and female students in terms of their opinions on skill or ability of using ICT. Mann-Whitney U test was carried out to determine the differences between gender and opinion on skill or ability of using multimedia. . The result showed that although the differences were significant in most cases, there were no differences between male and female students' perceptions on mobile phones – navigate round functions, make calls, send/share texts/images; use/download mp3 music files/sound files; and digital cameras taking/capturing photos/videos.

TABLE XII MANN-WHITNEY TEST FOR DIFFERENCE BETWEEN GENDER AND OPINION ON USING ICT AND MULTIMEDIA

Opinion on using ICT	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
All the main features of MS Word	9253.5	28168.5	-5.892	0.000*
All the main features of MS Power Point	11292	30207	-3.623	0.000*
All the main features of MS Excel	8882.5	27797.5	-6.331	0.000*
Install software on a PC	9694.5	28609.5	-5.366	0.000*
Identify and sort out a computer virus	9953	28868	-5.085	0.000*
Using email to send messages and attachments	10510.5	29425.5	-4.441	0.000*
Printing documents/ information	10465.5	29380.5	-4.528	0.000*
Opinion on using multimedia				
YouTube account - upload, edit, caption, comment on others	9609	28524	-5.451	0.000*
Upload to the web (e.g. pictures/files/videos)	9767.5	28682.5	-5.263	0.000*
Skype (or similar alternative) - set up account, find friends, set up call	10746	29661	-4.205	0.000*
Mobile phones – navigate round functions, make calls, send/share texts/images	14417	25592	-0.041	0.967
Use/download mp3 music files/sound files	14096.5	25271.5	-0.407	0.684
Digital cameras taking/capturing photos/videos	11857.5	30772.5	-2.923	0.003*
Playing computer games online/with a console	13281	32196	-1.322	0.186
Content creation multi-media tools (e.g. Image editing, movie editing, web page software, quiz makers etc.)	10664.5	29579.5	-4.273	0.000*
Adding keywords or tagging (metadata) to my online resources to make them visible in search engines	11356.5	30271.5	-3.572	0.000*

Note: *significant at $p<0.05$

TABLE XIII MANN-WHITNEY TEST FOR DIFFERENCE BETWEEN GENDER AND OPINION ON SKILL OR ABILITY OF USING ICT AND MULTIMEDIA

Opinion on using ICT	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
All the main features of MS Word	10169.5	29084.5	-4.875	0.000*
All the main features of MS Power Point	11094	30009	-3.809	0.000*
All the main features of MS Excel	11263	30178	-3.634	0.000*
Install software on a PC	10223	29138	-4.774	0.000*
Identify and sort out a computer virus	10499	29414	-4.459	0.000*
Using email to send messages and attachments	11881	30796	-2.926	0.003*
Printing documents/ information	10872	29787	-4.032	0.000*
Opinion on using multimedia				
YouTube account - upload, edit, caption, comment on others	10541	29456	-4.423	0.000*
Upload to the web (e.g. pictures/files/videos)	11107.5	30022.5	-3.776	0.000*
Skype (or similar alternative) - set up account, find friends, set up call	9906.5	28821.5	-5.163	0.000*
Mobile phones – navigate round functions, make calls, send/share texts/images	14205.5	33120.5	-0.282	0.778
Use/download mp3 music files/sound files	14379	33294	-0.084	0.933
Digital cameras taking/capturing photos/videos	13438	32353	-1.153	0.249
Playing computer games online/with a console	11668	30583	-3.127	0.002*
Content creation multi-media tools (e.g. Image editing, movie editing, web page software, quiz makers etc.)	11217.5	30132.5	-3.654	0.000*
Adding keywords or tagging (metadata) to my online resources to make them visible in search engines	10693	29608	-4.327	0.000*

Note: *significant at $p<0.05$

TABLE XIV KRUSKAL-WALLIS TEST FOR DIFFERENCE AMONG AGE GROUPS AND OPINION ON USING ICT AND MULTIMEDIA

Opinion on Using ICT	**Chi-Square**	**df**	**Asymp. Sig.**
All the main features of MS Word	14.976	3	0.002*
All the main features of MS Power Point	15.364	3	0.002*
All the main features of MS Excel	10.038	3	0.018*
Install software on a PC	16.305	3	0.001*
Identify and sort out a computer virus	9.918	3	0.019*
Using email to send messages and attachments	6.731	3	0.081
Printing documents/ information	3.898	3	0.273
Opinion on Using Multimedia			
YouTube account - upload, edit, caption, comment on others	9.365	3	0.022*
Upload to the web (e.g. pictures/files/videos)	2.858	3	0.414
Skype (or similar alternative) - set up account, find friends, set up call	9.790	3	0.020*
Mobile phones – navigate round functions, make calls, send/share texts/images	3.188	3	0.363
Use/download mp3 music files/sound files	5.867	3	0.118
Digital cameras taking/capturing photos/videos	2.864	3	0.413
Playing computer games online/with a console	4.138	3	0.247
Content creation multi-media tools (e.g. Image editing, movie editing, web page software, quiz makers etc.)	5.108	3	0.164
Adding keywords or tagging (metadata) to my online resources to make them visible in search engines	14.530	3	0.002*

Note: *significant at $p<0.05$

TABLE XV KRUSKAL-WALLIS TEST FOR DIFFERENCE AMONG AGE GROUPS AND OPINION ON SKILL OR ABILITY OF USING ICT AND MULTIMEDIA

Opinion on Using ICT	**Chi-Square**	**df**	**Asymp. Sig.**
All the main features of MS Word	3.225	3	0.358
All the main features of MS Power Point	5.497	3	0.139
All the main features of MS Excel	3.590	3	0.309
Install software on a PC	13.013	3	0.005*
Identify and sort out a computer virus	7.774	3	0.051*
Using email to send messages and attachments	3.741	3	0.291
Printing documents/ information	5.997	3	0.112
Opinion on Using Multimedia			
YouTube account - upload, edit, caption, comment on others	0.094	3	0.992
Upload to the web (e.g. pictures/files/videos)	3.278	3	0.351
Skype (or similar alternative) - set up account, find friends, set up call	0.987	3	0.804
Mobile phones – navigate round functions, make calls, send/share texts/images	2.106	3	0.551
Use/download mp3 music files/sound files	5.926	3	0.115
Digital cameras taking/capturing photos/videos	3.022	3	0.388
Playing computer games online/with a console	4.159	3	0.245
Content creation multi-media tools (e.g. Image editing, movie editing, web page software, quiz makers etc.)	2.668	3	0.446
Adding keywords or tagging (metadata) to my online resources to make them visible in search engines	5.810	3	0.121

Note: *significant at $p<0.05$

In Table XIV, Kruskal-Wallis test showed that there were differences among age groups in terms of their opinions on all the main features of MS Word; all the main features of MS Power Point; all the main features of MS Excel; install software on a PC; and identify and sort out a computer virus. However, there were no differences among age groups in terms of their opinions on using email to send messages and attachments (X^2 = 6.731, df = 3, p = 0.081) ; and printing documents/ information (X^2 = 3.898, df = 3, p = 0.273). Kruskal-Wallis test was carried out to determine the differences among age groups in terms of their opinions on using multimedia.

The result showed that the differences were not significant for upload to the web (e.g. pictures/files/videos) (X^2 = 2.858, df = 3, p = 0.414); mobile phones – navigate round functions, make calls, send/share texts/images (X^2 = 3.188, df = 3, p = 0.363); use/download mp3 music files/sound files (X^2 = 5.867, df = 3, p = 0.118); digital cameras taking/capturing photos/videos (X^2 = 2.864, df = 3, p = 0.413); playing computer games online/with a console (X^2 = 4.138, df = 3, p = 0.247); and content creation multi-media tools (e.g. Image editing, movie editing, web page software, quiz makers etc.) (X^2 = 5.108, df = 3, p = 0.164). There was significant difference among age groups in terms of their opinions on YouTube account - upload, edit, caption, comment on others; Skype (or similar alternative) - set up account, find friends, set up call; and adding keywords or tagging (metadata) to my online resources to make them visible in search engines.

In Table XV, Kruskal-Wallis test was carried out to determine the differences among age groups with regard to their opinions on skill or ability of using ICT. The results showed that the differences were not significant for all the main features of MS Word (X^2 = 3.225, df = 3, p = 0.358); all the main features of MS Power Point (X^2 = 5.497, df = 3, p = 0.139); all the main features of MS Excel (X^2 = 3.590, df = 3, p = 0.309); using email to send messages and attachments (X^2 = 3.741, df = 3, p = 0.291); and printing documents/ information (X^2 = 5.997, df = 3, p = 0.112). But there were significant differences in terms of their opinions on install software on a PC; and identify and sort out a computer virus. Kruskal-Wallis test was carried out to determine the differences among age groups in terms of their digital literacy opinions on skill or ability of using multimedia. The result showed that there were no significant differences among age groups with regard to the digital literacy of using multimedia.

VI. RECOMMENDATIONS AND CONCLUSION

The overall results of this survey suggest that since those students lived in village their digital literacy is less than the students who lived in town. There are some differences in students' opinion and skill or ability of digital literacy. In the light of the experiences earned from the mentioned topics, the following recommendations are established for increasing DL competency of all students at Dhaka University. This study has given a detailed account of DL and provides a good understanding of what needs to be done at present in this regard. However, the Dhaka University authority should take the following recommendations:

1. Orientation Programs: The authority should organize orientation programs on digital literacy for the new students.

2. Number of Computer: Dhaka University authority should increase the number of computers at the Department computer laboratory, university cyber center, residential places etc. with Internet connection.

3. Need More Internet Speed: The authority of Dhaka University should increase the speed of Internet speed through Wi-Fi connection.

4. Building Awareness Program: A massive awareness raising campaign should be initiated in all the faculty of Dhaka University about DL and its significance.

5. Policy Formulation: A clear-cut DL program plan needs to be put in place so that all stakeholders are aware of the importance of DL. Primarily, government should include DL policies in all the sectors of Bangladesh. Dhaka University authority must include DL courses in their curriculum.

6. Information Retrieval (IR) Techniques: As many students do not know the using of Boolean operator, naturally they will not be able to make query using adjacency operator, truncation and others. Authority needs to arrange more training for adaptation with printed information retrieval tools and electronic IR tools.

7. DL Programs: Dhaka University authority should immediately allocated internet facilities for the students. The availability of online training material across all subject areas and disciplines should be ensured as soon as possible. Authority of Dhaka University should start DL program to educate the faculty members. However, it needs to give more emphasis on ICT literacy as it is the demand of current digital and knowledge-based society.

8. Building A Committee: A National Committee on DL should be formed which will be responsible for designing, coordinating and evaluating this nation-wide program. The committee will have representatives from teachers, librarians and information professionals, technologists, educationists, civil society members and education administrators. The ministries of Education, ICT, Information and Cultural Affairs would be engaged in the implementation of the program.

9. Monitoring Progress: Fresher students should be given assignments to check whether they are achieving and developing DL skills. They should be instructed and guided to attain DL skills in a logical manner and master these skills to complement their academic progress.

10. Extensive Training on ICT Literacy: ICT training modules should be integrated with the DL programs so that students can effectively utilize computing and telecommunications techniques for better fulfilling their information needs.

11. Training Program: Intensive and extensive training program should be organized for students, teachers and information professionals; they should be introduced to modern techniques and technologies of information production, processing and distribution, so that they can become proper guides for the students in acquiring DL skills.

This research reported Dhaka University first year student's digital literacy. It is hoped that the findings of this study will be taken into account by Dhaka University authority to develop and improve its DL of students. The findings of this study may apply only to students at university levels, and so further research is needed to explore the possibilities of transferring them to DL education of other types and phases. Moreover, since DL is a broad concept that is constantly evolving, its fostering is a long and continuous process, consisting of developing not only knowledge and skills, but also appropriate awareness and higher level thinking skills. Therefore, incorporating DL into the education process of very disciplines and courses is a reasonable direction for DL development.

Although the question of how best to effectively integrate DL education into the curriculum may need further research, educators should always keep the key purpose of DL in mind. DL is not just for grasping certain knowledge and skills, but also for helping students develop their ability to survive and develop in this digital society. Most importantly, DL develops students' abilities to employ these digital technologies for generating constructive social practices. This is the first time an effort has been made to assess first year students' DL of Dhaka University in Bangladesh. This study may encourage more such research on DL in Bangladesh and beyond.

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