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Identifying The Digital Skill Level Of Teachers In Garo Hills

Potshangbam Shantikumar Singh
Research Scholar
Dept. Of Management, North Eastern Hill University, Tura Campus, Meghalaya

Dr. Thrinadha Rao Bandaru
Assistant Professor
Dept. Of Management, North Eastern Hill University, Tura Campus, Meghalaya

Abstract
The aim of the study is to survey and measure the digital skill of secondary school teachers in Garo Hills, Meghalaya and to check whether there is any significant difference in their skill level among the teachers of different districts with the objectives (i) to find the digital skill level of the secondary school teachers (ii) to check the difference of digital skill level among teachers in five districts of Garo Hills. In the current scenario, if school teachers are not digitally competent, it would be difficult to guide the young generation as new curriculum demands integrated digital technologies in the classroom. Meghalaya government in collaboration with IPE Global Pvt. Ltd. conducted training sessions for teachers in order to improve their digital awareness but it is not yet surveyed the change in their digital skill. This study will help to find the current digital skill level of teachers in the Garo Hills so that future plan could be implemented accordingly.

Keywords: *digital skill, digital competence, ICT, twenty-first century skill, teachers' digital skill level*

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I. Introduction

In recent years, there was a sudden change in the use of digital tools especially mobile phone and computer for the transaction of learning material and even for regular classes. Though everyone has gone through the pandemic situation, it is still in the dark that whether the teaching community could utilize the present digital tools fully for educational purposes and it is needed to be studied. The digital and social are related for similar types of fields like economic, cultural, social and personal. Digital activities are mediated by access, skills and attitudinal aspects.[1] The purpose of this survey was to identify the current digital skill level of the teaching community in relation to the use of a basic digital tools i.e., a mobile phone and a computer which were used extensively in the last two years as a communication tool due to the pandemic.

II. Literature Reviews

For this study, literature review was done based on the following themes. It enables us to find out the most desirable factors for surveying digital skill in the region.

Technical

Parrott and Kok (1997) point out the need of technical expertise in producing good software. Turner (2005) explains the various digital technology skills an educator must possess for performing their teaching effectively. Had, M. Z. C., and Rashid, R. A. (2019) opined that for teaching language using ICT, teachers have to equip themselves with adequate digitals skills. Das and Sangma (2019) in their study on the use of ICT in Meghalaya by Garo women in Agriculture points the problems related to financial, lack of training and lack of knowledge. Seal and Kalita (2019) in their study of ICT as source of information finds out that lack of awareness, poor network connectivity and inadequate technical skill persons are some of the major constraints in West Garo Hills.

[1] Helsper, E., J., (2012). A Corresponding Fields Model for the Links Between Social and Digital Exclusion. Doi:10.1111/j.1468-2885.2012.01416.x

Communication

Masterman (1985) says that the increasing use of mobile devices will lead to numerous challenging in communication possibilities. Carver and Biehler (1994) discuss the multimedia incorporation would be influential for accessibility of educational materials. McKenna (2007) points out that communicating more strategically will become the prime validation of true self. Carlsson et. al. (2008) discusses the new challenges in communication concerning media education as there are numerous devices and technologies emerge, selecting an appropriate one would be a tough task. Mascarenhas (n.d.) identifies communication skill as one of the main skills to be implemented in teacher training and development programmes. Aeseaert et. al. (2014) consider communication with computer as one of the factors in measuring ICT competence among the employees. Carlisle et. al. (2021) founds out that online marketing and communication skill would be some of the most important future digital skills. van Laar et. al. (2020) pointed out Communication as one of the important learning attitude factors that influence in the development of digital skill.

Behaviour

Bawden (2008) thinks that correct and sensible behaviour will help in improving digital literacy as a moral dimension which can reflect in the way how a person sets privacy and security in their digital gadgets. Proctor and Dutta (1995) point out that well behaviour is acquired through practice. Gini et. al. (2007) thinks that aggressive behaviour will impact in difficulty in young people's discissions making.

Self-reflection

Baartman and Brunijn (2011) mention that critical self-reflection and openness are necessary in transformative integration of knowledge, skill and attitude. Blizzard and Abhigyan (2017) points out that use of technology is influenced by type of school and stream that the teacher works.

Experience

Proctor and Dutta (1995) explain skill as goal directed and well-organized behaviour which is acquired through practice and perform a certain job. Centrally Sponsored Scheme of Information and Communication Technology during 2008-2009, in their report states that use of technology appropriately improves their educational experience and develops a better workforce. Kasparova (2019) is of the opinion that for efficient transformation of digitisation, digital skill is a necessary entity. Richardson and Bissell (2019) assume that digital skills emerge through repetitive practices.

Finding Information

Masterman (1985) states that in the increasing access of Internet, searching and finding valid information is a challenging task for the young minds. Leidner and Jarvenpaa (1995) discuss that finding information in modern days is about automating rather than transforming. Perifanou et. al. (2021) found out that during Covid-19 situation, teachers use digital tools for finding, evaluating and developing educational resources as well as communicating with the students.

Socio-economic and Demographic Profile

Shepherd (2004) points out that socio-economy is one of the factors that will impact in the use of digital technologies. Ohler (2010) says that social interaction will lead to an expansion of media literacy. Satya (2015) discusses the low and high impact of localized terms like clan promotion, ethnicity, culture and excluding technology and e-governance as lower growth in employability. Bhandari et. al. (2021) considers socio-economic and demographic profile as major instrument in deciding the acquisition of digital skill. The study of Özsoy et. al. (2020) found out that age, gender, education, household income significantly predicts digital skill levels of an individual. Rodriguez-Hevía et. al. (2020) highlights that sociodemographic factors and population density may be considered important while executing e-governance.

Self-assessment

Potter (2008) points out that self-assessment tool is a useful structure to measure the performance of students or pre and in-service educators. Ilgan et. al. (2015) differentiates and shows the relation between psychological well-being of a teacher and the quality of school work life. Różewski et. al. (2019) suggests the selection of resources best fit to a user's digital profile in measuring digital competency using Dig Comp framework.

Professional Growth

Mascarenhas (n.d.) identifies the importance of development programmes in soft-skill like communication, problem solving, decision making, negotiation and leadership to enhance teaching and learning.

Khongji (2015) points out that attending skill enhancement training can be a detrimental factor in enhancement of skill. Kaimara et. al. (2021) points out the importance of professional development and training teacher but also discuss issues of lack of equipment.

Innovation

Fullan (1989) points out the need of innovation in education change. Grunberg and Summers (1992) discuss the issues while implementing innovations in schools and states that innovation would be one of the changes in Education change. Barna and Epure (2020) suggests the future relevant innovation for developing digital skill would be private sector initiatives enhancing youth digital skill for employability. Handley (2018) considers projects taken up by national organizations as positive to improve digital literacy by executing institutional programmes. Shakina et. al. (2021) in their paper Digital divide in corporate opined that digital innovation may have a life cycle period.

Soft-skill

Zeitoun (2008) points out that a digitally literate person must be able to deliver learning content via electronic media that suits the environment. Mascarenhas (n.d.) consider developing soft-skill as part of a teaching community in order to enhance learning. Kumari, Sonia, and Sharma (2017) explore the content of soft skill and opined that lack of quality among teachers is associated with having not adequate employability and soft skill.

Digital Skill

van Laar et. al. (2017) in their paper the relation between 21st century skills and digital skills identifies seven core skills as technical, information management, communication, collaboration, creativity, critical thinking and problem solving and five contextual skills which includes ethical awareness, cultural awareness, flexibility, self-direction and lifelong learning. van Laar et. al. (2018) further identifies the six types of 21st century digital skill as information, communication, collaboration, critical thinking, creativity and problem solving. van Laar et. al. (2020) use information, critical thinking, creativity and problem solving to examine the digital skill of professionals. Turner (2005) explains that digital technology skill for educators include Word Processing Skills, Spreadsheets Skills, Database Skills, Electronic Presentation Skills, Web Navigation Skills, Website Design Skills, E-Mail Management Skills, Digital Cameras, Computer Network Knowledge. Laanpere (2019) states that so far UNESCO's Digital Literacy Global Framework does not specify a standard instrument for monitoring digital literacy indicator. Robroo (2019) indicates that there was significance difference at the level of 0.01 between the learning achievements before and after learning by pre-service teachers. Różewski et. al. (2019) suggests that in order to measure digital skill using DigComp framework in the form of Online Self-Assessment Tool, select the resources best fit to user's digital profile. van Laar et. al. (2019) opined that to measure digital skill it should follow a sequence order like communication and information, collaboration, critical thinking and creative skill which all followed to problem solving skill. Johari and Azli (2018) in their study by using ACOT model states that teachers could rate themselves their digital skill accordingly as Entry, Adoption, Adaptation, Appropriation and Invention. Manco-Chavez et. al. (2020) discusses that there is a positive relationship between integration of ICT and digital skills. Iordache et. al. (2017) in their paper developing digital skills and competence, it includes five categories operational, technical and formal; information, cognition; digital communication; digital content creation; and strategic. Olszewski and Crompton (2020) points out the importance of arranging strategic time for the educators to develop digital skill by the school leaders. The study of Sandars et al. (2016) explains that teachers use their knowledge to facilitate student learning, creativity, and innovation in both face-to-face and virtual environments. It also provides the ISTE Standards Teachers International Society for Technology in Education Effective teachers model and urges all teachers to meet the standards and performance indicators. Pérez-Escoda et al. (2016) discusses the digital skills in the Z generation for a curricular introduction in primary school stating that they are necessary for them to face the challenges of a digital society. It also provides empirical evidence about the level of digital skills of students belonging to this generation showing the need to address digital competence in schools in systematic manner. In the study of Iordache et al. (2017) tried to unravel the complexity and diversity of concepts regarding digital skills, literacies and competences. It was based on a literature review and quick-scan analysis of 13 digital literacy models that have been published and used by actors in the field between 2004-2014. The frameworks were mapped in a matrix and compared on the basis of 39 indicators, clustered in five categories: operational, technical and formal; information, cognition; digital communication; digital content creation; and strategic. The results of the analysis point towards an unbalanced focus on certain skills and competences, with particular emphasis on a series of operational, information-searching, and communication skills. Różewski et al. (2019) studied with a project called Digital Skills Accelerator to develop digital skills set of learning resources. The test analysis was in the form of Online

Self-Assessment Tool. The system uses DigComp[2] framework to generate the user path. It suggests to select resources best fit user's digital skills profile and it will help in raising their digital competence.

From the review of the above literatures, it is assumed that future education surely will be integrated with ICT. In order to get the optimal experience in teaching learning using ICT, each teacher has to be digitally competent. So, in order to find out the competency of the teachers, a survey of measuring their digital skill is conducted with the following objectives.

Objectives of the study
(i) to find out the digital skill level of secondary school teachers
(ii) to compare the digital skill levels of teachers in different districts

Research Question
Is there any significant difference in the digital skill levels among teachers of the five districts in Garo Hills?

III. Methodology

The study was taken up in Garo Hills, Meghalaya. The pass per cent in SSLC and HSSLC examination conducted by the state board is relatively low in this area. (mbose.in)[3].

Data Collection

Li and Hu (2020) studied to develop and validate the digital skill scale for school children. The aim of the study was to develop a reliable and valid scale to measure digital skills for school children (DSS-SC). Based on theoretical ground and empirical evidence, the scale should measure the skill in developing countries. With cross-sectional study they tried to develop the initial framework and executing EFA and CFA. DSS-SC was prepared as a theoretically and empirically consistent instrument. It consists of 22 items in 5 dimensions, i.e., Operational Skills (basic operation, information management, information navigation), Mobile Skills (software operation, device application), Social Skills (social sharing, social interaction), Creative Skills (content creation, content integration), and Safety Skills (privacy protection, risk prevention). Özsoy et al. (2020) studied to examine the digital divide in a non-Western population. They measured the digital skill levels of the participants through performance tests developed by van Deursen, and van Dijk (2010). The result indicates low digital skill level of the participants. The users are most successful at the formal level, followed by operational, informational and strategic skills, respectively and the level of strategic skills was quite low. It was also found that age, gender, education, household income significantly predicts digital skill levels. Manco-Chavez et al. (2020) did research on management of ICT (Information and Communication Technology) and the development of digital skills during the pandemic that caused COVID-19. A study with a quantitative, non-experimental, cross-sectional, correlational approach was developed. The sample consisted of 168 students from a public university in Lima, Peru. Two tools were adapted: 1) integration of ICT, 18 items and 2) digital skills, 30 items, with reliability coefficients by Cronbach's Alpha of 0.976 and 0.889, respectively. The questionnaires were developed and taken through Google forms. The results showed that the level of integration of ICT was high (89.9 per cent) as well as digital skills (86.9 per cent). Spearman's Rho correlation analysis concluded that there was a positive and high relationship between integration of ICT and digital skills (0.761, $p < 0.05$). Finally, discussions were raised about the development of aspects related to ICT during the current pandemic. Allmann and Blank (2021) re-examine the theory and measurement of digital skills. They introduce a new methodology to research skills: participant-observation of novices in the process of learning new skills along with interviews with the people who help them. The second contribution: a different theory of skills, which identifies three primary characteristics: (1) sequence, (2) simultaneity, and (3) path abstraction. Third, they argue that there is a need to change current ways skills are measured. In the paper Teachers' digital skills readiness studied by Perifanou et al. (2021), they survey regarding the use of digital technologies by teachers in their teaching and their professional responsibilities. It points out that digital tools that can be used by digital competent teachers. They revealed that teachers use digital tools for in finding, evaluating, and developing educational resources as well for teaching. They also used digital tools for self-study, students' assessment, as well as interacting and communicating with students. They suggest long-term planning and development of the digital school and digital education would be an issue. In the paper titled the relation between twenty-first century skills and digital skills: a systematic literature review written by van Laar et al. (2017) states that innovation starts with people. With the main objectives were (1) to examine the relation between twenty-first century skills and digital skills; and (2) to provide a framework of twenty-first century digital skills with conceptual dimensions and key operational components aimed at the knowledge worker. They identified seven core skills: technical, information management, communication, collaboration, creativity, critical

[2] https://www.itu.int, DigCom is digital skill framework developed by International Telecommunication Union
[3] https://www.mbose.in, results are available in archive

thinking and problem solving. Five contextual skills were also identified: ethical awareness, cultural awareness, flexibility, self-direction and lifelong learning.

For this study, questionnaire-based survey method is used. By using random sampling method, the schools where the respondents will be selected are identified. After informing and receiving the permission of the Head of the institute, a semi-structured questionnaire prepared by the researcher is distributed to the teachers of the selected schools. All the teachers of the secondary and higher secondary schools are included as respondent.

Tools

The questionnaire items were prepared based on DigCom framework, prepared by International Telecommunication Union. It divides the Digital Skills into three groups as Basic, Intermediate and Advanced Skill. Digital skill can be measured in three basic methods: (i) Using survey by asking questions on the use of digital app or gadgets and assuming their response as indirect evidence over command of skill (ii) Survey by using questions that ask self-assessment of skill. It is the most commonly used method. (iii) Performance Test in a laboratory or in a controlled environment. The first method does not clearly explain the relation between use of app or gadgets and skill.[4] In the second method, the respondent may overrate his/her skill in their self-assessment.[5] So, we combined the features of the first and the second methods to get a better result of the overall skill. The Population of the study includes Secondary and Higher Secondary schools of Garo Hills.

Reliability

The semi-structured questionnaire has 24 items. This tool has five sections with reliability coefficient by Cronbach's alpha of 0.941. It uses Lickert's scale like rating to rate the skill level from Very efficient (5) to Poor (1). It has five factors of skill level. The sample data consists of 765 respondents from 83 randomly selected schools.

Validity

The relationship among the factors is tested using KMO and Bartlett's test under Principal Component Analysis and found the score as 0.831 and significance level as < .001** (P value). So, the dataset of respondent is adequate to test our objectives. Cronbach's alpha for each factor of digital skills were also checked separately and found 0.742 for Technical Skill, 0.772 for Information and Communication Skill, 0.769 for Creative Skill, 0.869 for Critical Thinking skill and 0.901 for Problem-solving Skill. The overall Cronbach's Alpha for the tool used for collecting the various skills is 0.941. The tool has very good internal consistency.

Descriptive Analysis of Data

Table 1: Respondents from each Categories of Schools

District	Category of School					Total
	Private (25)	Adhoc (20)	Deficit (32)	Government (5)	Other (1)	
EGH	20	12	51	18	6	107
NGH	21	16	65	5	0	107
SGH	9	12	65	15	0	101
SWGH	13	12	62	6	0	93
WGH	128	89	130	10	0	357
Total	191	141	373	54	6	765
%	25	18	49	7	1	100

Table 1 shows that the highest number of respondents are from the Deficit Schools with 49 per cent. The second highest respondents are from Private schools with 25 per cent and third from Adhoc schools with 18 per

4 Van Deursen, A. J. A. M., & Van Dijk, J. A. G. M. (2011). Internet skills performance tests: Are people ready for ehealth? Journal of Medical Internet Research, 13(2), e35. https://doi.org/10.2196/jmir.1581

5 Hargittai, E. (2005). Survey Measures of Web-Oriented Digital Literacy. Social Science Computer Review, 23(3), 371–379. https://doi.org/10.1177/0894439305275911

cent. The number of respondents from Government school is seven per cent and few respondents do not belong to any of these categories of school which is the lowest with one per cent.

District wise respondents:

Table 2: District wise Gender respondents in Age group

District	Male	Female	Total	Age group	Male	Female	Total
EGH	59	48	107	Below 25	4	12	16
NGH	63	44	107	25-30	57	71	128
SGH	58	43	101	31-40	107	129	236
SWGH	61	32	93	41-50	118	79	197
WGH	181	176	357	Above 50	136	52	188
Total	422	343	765		422	343	765

From Table 2, 55 per cent of the respondents are male and remaining 45 per cent are female. Out of them two per cent belongs to the age group Below 25 years, 17 per cent in 25-30, 31 per cent in 31-40, 26 per cent in 41-50 and 25 per cent in the age group Above 50.

Descriptive Analysis of The Factors

Mean and SD with respect to Technical Skill, Information & Communication Skill, Creative Skill, Critical Thinking Skill and Problem-Solving Skill are tested using statistical method.

Skill of the majority of the teachers are consistent in the use of keyboard, screen touch technology. But they are less efficient in using MS-Office as well as maintaining and managing files in the computer. But in average (3.29) all the teachers fare well in Technical related skills with standard deviation 1.04.

The teachers have efficient skill in managing privacy setting in their phones They are less efficient in filling up online forms and questions. Their average skill level score is 3.02 with std. deviation 1.12.

Their skill in finding product in an e-commerce platform is nearly average with score 2.86 but using graphics software or designing pamphlets etc. are of below average. Their average score in Creative skill is 2.19 with std. deviation 1.07.

The digital skill in setting proper network security for internet connection is good whereas they have least idea about extracting big data for data analysis. In overall, they score below average skill level in Critical thinking skill with 1.78 with std. deviation 0.96.

The skill in screen casting to TV or computer monitor are good. Here, it is noted that the modern television and computers are coming with readymade project to this device option. But they have less idea of Cloud Computing Technology for data analysis. Their mean score for Problem-solving skill is 1.77 with std. deviation 0.96.

Table 3: Mean & SD of Overall Mean and Standard Deviation of the Groups

Factors of Digital Skill	Mean	Std. Deviation
Technical Skill	16.21	3.729
Information and Communication Skill	12.06	3.538
Creative Skill	10.95	3.884
Critical Thinking Skill	6.94	3.130
Problem-Solving Skill	10.85	4.846
Valid N (listwise)	765	

As the highest mean is 16.21, which is the only that shows the efficiency of digital skill for the teachers are mostly Basic related to technical skills like use of keyboard, screen touch and simple word processing program etc. They score least in Critical Thinking with score 6.94. As all the other skills lead to problem-solving skill, the scores in rest of the skills are way below the average.

Finding the Digital Skill Level

In order to find out the level of skill, the data is grouped based on the descriptive analysis of their overall score of integrated skill into three groups. All those scores below 49 are kept at the first level (Basic) and all the score which are more than 60 are kept at the third level (Advance). Those scores between these two values are kept at the second level (Intermediate).

Table 4: Chi-square test for goodness of fit of equality of level of digital skill of teachers

	Frequency	Percent	Chi-square value	P value
Basic Skill Level	232	30.3	44.34	<.001**
Intermediate Skill Level	339	44.3		
Advanced Skill Level	194	25.4		
Total	765			

In Chi-square test for goodness of fit for equality in level of digital skill of teachers, it is found that P value is less than 0.01, and Chi-square value 44.34. Hence it is concluded that Level of Digital Skill of teachers are not equally distributed. Based on the percentage, majority of teachers belong to Intermediate Skill Level (44.3%). The below table shows the distribution of digital skill levels in each district.

Table 5: District-wise Digital Skill Level

District	Basic	Intermediate	Advance	Total	%
EGH	63	26	18	107	13.99
NGH	23	72	12	107	13.99
SGH	54	10	37	101	13.20
SWGH	18	59	16	93	12.16
WGH	74	172	111	357	46.67
Total	232 (30%)	339 (44%)	194 (25%)	765	

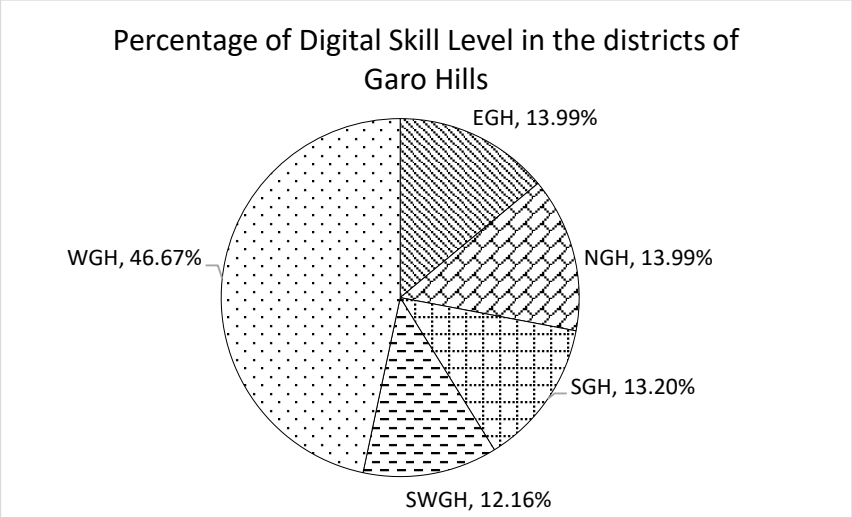

Fig 1: Pie Graph showing the digital skill levels

So, it can be said that the digital skill level of teachers in this region are different at the district level. The digital skill level of teachers in West Garo is the highest at 46.67 per cent and South-West Garo Hills has the minimum at 12.16 per cent.

IV. Analysis and Findings

In this twenty-first century world, educators were supposed to be well equipped with digital skills. Because, all the learning materials as well as strategic materials are available online at any time. They could use these materials as a reference to clear the doubts and implement new ideas innovatively. Yet, it is not satisfied as their skill level is below average. So, it is need of the hour to train the teachers with proper facilities to become more skillful digitally.

Another aspect we found out is that, many respondents over-rate themselves in the related questionnaire. So, in order to extract more accurate result, performance test along with questionnaire method could be implemented. If any training schedule are supposed to be implemented then, it would be wise to discuss the practical solutions and procedures for skill improvements with the organization and teachers themselves. Policy maker should aim in helping the professionals to acquire, maintain and develop their digital skills.

V. Conclusion

The digital skill level of the region is at intermediate and has significant difference among the five districts. If the policy maker has to introduce NEP 2020 with ICT integrated mode, then an awareness programme

as well as training sessions would be necessary in order to level the difference of digital skill level. As the survey is done using questionnaire and self-assessment method, there may be over rating and if we need to get more accurate result, performance test on these five factors should be tested using larger respondents.

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