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E-learning readiness of teachers of two state agricultural universities: A comparative study in Northern India

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Abstract
Advances in Information and Communication technologies (ICTs) have comprehensively transformed the academic landscape in education sector in India. Consequently, the process of teaching and learning along with educational programmes and pedagogy of instruction are being restructured, reformed and realigned to meet the expectations of a whole new breed of students entering the technical institutions. ICT applications in education sector can greatly enhance the quality of learning outcomes. The learners, through multifaceted ICT applications, can control the content, time and pace of learning. However, we need to assess the e-learning readiness of an educational institution and its different stakeholder before implementing any e-learning strategy. The present study was undertaken to assess and analyse the e-learning readiness of two premier State Agriculture Universities (SAUs) of North India. The study findings indicate the two SAUs under study are 'ready but needs improvement' on certain areas. The findings will prove to be useful for policy makers, educationists and researchers in determining the changes and challenges facing agriculture higher education in India and catalyse the plans for making all the SAUs in India to be e-ready.

Keywords: E-Learning, e-Learning Readiness, e-Readiness, SAUs, Higher agriculture education, etc.

Introduction
The promise and potential of e-learning has always been there since the advent of Information and Communication Technologies (ICTs) but few educational institutions showed the urgency and eagerness to adopt it in their instruction delivery systems.In order to make-up the lost time due to nationwide lockdown and overcome the Corona pandemic-induced uncertainty and resultant emergency has forced every educational institutional scurrying for alternative modes of delivery of instruction and instructional material.

E-learning is said to be one of the key success factors in enhancing the competitive advantage of higher educational institutions mandated to provide trained and skilled manpower to meet the challenges of enhancing access to education to all the sections of the society. Technology in itself does not have an educational value until it is incorporated in the teaching-learning process, either in classroom or outside. Navani and Ansari (2016) [10] observed that integration of Information and Communication Technologies (ICTs) in education sector has completely changed the dynamics of teaching and learning process; and has undeniable impact on learning outcomes. Consequently, e-learning has emerged as an important education tool to improve the learning outcome as well as expand the learning opportunities. Further, the explosive growth in Information Technology (IT) and new developments in learning science provides opportunities to create well-designed, learner-centered, meaningful and facilitated e-learning environments (Khan, 2005) [5]. Higher education institutes/ universities are therefore now motivated to include e-learning courses as an alternative method in education. But in order to realize this, we need to ensure that teachers as we as students / learners are prepared as well as motivated to take up e-Learning (Navani and Ansari, 2019) [12].Tahereh *et.al* (2010)[17] observed that e-learning as a solution provides the possibility of widespread use, access and sharing of knowledge unmatched by other types of Instruction delivery. Navani and Ansari, (2020) [13] asserted that e-learning can help as a tool to improve the access, affordability as well as availability of education to the masses. However, the issues concerning the readiness of the different stakeholder for implementing e-learning needs to be studied so that it can be implemented successfully in higher education institutions.

What is e-learning and e-learning readiness?
Liaw *et al* (2007) [6] define e-Learning as the convergence of technology and learning, and the use of network technologies to facilitate learning anytime, anywhere.

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Davis (2001) [2] describese-Learning as technology-enabled learning that covers various concepts, or phenomenon delivering instructions through technology. Rosenberg (2001)[15] refers to e-Learning as using Internet technologies to deliver various solutions to learners. Holley (2000) [4]stated that e-Learning is difficult to implement without the full cooperation and support of lecturers as the degree of interaction between lecturers and students is still predominant in e-Learning environments. Nowadays, e-Learning has become an accepted educational paradigm across universities worldwide (OECD, 2005)[14].E-learning can therefore be defined as a set of strategy, business processes, application, tool, and technologies linking individuals/ students, instructor and University resources for the purpose of enhancing and sharing knowledge using internal and external networks.

The e-Learning systems are a kind of technological developments that have reformed and restructured the delivery and interaction of students and teachers with course materials and related resources. The e-Learning systems have been widely used in developed countries and have recently become more common in many developing countries the importance of electronic media can't be ignored for many reasons it can play a critical role in equipping modern university teachers with sophisticated and innovative learning tool. **Neeru (2009)[9]** reported about the transformation of higher education in the country in terms of access, equity and quality due increased to usage of ICT in education. Therefore, integration of ICT in teaching and learning process with empower teachers to focus on student centered approach, active and interactive learning, connecting with learner experiences and needs, and development of critical and ethical understandings of the value of the use of ICT.

Readiness includes learners' awareness and ability to adapt to technological challenges, collaborative learning in synchronous as well as asynchronous modes. Readiness for an organization intending to adopt e-Learning can be defined as the "mental or physical (infrastructural) preparedness for that organization for some e-Learning experience or action". It is important to comprehend that readiness can't take only binary values; rather it is a continuous process. Machado (2007) [7] explained e-readiness in context of higher education as "the ability of Higher Education Institutes (HEIs) and the capacity of institutional stakeholders to generate learning opportunities by facilitating computer-based technologies. Therefore, e-Learning readiness is required in making sure the users are capable of using the e-Learning environment technology in the best way possible. Technically speaking, e-Learning readiness is the capability of prospective e-Learning users in using an e-Learning environment as well as the usage of alternative technology.

Further, driven by the changing dynamics in education sector and students' needs, e-learning in higher agriculture education is being promoted in a phased manner. Some innovative and useful initiatives have been undertaken by a number of agriculture universities under the guidance and assistance of ICAR. However, they are too few and localised in nature. Before any large scale introduction of e-learning in agriculture education we need to ascertain the e-learning readiness of different stakeholders in agriculture universities (Navani and Ansari, 2020). Therefore, e-Learning readiness of faculty in this study was conceptualized to include their readiness to integrate latest ICTs in the classroom situations, technical competency in educational content management (e. g. designing and uploading educational content on the web,

online supervision and evaluation systems, etc.) and their attitude towards e-Learning as a mode of instruction.

The present study was undertaken with the following objectives:
1. To find out socio-personal and psychological characteristics of the teachers (SAU)
2. To determine e-learning readiness of teachers of two SAU.

Research Methodology

The present study was done in two randomly selected State Agriculture Universities (SAUs) in North India, i.e. G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand (hereinafter referred as SAU-1) and Himachal Pradesh Krishi Vishvavidyalaya (HPKV), Palampur (hereinafter referred as SAU-2). Both these Universities are premier agriculture universities of North India catalysing the agriculture education, research and extension activities, and contributing significantly in enhancing agriculture productivity, production efficiency and farm profitability in India.

Study Locale: Profile description of two SAUs is given hereunder.

1. **G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand:** It is the first agriculture university in India established on 17th November 1960 on land grant pattern of the USA. It has one of the largest campuses in India and is currently ranked first among all the State Agriculture Universities (SAUs) and ranked third overall among all the institutions included under higher agriculture education network in India. Pantnagar University has seven faculties offering UG, PG and Ph. D. programmes in Agriculture, Home science, Veterinary Sciences, Fisheries, Engineering and Basic sciences & Humanities. The University is widely recognized as the 'harbinger of Green Revolution in India' by none other than Nobel laureate Norman E. Borlaug as it contributed significantly in ushering the green revolution in the country that made the country self-reliant in foodgrains production. College of Agriculture at G.B. Pant University of Agriculture and Technology, Pantnagar was purposively selected for the study as it is the largest academic unit of the University. It has a dynamic and innovative Undergraduate, Postgraduate and Doctoral programme to meet the modern challenges of scientific manpower required for furthering the goals of agriculture sector in the country. The college has eleven departments, namely Agricultural Communication, Agricultural Economics, Agro-meteorology, Agronomy, Vegetable Science, Food Science & Technology, Horticulture, Soil Science, Genetics & Plant Breeding, Entomology and Plant Pathology. Stratified random sampling was followed to select the respondents (teachers) for the study.

2. **Himachal Pradesh Krishi Vishvavidyalaya (HPKV),** Palampur (Himanchal Pradsh), recently renamed as Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishvavidyalaya (in June, 2001), was established on November 1978 as an expansion of the existing College of Agriculture (established in May 1966, and initially part of the old PAU, Ludhiana). The College of Agriculture, Palampur formed the nucleus of the newly established agriculture university (HPKV). It has been accredited by the Indian Council of Agriculture Research (ICAR) and

is an ISO 9001:2008 certified institutions over the years. The university has contributed significantly in transforming the farm scenario of state of Himachal Pradesh, particularly horticulture crops. Today, the State has earned its name for agricultural diversification and the farming community has imposed its faith in the University. The College of Agriculture of HPKV has 13 departments, *viz.*, Agricultural Biotechnology, Agricultural Economics, Extension Education and Rural Sociology, Agricultural Engineering, Agronomy, for age and Grassland Management, Crop Improvement, Entomology, Horticulture, Organic Agriculture, Plant Pathology, Seed Science & Technology, Soil Science, Tea Husbandry & Technology, Vegetable Science & Floriculture.

Sampling
The sampling frame included the teachers of all the three cadres/ designations (Assistant Professor, Associate Professor and Professor) working in Colleges of Agriculture at the two SAUs. In order to give due and equal representation to the three designations, Stratified random sampling with proportional allocation was used for selecting the respondents (i.e. teachers of SAUs).

Selection of respondents (Teachers): On the basis of designation of different teachers in the university, three strata were formed. Assistant Professors or equivalent constituted the first stratum, Associate Professors or equivalent constituted the second strata and Professors or equivalent constituted the third strata. Stratified random sampling following PPS (Probability proportional to size) was used to select the study sample.
This was achieved in the following way

nh 1=(N h1/ N)*n

Where, nh1=sample size for stratum h1
N1h=population size for stratum h1
N=total population size
n=total sample size
Thus, the sample included the 70 teachers from each of the two SAUs; and the total study sample comprised of 140 teachers: 33 Assistant Professor, 29 Associate Professors and 79 Professors. The study sample may look little heavy/ disproportionate, but we had to depend on the existing strength of the three cadres of teachers as many posts of the three different cadres were lying vacant. The sample distribution is given in table-1.

Table 1: Distribution of respondents in different strata.

Categories	GBPUAT		HPKV	
	No. of Teachers (Population Size)	Total =70 (Sample Size)	No. of Teachers (Population Size)	Total =70 (Sample Size)
Assistant Professor	74	27	3	2
Associate Professor	9	3	15	13
Professor	109	40	65	55

Based on proportional allocation in each strata (as given in table-1), the study sample included 140 teachers – seventy from each of the two selected SAU. Further, the data was collected through a structured and pre-tested interview schedule. The independent variables (i.e. Socio-personal and Psychological variables) selected for the study were: Age, Gender, Educational qualification, Designation, Annual income, Teaching experience, Computer literacy, Achievement motivation, Access to internet facility, and Mobile phone ownership and use. Further, the e-learning readiness was the lone dependent variable. The e-learning readiness of SAU's teachers was measured on eight dimensions using a slightly modified framework of

Mutiaradevi (2009): Technological Readiness, Online Learning style readiness, Infrastructure readiness, Attitude readiness, Human Resource Readiness, Environmental Readiness, Cultural Readiness and Financial readiness. An elaborate schedule was administered, with minor modifications, to measure each of the eight e-learning readiness dimensions. The data, thus collected, was analysed using SPSS (v. 17.0).

Results and Discussion
(a) Socio-psychological and Communication characteristics of teachers of SAUs: The results obtained are given in table-1below.

Table 2: Distribution of respondents according to their Socio-Personal characteristics.

Categories	No. of Teachers (N=70)	
	GBPUAT (N₁=70)	HPKV (N₂=70)
Age (in Years)		
Young (<36)	20(28.57)	13(18.57)
Middle (36-55)	34(48.57)	51(72.85)
Old (>55)	16(22.86)	6(8.58)
Gender		
Male	46(65.71)	57(81.42)
Female	24(34.28)	13(18.57)
Educational Qualification		
Masters	0(0.00)	11(15.71)
PhD	67(95.71)	58(82.85)
Post Doc	3(4.28)	1(1.42)
Designation	Pop. Size / Sample Size	Pop. Size / Sample Size
Assistant Professor	110 / 31	3 / 2
Associate Professor	59 / 16	15 / 13
Professor	85 / 24	65 / 55
Annual Income (in INR)		

Low (<6,25,556.70)	26(37.14)	17(24.28)
Medium (6,25,556.70-11,38,245.00)	15(21.43)	42(60)
High (>11,38,245.00)	29(41.43)	11(15.71)
Teaching Experience		
Low(<5 years)	28(40.00)	8(11.42)
Medium (5-23 years)	26(37.14)	40(57.14)
High (>23 years)	16(22.85)	22(31.42)
Achievement Motivation		
Low (<17.16)	16(22.85)	15(21.42)
Moderate (17.16-29.58)	38(54.28)	49(70.00)
High (>29.58)	16(22.85)	6(8.57)
Computer Literacy		
Low (<56.2)	8(11.42)	10(14.28)
Moderate (56.2-75)	48(68.57)	55(78.57)
High (>75)	14(20.00)	5(7.14)
Access to Internet		
At office	11(15.71)	22(31.42)
Officeas well as Home	59(84.29)	48(68.57)
Mobile Phone Ownership		
Basic phone	7(10.00)	11(15.71)
Smart phone (android, windows etc.)	47(67.14)	53(75.71)
Only Tablets or Phablets	9(12.85)	2(2.85)
Both (smart phone and tablets)	7(10.00)	4(5.71)

A careful perusal of the data presented in table-1 revels that majority of the respondents were middle aged (36-55 years), male and had doctorate as their highest qualification in both the SAUs under study. As regards designations, majority were Assistant Professor in SAU-1 whereas it were Professors in SAU-2; and regarding annual income, majority were in high income category in SAU1 and medium category in SAU-2. Further, majority in SAU-1 had low teaching experience and medium in SAU-2. Achievement motivation, computer literacy of most of the respondent was found to be in moderate category. Additionally, majority of respondents has access to internet at home as well as office; and majority of them owned a smart phone.

(b). E-learning readiness of two SAUs
As mentioned earlier, the e-learning readiness of the teachers of SAUs was measured on eight dimensions using the modified framework of Mutiaradevi (2009) [8]. The results obtained are given in table-2 below.

Table 3: Comparison of e-learning readiness of two SAUs

Item	Dimension	SAU-1 (GBPUAT)		SAU-2 (HPKV)	
		Mean score	**% of readiness**	**Mean score**	**% of readiness**
1.	Technological skills readiness	31.84	90.97	25.1	71.42
2.	Online learning style readiness	32.9	73.11	19.34	43.7
3.	Infrastructure readiness	35.74	89.35	31.9	79.75
4.	Attitude readiness	91.63	79.67	78.3	68.08
5.	Human resource readiness	36.51	71.38	38.1	69.27
6.	Environmental readiness	14.72	73.50	11.85	59.25
7.	Cultural readiness	21.8	72.66	19.82	60.06
8.	Financial readiness	29.3	83.71	28.63	81.8

(Percentage readiness was calculated using the formula: Percentage of readiness = (Mean score of dimension/ Max. score range)x 100)

It is evident from the above table that SAU-1 has scored consistently higher than SAU-2 on all the eight dimensions of e-learning readiness. Technological readiness, Online learning style readiness, Infrastructure readiness, Attitude readiness, Human resources readiness, Environmental readiness, Cultural readiness and Financial readiness of the teachers of GBPUAT was found to be greater than that of HPKV. Thus, we can conclude that e-learning readiness of teachers of SAU-1 (i.e. GBPUAT) is higher than that of SAU-2 (HPKV).

(c). E-learning readiness of SAUs
Inan and Lowther (2009) defined teachers' readiness as teachers' perceptions of their capabilities and skills required to integrate technology into their classroom instruction, and teachers' readiness to integrate technology is the most important factor that has a direct impact on technology integration. To determine e-learning readiness of State Agricultural Universities, Aydın and Taşçı's (2005) e-learning assessment model was adopted. The expected levels of readiness were determined as depicted in following figure
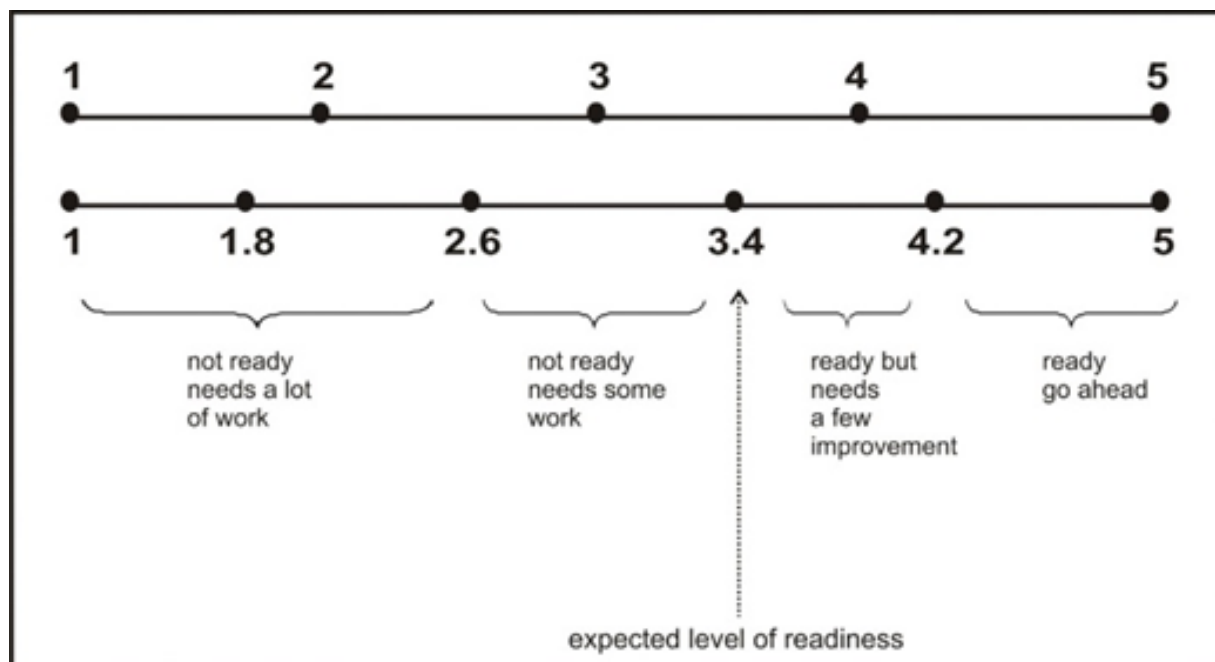
Fig 1: Aydın and Taşçı's (2005) e-learning assessment model

He clearly mentioned expected level of readiness. The items can easily be coded as 1, 2, 3, 4, and 5, as in a five-point Likert type scale. Therefore, the 3.41 mean score can be identified as the expected level of readiness with the item, while other responses enable organizations to show higher or lower levels of readiness. The 3.41 mean average was determined after identifying the critical level: 4 intervals/5 categories = 0.8.

The results obtained in the overall e-learning readiness of SAUs are given in table-4 below.

Table 4: E-learning readiness of SAUs

Item no	e-learning Readiness	SAU-1		SAU-2	
		Mean	Comments	Mean	Comments
1	Technological Skills Readiness	4.19	Ready go ahead	3.981	Ready but needs few improvements
2	Online learning style readiness	2.54	Not ready needs a lot of work	2.48	Not ready needs a lot of work
3	Infrastructure readiness	4.321	Ready go ahead	4.291	Ready go ahead
4	Attitude readiness	3.44	Ready but needs few improvements	4.017	Ready but needs few improvements
5	Human resources readiness	2.68	Not ready needs some work	2.825	Not ready needs some work
6	Environmental readiness	4.13	Ready but needs few improvements	4.066	Ready but needs few improvements
7	Cultural readiness	3.59	Ready but needs few improvements	3.399	Expected level of readiness
8	Financial readiness	4.99	Ready go ahead	4.411	Ready go ahead
	Overall Average Mean	3.73	Ready but needs few improvements	3.68	Ready but needs few improvements

Based on the overall Average of Mean Scores on all eight dimensions of e-learning readiness, we can conclude that both the SAUs are "Ready but needs few improvements". SAU-1 fares a little better than SAU-2. Further, Mean Scores of SAU-1 in case of Technological Skill readiness, Online learning style readiness, Infrastructure readiness, Environmental readiness, Cultural readiness and Financial readiness are little better than those of SAU-2. However, in respect of Attitude readiness and Human Resource readiness, SAU-2 has scored better than SAU-1.

Thus we can conclude that SAU-1 (i.e. GBPUAT) is better in respect of overl e-learning readiness that SAU-2. Navani and Ansari (2016, 2020)[10, 13], Darab and Montazer (2011)[1] and Saekow and Samson(2011) [16] also assessed the e-learning readiness and reported similar results.

Conclusion
E-learning is said to be one of the key success factors in enhancing the competitive advantage of higher educational institutions mandated to provide trained and skilled manpower to meet the challenges of enhancing access and affordabilityof education to all the sections of the society. But before implementing e-readiness strategies and plans, we need to assess the readiness of different stakeholders such as learners, teachers and administrators.

However, in view of the Corona induced uncertainties and challenges, e-learning has emerged as the new paradigm of modern education delivery systems. Every educational institution –from primary school to the highest level of University- is engaged in proactively promoting online learning as a solution to overcome the lost time due to nationwide lockdown. There is no doubt that e-learning can replace the traditional face-to-face synchronous learning. But the organisations have to be e-ready to adopt e-learning and benefit from it.

The present study has highlighted the indicators of e-learning readiness of teachers of SUAs in North India. Although higher agricultural education and R&D in India have grown overwhelmingly over the years but funding levels have not kept pace with growth in the number of programmes, institutions, colleges and universities. Restricted funding and vacant faculty positions in many SAUs are not allowing institutions to modernize the programmes and infrastructure to catch up with the changing needs of agriculture education

according to the needs of learners on one hand and scale-up the required skill-set of their teachers & administrators. E-learning readiness of SAUs shall require massive investments in telecommunication infrastructure, high-end bandwidth for internet connectivity and training of teaches in the art and craft of e-learning.

Acknowledgement

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