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Full Length Research Paper

Design of a green skills scale for Chinese University students

Quan Su[1]*, Yuan-Cheng Chang[2] and Peng-Fei Chen[2]

Department of Education Management, Chinese International College, Dhurakij Pundit University, Thailand.

Based on the concept of sustainability and the aim of addressing China's great need for talent with green skills, a green skills scale was designed with the help of Chinese university students. Students from four institutions of higher education who had agreed to the Principles for Responsible Management Education (PRME) participated as research subjects. With reference to the reviewed literature, a green skills scale was developed for Chinese university students. The scale was reviewed by experts and scholars and subjected to a reliability and validity analysis, and 900 students were selected to be included in the sample. The green skills of university students are divided into four dimensions: cognition of green knowledge, mastery of green skills, application of green skills, and green skills development, resulting in a total of 16 questions.The overall reliability of the scale is 0.845, the reliability of the dimensions lies between 0.813 and 0.880, the correlation coefficients between the dimensions lie between 0.185 and 0.497, and the root-mean-square values of the AVE of the corresponding coefficients are all larger than the correlation coefficients of the corresponding row and column variables, demonstrating that the green skills scale for university students has good reliability and validity.

Key words: Chinese institutions of higher education, Chinese university students, green skills, green skills scale for university students.

INTRODUCTION

Green skills are regarded as sustainable skills that are related to the technical skills, knowledge, values, and attitudes needed for businesses, industries, and communities to develop and support sustainable social, economic, and environmental outcomes.China has a large demand for talent with green skills at present, and the implementation of China's strategy to become a great manufacturing power has further increased the demand.

The first factor is the demand for professional talent with green skills. The extensive accumulation of human capital is crucial for the development of emerging green industries. The accumulation of human capital allows the rapid transformation of new ideas, technologies, products, and services into greater direct productivity (Wang et al., 2019). The large gap in professional talent with green skills poses enormous challenges to the development of

China's green industries.

Cultivating and expanding the supply of professionals with green skills is imperative (Xu, 2015). The second factor is the demand for general talent with green skills (Tang, 2021). Compared with talent without green skills, those with green skills have a belief in green ideas, actively practice green behaviors, make an effort to master green knowledge and skills, and show higher levels of unconventional analytical skills, besides possessing higher levels of human capital and on-the-job training experience (Consoli et al., 2016b).

However, against the background of China's urgent demand for talent with green skills, talent with green skills cultivated by higher education is urgently needed by society at present.The concept of talent is also based on the specific cognition and standards required by the goals of talent cultivation in higher education, that is, what kind of qualities and abilities the students are expected to possess (Bagwasi, 2019). The main purpose of cultivating students' green skills is no longer to alleviate graduates' difficulty in finding employment but to fulfill the needs of society and equip students with the ideology of sustainable development. It is believed that in the composition of green skills, knowledge is the basis and values are the backbone, while ability and action are the manifestations (Beringer and Adomssent, 2008).

To achieve the goal of improving the green skills of university students, China's institutions of higher education offer various types of green skills courses and encourage students to participate in scientific research and social practices related to green topics. The ability to realize sustainable development goals depends on whether students possess green skills. As students' green skills are an integral part of realizing the sustainable development of green education, the development of skills in green education is an important opportunity for students to find a place in the professional service and labor market. (Aithal et al., 2016)

Although scholars have devoted great effort to cultivating students' green skills and helping them find a place in the professional service and labor market, most of the existing green skills scales are designed to measure the abilities of enterprise employees; thus, China still lacks a well-developed scale to measure the green skills of students. This is a gap in research, and in this study we propose to build a green skills scale for university students for this reason.

LITERATURE REVIEW

Research on the development of green skills

Steele (1980) pointed out that green competencies are the ability of people to interact with the immediate environment in a way that is constructive and reflective of immense enthusiasm. First, people must become aware of environmental problems and want to protect the environment; second, they must understand the basic concepts of environmental problems; finally, they must use relevant skills, such as reducing waste and emissions to protect the environment (Steele, 1980). According to Pedersen (1999), green skills include the following: first, the practical skills to protect the environment; second, the individuals' attitudes towards and cognition of environmental protection; third, the desire to increase their knowledge of environmental protection. As higher-order variables, green skills are composed of environmental perceptions, motivations, and attitudes (Corral-Verdugo, 2002; Heonget al., 2016).In the same way, Fraijo-Sing et al. (2010) explained that green skills consist of two key elements, environmental knowledge and skills.

Green skills include instincts and acquired skills. Instinctive green skills are a kind of intrinsic characteristic, while acquired green skills are composed of dimensions such as knowledge, skills, cognition, and behavior related to the environment (Subramanian et al., 2016). Professionals with green skills usually possess cognitive, technical, interpersonal, and introspective skills (Pavlova, 2018). Green skills are also professional skills, which are mainly reflected in the skills, knowledge, values, and attitudes that must be mastered to engage in "green jobs" or "green careers"(Liu, 2016). Although green skills have a significant bearing on green economies and industries (Cabral and Dhar, 2019), there has not been a consensus on what green skills are or their specific connotations, and the definitions are still unclear. Most people are only aware of general, technical, and employability-related skills but are still unfamiliar with the concept of green skills (Zolkifli et al., 2016). Green skills are regarded as sustainable skills that are related to the technical skills, knowledge, values, and attitudes needed for businesses, industries, and communities to develop and support sustainable social, economic, and environmental outcomes (Bremer and Heidegger, 2010; Governments, 2009). Based on existing research, the OECD proposed that green skills are the skills needed to adapt products, services, and processes to address climate change and the related environmental requirements and regulations, and they are needed in all sectors and at all levels of the workforce (OECD, 2014). The categories of green skills include the skills needed to support resource efficiency and low-carbon industries, improve climate adaptability, and protect and manage natural assets (Government, 2011; Sern et al., 2019).

Based on an extensive review of the literature, in this study, we argue that "green skills" refer to the sum of the knowledge, abilities, values, and attitudes needed to live in, develop, and support a society that reduces the impact of human activities on the environment. Taken together, green skills are mainly composed of the following dimensions: knowledge (cognitive dimension), techniques or ability (application dimension), and

attitudes/values (emotional dimension).

The above dimensions are what workers need to promote social, economic, and environmental sustainability. In the cognitive dimension, green awareness, which is usually displayed in the form of environmental protection knowledge, can be regarded as an element of green skills. From an application perspective, "greenskills" refer to the abilities in science, technology, engineering, and mathematics that are related to specific green careers, which include the ability to reduce energy consumption or greenhouse gases. In the emotional dimension, "greenskills" are the motivation of individuals to protect natural resources and the ability to learn green skills and grow (CEDEFOP, 2012; Diep and Hartmann, 2016). Therefore, in this study, green skills was divided into the following four dimensions.

Cognition of green knowledge

"Green knowledge" is defined as "general knowledge about the facts, concepts, and relationships regarding the natural environment and the entire ecosystem" (Fryxell and Lo, 2003). It involves knowledge related to environmental issues and produces solutions to environmental issues by forming green awareness and encouraging green behaviors (Kollmuss and Agyeman, 2002). Green knowledge is generally divided into objective and subjective green knowledge.

The former refers to practical green knowledge about environmental issues, while the latter refers to actions taken by individuals on environmental issues based on their knowledge (Pagiaslis and Krontalis, 2014). The value of green knowledge to employees lies in improving their ecological literacy, that is, their ability to recognize concepts and behaviors related to environmental protection and conservation (Laroche et al., 2001). Previous literature points out that for emerging and developed countries, objective and subjective green knowledge have a great impact on university students' environmental cognition (Vicente-Molina et al., 2013), and such environmental cognition is acquired by students through environmental education (Zsoka et al., 2013).

Scholars have studied the types of green awareness related to various environmental issues, such as cognition of air pollution (He and Liu, 2018), cognition ofthe carbon footprint of the process of consumption (Garcia et al., 2019), and cognition of energy consumption in the production process (Shrouf et al., 2017), as well as cognition of environmental risks and cost-effectiveness (Peng and Yang, 2016). Green awareness prompts employees to pay attention to the negative impacts of their personal actions on the environment and urges them to take action to alleviate these negative impacts (Gadenne et al., 2009). Green awareness is regarded as an important factor for organizations when implementing environmental management systems (Perron et al., 2006).

Green awareness is also a factor that drives the green purchasing intentions of consumers and affects their behavior and attitude toward green products (Goh et al., 2016). Sakr et al. (2010) pointed out that green awareness plays a key role in supporting the environmental management system of the construction industry and promoting the sustainable development of industry. In a study of Nicaragua's natural reserves, Somarriba-Chang and Gunnarsdotter (2012) found that green awareness facilitates local communities' participation in biodiversity conservation surrounding ecotourism attractions. Kirstges and Torsten (2002) pointed out that green awareness is a crucial factor in realizing the sustainable development of tourism and guiding tourists in becoming engaged in eco-tourism by displaying green behaviors.

Mastery of green skills

The International Labour Organization (ILO) further divided the skills related to the emerging green economy into general and special skills. Among them, "general skills" refer to the general skills required for all fields related to green jobs; "special skills" refer to the professional skills required for special fields, which can be further subdivided into having green knowledge, mastering green technology, understanding sustainable materials and their production and processing methods, and possessing the ability to produce green products and provide green services (Jeon et al., 2011). divided green skills into transitional vocational skills, general or core employability-related skills, professional or vocational skills, and broad vocational skills (Knibb and Paci, 2013). To explore the special or professional skills needed to build green skills, Sern et al. (2019) used the literature analysis method and obtained academic articles and technical reports related to green skills in various disciplines from databases, including Science Direct, Google Scholar, Research Gate, and Academia. From the existing literature, the study summarized 10 professional skills needed to build green skills. These skills include green design skills (Ragheb et al., 2016); leadership skills (Sern et al., 2019); management skills; urban planning skills; garden planning skills (Stevens et al., 2010); the skills for managing energy, finance, procurement, and waste; and communication skills (Sern et al., 2019).

The mastery of green skills facilitates the smooth construction of an environmental management system, including supporting sustainability education and improving environmentalprotection (Kanyimba et al., 2014). If employees can master green skills, it will have a significant positive impact on facilitating sustainable operations, improving financial performance, and protecting the environment (Wu et al., 2016), as these skills help employees analyze and sort out various

environmental problems and create reasonable solutions based on the green awareness that they have built (Karimzadegan and Meiboudia, 2012).

Application of green skills

The application of green skills is also known as eco-friendly, environmentally sustainable, and responsible environmental behavior (Wang and Yao-Fen, 2016). In organizational environments, the application of green skills is referred to as "green behaviors," which are defined as the direct or indirect behaviors participated in by employees that contribute to the development of environmental sustainability (Ones and Dilchert, 2012). Paço et al. (2019) described such behaviors as creating green products that are energy efficient, cause the least pollution, and are reusable and recyclable (Laurett et al., 2019). The definition of green behaviors has been extended to include the development of eco-friendly production and regular monitoring of environmental costs, which are conducive to environmental management systems and further improve the financial performance of enterprises (Cheng et al., 2019). Aprile and Fiorillo (2017) discussed the specific environment in which people display green behaviors. Such behaviors are induced because problems such as environmental pollution and resource depletion have threatened their lives and welfare (Aprile and Fiorillo, 2017).

Casalo and Escario (2018) discussed the heterogeneity of green attitudes and behaviors and argued that the stronger the green attitudes toward protecting the environment, the stronger the green behaviors displayed by individuals will be (Casalo and Escario, 2018). Green attitudes, values, and communication are prerequisites for green behaviors. An attitude is the favorable or unfavorable evaluation of a person of the discussed behavior or the degree of the evaluation.

In the context of environmental management, a green attitude is defined as an individual's cognitive assessment of environmental protection value (Lee, 2008). Ojo et al. (2019) explored the relationship between green attitudes and green behaviors and demonstrated that green attitudes are a key factor that prompts stakeholders to become engaged in environmental protection (Bergin-Seers and Mair, 2009). Therefore, it is necessary to cultivate organizations'and individuals' values and attitudes toward environmental sustainability and green development through environmental education to encourage pro-environmental behaviors among organizations and individuals (Major et al., 2017).

Green skills development

Green skills development includes the cultivation of problem-solving skills in everyday scenarios (life skills education) and sustainable consumption and lifestyle education, as well as the learning of innovation and entrepreneurship, while seeking to ensure that all workers contribute to environmental, economic, and social sustainability and take on appropriate roles at work and in the wider community (Tang, 2021). Such education efforts also seek to enhance organizational members'and individuals' adaptability and transitional skills to help them learn and apply new techniques in work and life as well as foster their entrepreneurial skills to help them seize opportunities for low-carbon technology development (Li, 2015). The results of practicing green human resource management show that developing employees' green skills is conducive to employees developing other dimensions of green skills (Barry and Gerhart, 2005), prompting them to improve their performance and achieve personal development (Rajiani, 2016). On the one hand, the upgrading of green skills prompts employees to exhibit altruistic behaviors, while, on the other hand, it promotes environmental sustainability in general by encouraging green behaviors among employees (Rajiani, 2016). Although green and sustainable development have increasingly become issues of concern in various countries and among major international organizations, judging from the relevant studies and the reality of some countries, there are still many obstacles barring the development of green skills.

The first is the contradictions between green development and short-term goals. The priorities of solving problems such as rising production costs, increasing competition, and falling profit margins are all higher than those of pursuing technological innovation, skills development, and sustainable practices. Second, green growth, jobs, and skills development are still relatively new concepts, and systematic and effective methods, policies, and paths to achieve green innovation have yet to be implemented(Zubir et al., 2021).

Third, the school system is sluggish in responding to the development of the green economy. Compared to non-green jobs, more formal education, work experience, and on-the-job training are needed to perform green jobs. To support the development of the economy and society, vocational education must respond quickly to industrial technology, and even adopt a forward-thinking approach in planning, to realize the effective development of green skills through teacher training, offering majors related to green techniques and providing integrated courses (Brandt et al., 2019).

Liu (2016) designed a green skills questionnaire based on interviews with experts, research on literature, and field surveys. The questionnaire adopts exploratory and confirmatory factor analysis. The green skills of personnel can be categorized into three dimensions and include six first-order factors covering management, technology, and operations, which include green marketing, self-learning, low-carbon loops, use of environmental protection equipment, use of energy-saving technology, and service

innovation, as well as 23 constituent elements, such as the service process for designing cleaner production methods. Liu's (2016) survey based on nine major disciplines of vocational education showed that the elements of green skills mainly include sustainable development ability, awareness of energy-saving and environmental protection, safety knowledge, and related operation habits. Green skills development is an effective way for vocational education to facilitate sustainable social development. From the perspectives of the economy, society, and environment, Chen and Li (2017) developed a scale for construction engineering technology, which informed the development results of green management, technology, and operation. It also facilitated the development plans of students from institutions of higher education that specialize in architecture by enabling the building teams of teachers who specialize in green issues andthe offering of green courses as well as enabling the implementation of the development results in teaching.

The green skills questionnaire survey by Lai et al. (2018) was based on responses by 332 lecturers from the engineering department of the Polytechnic Colleges of Malaysia. According to the opinions of the lecturers, the green skills knowledge that should be taught in green skills training courses should mainly include knowledge related to environmental pollution, environmental protection law, energy conservation, renewable energy, environmentally friendly design, solid waste management, water resource utilization, natural resource management, manufacturing processes, sustainable lifestyles, biodiversity, and ecosystems. With reference to the scale development technique proposed by Churchill (1979) and the improvement plan for scales proposed by Hinkin (1995), Cabral and Dhar (2019) developed a green skills scale. Based on the previous research's conclusions and results, the authors of the study proposed that green skills be composed of various elements including green knowledge, techniques, abilities, attitudes, behavior, and awareness (Cabral and Dhar, 2019). A comprehensive and systematic green skills scale was designed, which provides important theoretical references for subsequent research on green skills. There is a total of 40 items. To adequately integrate green skills into vocational education, as early as 2015, Landward Research Ltd and Aitchiso (2015) designed a green skills questionnaire. Landward Research Ltd and Aitchiso (2015) believed that green skills mainly include the understanding of green knowledge, possession of green skills, application of green skills, and professional growth. Based on the above research on green skills and the green skills that Chinese university students should possess, in this study, we summarize a set of elements that should be included in the green skills scale for university students, including cognition of green knowledge, mastery of green skills, application of green skills, and green skills development ability.

RESEARCH METHODS

Based on the literature review and with reference to previous scholars' research on green skills, for this study, a green skills scale and questions was designed. As shown in the appendix 1. To accurately reconstruct the scenarios faced by Chinese university students, the questions were assessed using a content validity test based on experts' opinions before the scale and questions were determined.The questionnaire and questions were also reviewed and scored by experts. The initially designed questionnaire was modified according to the comments of the experts to ensure that the questions in the questionnaire could be used to collect the required information effectively.

Expert assessment

Based on the literature review, in this study, green skills was divided into four categories: understanding of green knowledge, mastery of green skills, application of green skills, and green skills development. Experts were invited to evaluate the dimensions of the questionnaire in this study to explore whether the questionnaire was comprehensive and reasonable for the measurement of green skills. Copies of the expert assessment questionnaire were distributed to five experts. If a question was assessed as appropriate, it would be retained. If a question was assessed as requiring amendment, it would be revised according to the experts' opinions.If one of the experts recommended itbe changed, the question would be revised. If one of the experts regarded a question asinappropriate, it would be deleted.

After the assessment and review by experts, the green skills scale for university students was adjusted and revised based on their opinions. In the final version, the dimensions of the green skills scale for university students include understanding of green knowledge, mastery of green skills, application of green skills, and green skills development. The questions on the dimension of understanding of green knowledge were designed with reference to Fryxell and Lo (2003), Kollmuss and Agyeman (2002), Pagiaslis and Krontalis (2014), Vicente-Molina et al. (2013), and Zsoka et al. (2013). The questions on the dimension of mastery of green skills were designed with reference to Knibb and Paci (2013), Kanyimba et al.(2014), Wu et al.(2016), and Karimzadegan and Meiboudia (2012). The questions on the dimension of application of green skills were designed with reference to Wang and Yao-Fen (2016), Ones and Dilchert(2012), Bergin-Seers and Mair (2009), and Major et al. (2017). The questions of the dimension of green skills development were designed with reference to Tang (2021), Barry and Gerhart (2005), Rajiani(2016), and Brandt et al. (2019). There are four questions on understanding of green knowledge, four on mastery of green skills, four on application of green skills, and four on green skills development, for a total of 16 questions.

Research objects and sampling method

The United Nations Principles for Responsible Management Education (PRME) were formally established in 2007 at the Geneva Global Compact Leaders Summit. As of May 2022, including Tsinghua University School of Economics and Management, a total of 29 institutions in China (including Hong Kong and Macao) hadjoined the organization (PRME, 2022). Therefore, undergraduate students from four Chinese institutions of higher education that had joined the PREM organization were selected to be included in the sample.

In the pre-test, the selected participants to be included in the sample included students from four Chinese institutions of higher

Table 1. Fit index of the model.

Parameter	Standard of excellence	Value of the model	Quality of the parameter	Up to standard or not
CMIN		103.936		
CMIN/DF	3.	1.061	Excellence	Yes
GFI	>0.9	0.986	Excellence	Yes
AGFI	>0.9	0.980	Excellence	Yes
NFI	>0.9	0.985	Excellence	Yes
IFI	>0.9	0.999	Excellence	Yes
TLI	>0.9	0.999	Excellence	Yes
CFI	>0.9	0.999	Excellence	Yes
RMSEA	<0.05	0.023	Excellence	Yes

Source: Author

education. Two hundred and fifty-eight copies of the questionnaire were distributed to them, from which 200 valid questionnaires were recovered, with an effective rate of recovery of 77.5%. Reliability and exploratory factor analysis were performed. As for the factor analysis, the factor loading ratios of all the items were greater than 0.7, indicating good validity. For reliability, the Cronbach's alpha values of the four dimensions were all greater than 0.7 (Nunnally, 1978), indicating good reliability.

RESULTS

Undergraduate students from four Chinese institutions of higher education that had joined the PREM organization were selected to be included in the sample. Two hundred and forty students from each of the institutions were selected to be included in the sample, and a total of 960 copies of the questionnaire were distributed. Finally, 900 valid questionnaires were recovered. In the collected sample for the green skills scale, the ratio of male to female students was 435:465. The students were under the age of 18 (18%), 18 to 20 years old (39.3%), 21 to 23 years old (15.2%), 24 to 26 years old (16.1%), and over 26 years old (11.3%). The collected information underwent reliability, validity, and confirmatory factor analysis in statistical software.

Reliability analysis

There were four variables in the green education section of the questionnaire in this research. Using the above mentioned methods, the sample collected during the pre-experiment underwent internal consistency and reverse internal consistency analysis. The results show that the reliability of each variable did not increase significantly after deleting a question. In addition, the reliability of this study was 0.845, and the reliabilities of dimensions were between 0.813 and 0.880, indicating that the scale and dimensions of the study had high reliability, good stability, and good consistency.

Confirmatory factor analysis

Confirmatory factor analysis is a type of factor analysis. Different from exploratory factor analysis, confirmatory factor analysis is used to verify the reliability of the existing results of theoretical analysis (Lin et al., 2003). Confirmatory factor analysis is composed of three aspects, construct validity, combined reliability, and convergent validity, as well as discriminant validity. In this section, AMOS will first be used to analyze the construct validity of the model. The fit index includes GFI=0.986, AGFI=0.980, RMSEA=0.023, CFI=0.999, and the results are shown in Table 1. Figure 1 shows the Confirmatory factor analysis of green skills.

It can be seen from Table 1 that all parameters of the model reached a reasonable standard, indicating that the model's fitness met the standard and was acceptable.

Then, an estimation test was performed on the path coefficients, that is, we sought to judge in advance whether the regression coefficients were equal to 0. The criterion was whether the result was significant. If it was significant ($p<0.05$), it indicated that the regression coefficient was not equal to 0. The results are shown in Table 2. It can be seen from Table 2 that all the variables reached the significance standard of 0.001, indicating that the coefficients were significantly different from 0.

Third, the convergent validity analysis was conducted, and the results are shown in Table 3. It can be seen from Table 3 that the factor loadings of the variables lie between 0.692 and 0.985; the convergent validities lie between 0.813 and 0.883; and the average variance extracted values lie between 0.522 and 0.658. The results indicate that all the parameters meet the parameter standards of the structural model and that the convergent validity of the model is ideal. Lastly, the average of variance extracted recommended by Fornell was adopted to perform a test, that is, the discriminant validity analysis was conducted. The assessment standard is that if the mean variance of the variables exceeds 0.5, the convergent validity passes the test and
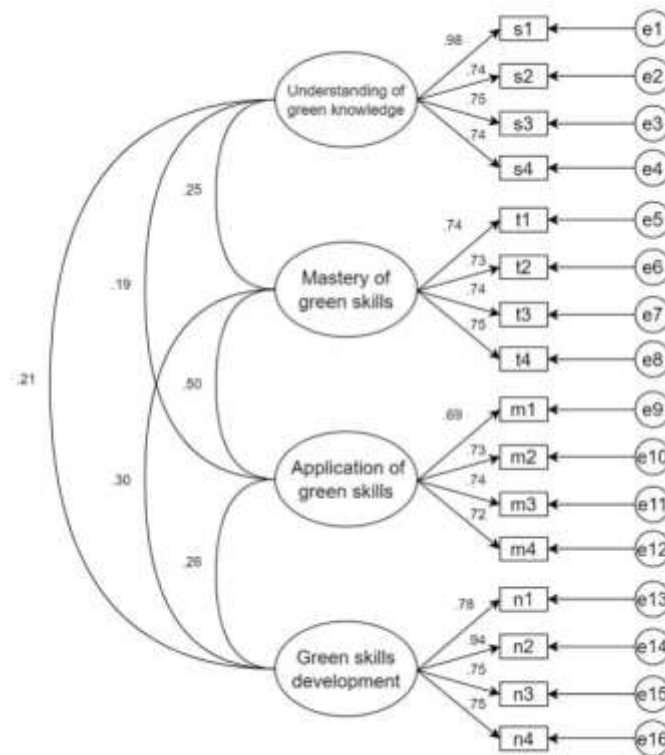
Figure 1. Confirmatory factor analysis of green skills
Source: Author

Table 2. Path coefficients of green skills.

Path			Estimate	S.E.	C.R.	p
s1	<---	Understanding of knowledge	1			
s2	<---	Understanding of knowledge	0.721	0.025	29	0.000
s3	<---	Understanding of knowledge	0.723	0.024	29.725	0.000
s4	<---	Understanding of knowledge	0.706	0.025	28.583	0.000
t1	<---	Mastery of skills	1			
t2	<---	Mastery of skills	1.003	0.051	19.548	0.000
t3	<---	Mastery of skills	0.984	0.049	19.898	0.000
t4	<---	Mastery of skills	1.001	0.051	19.58	0.000
m1	<---	Application of skills	1			
m2	<---	Application of skills	1.081	0.059	18.25	0.000
m3	<---	Application of skills	1.116	0.06	18.458	0.000
m4	<---	Application of skills	1.055	0.059	17.989	0.000
n1	<---	Skills development	1			
n2	<---	Skills development	1.217	0.041	29.444	0.000
n3	<---	Skills development	0.973	0.041	23.9	0.000
n4	<---	Skills development	0.96	0.04	23.796	0.000

Source: Author

if the square root of the AVE of any variable is larger than the Pearson correlation coefficient between it and other variables, the discriminant validity passes the test. The test results are shown in Table 4, and it can be seen from Table 4 that the correlation coefficients between the four variables, understanding of knowledge, mastery of skills,

Table 3. Factor loadings.

			Estimate	CR	AVE
s1	<---	Understanding of knowledge	0.985		
s2	<---	Understanding of knowledge	0.743	0.883	0.658
s3	<---	Understanding of knowledge	0.754		
s4	<---	Understanding of knowledge	0.737		
t1	<---	Mastery of skills	0.742		
t2	<---	Mastery of skills	0.726	0.824	0.539
t3	<---	Mastery of skills	0.741		
t4	<---	Mastery of skills	0.727		
m1	<---	Application of skills	0.692		
m2	<---	Application of skills	0.733	0.813	0.522
m3	<---	Application of skills	0.745		
m4	<---	Application of skills	0.718		
n1	<---	Skills development	0.778		
n2	<---	Skills development	0.938	0.882	0.654
n3	<---	Skills development	0.754		
n4	<---	Skills development	0.751		

Source: Author

Table 4. Discriminant validity.

	Understanding of knowledge	Mastery of skills	Application of skills	Skills development
Understanding of knowledge	0.811			
Mastery of skills	0.248***	0.734		
Application of skills	0.185***	0.497***	0.722	
Skills development	0.212**	0.300*	0.256*	0.809

*p<0.05, **p<0.01, ***p<0.001; the bold font indicates the root-mean-square values of the AVE of the variables.
Source: Author

application of skills, and skills development, lie between 0.185 and 0.497.The root-mean-square values of the AVE of the corresponding coefficients are all larger than the correlation coefficients of the corresponding row and column variables, demonstrating good discriminant validity.

DISCUSSION

Few studies have examined green skills in China, and quantitative research on the green skills of university students is particularly lacking. To assess the green skills of university students and conduct relevant quantitative research, the present study built upon the green skills evaluation indexes developed by Landward Research Ltd. and Aitchiso (2015), summarized green skills-related

literature to develop a preliminary green skills scale, and conducted expert evaluation and pre-testing to formulate a formal green skills scale. The scale consists of four categories: understanding of green knowledge, mastery of green skills, application of green skills, and green skills development. Understanding of green knowledge is defined as the ability to gain general knowledge about facts, concepts, and relationships about the natural environment and the ecosystem as a whole and to produce green behaviors and problemsolutions (Fryxell and Lo, 2003; Kollmuss and Agyeman, 2002), and comprises four items. Mastery of green skills refers to the possession of specific skills related to emerging green technologies, namely specialized skills required in specific areas (Jeon et al., 2011) or generic skills such as those related to environmental protection and sustainability (Knibb and Paci, 2013) and contains four

items.

Application of green skills refers to eco-friendly, environmentally sustainable, and responsible environmental behaviors (Wang and Yao-Fen, 2016) that are often called green behaviors in organizational settings (Ones and Dilchert, 2012) and comprises four items. Green skills development is the development of problem-solving skills, sustainable consumption and lifestyle education, and innovation and entrepreneurship learning in everyday situations (life skills education) and includes fouritems. These four green skills categories and items are used to measure the green skills of Chinese university students.

Conclusion

According to the research statistics, the model's parameters in construct validity, combined reliability, and convergent validity, as well as discriminant validity, all meet reasonable standards, indicating that the model is acceptable. The construction of the green skills questionnaire for university students also verifies that the green skills of university students are composed of four dimensions, namely cognition of green knowledge, mastery of green skills, application of green skills, and green skills development, with a total of 16 questions. Against the background of China's urgent demand for talent with green skills, talent with green skills cultivated by higher education is urgently needed by society. China's higher education has highlighted the key points forfostering the green skills of university students. When educational institutions offer courses to cultivate talent with green skills, they should start from the cognition of green knowledge so that students can gain in-depth knowledge and understanding of green skills.More practical courses should also be added to strengthen students' mastery of green skills and their application. Only then can Chinese university students make better use of green skills and become the talent with green skills that is urgently needed by society. Based on the above research, this study also provides guidelines for scholars to study the green skills of Chinese university students.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

Aithal PS, Rao P (2016). Green Education Concepts & Strategies in Higher Education Model. International Journal of Scientific Research and Modern Education 1(1):793-802.

Aprile MC, Fiorillo D (2017). Water conservation behavior and environmental concerns: Evidence from a representative sample of Italian individuals. Journal of Cleaner Production 159:119-129.

Bagwasi MM (2019). The major educational policies, models and ideas that have influenced Botswana's education system. Policy Futures in Education 17(3):370-382.

Bergin-Seers S, Mair J (2009). Emerging green tourists in Australia: Their behaviours and attitudes. Tourism and Hospitality Research 9(2):109-119.

Beringer A, Adomssent M (2008). Sustainable university research and development: Inspecting sustainability in higher education research. Environmental Education Research 14(6):607-623.

Brandt JO, Bürgener L, BarthM, Redman A (2019). Becoming a competent teacher in education for sustainable development: Learning outcomes and processes in teacher education. International Journal of Sustainability in Higher Education 20(4):630-653.

Bremer R, Heidegger G (2010). Skills for green jobs: European synthesis report. Office for Official Publications of the European Communities. European Centre for the Development of Vocational Training.https://op.europa.eu/en/publication-detail/-/publication/6b5a1d04-1db7-4ee3-95b6-dc3d798fd2b7

Cabral C, Dhar RL (2019). Green competencies: Construct development and measurement validation. Journal of Cleaner Production 235:887-900.

Casalo LV, Escario JJ (2018). Heterogeneity in the association between environmental attitudes and pro-environmental behavior: A multilevel regression approach. Journal of Cleaner Production 175:155-163.

CEDEFOP (2012). Green skills and environmental awareness in vocational education and training. European Centre for the Development of Vocational Training (CEDEFOP), Europe. https://www.cedefop.europa.eu/en/publications/5524

Chen HX, Liu K (2017). Development and implementation of green skills for construction engineering technology majors in higher vocational colleges. Industrial Technology and Vocational Education15(2):61-63.

Cheng H, Hu X, Zhou R (2019). How firms select environmental behaviours in China: The framework of environmental motivations and performance. Journal of Cleaner Production 28:132-141.

Churchill GA (1979) A paraduigm for developing better measures of marketing constructs. Journal of Marketing Research 16(2):6473

Consoli D, MarinG, Marzucchi A, Vona F (2016). Do green jobs differ from non-green jobs in terms of skills and human capital. Research Policy 45(5):1046-1060.

Corral-Verdugo V (2002). A Structural Model of Proenvironmental Competency.Environment and Behavior 34(4):531-549.

Diep PC, Hartmann M (2016). Green Skills in Vocational Teacher Education–a model of pedagogical competence for a world of sustainable development. TVET@ Asia 6:1-19.

Fraijo-Sing B, Corral-Verdugo V, Tapia-Fonllem C, González-Lomelí D (2010). Promoting pro-environmental competency. Psychological Approaches to Sustainability8(3):225-246.

Fryxell GE, Lo CW (2003).The influence of environmental knowledge and values on managerial behaviours on behalf of the environment: An empirical examination of managers in China. Journal of Business Ethics 46(1):45-69

Garcia S, Cordeiro A, de Alencar Nääs I, Neto PLDOC (2019).The sustainability awareness of Brazilian consumers of cotton clothing. Journal of Cleaner Production 215:1490-1502.

Gadenne DL, Kennedy J, McKeiver C (2009). An empirical study of environmental awareness and practices in SMEs. Journal of Business Ethics 84(1):45-63.

Goh SK, BalajiMS (2016). Linking green skepticism to green purchase behavior. Journal of Cleaner Production 131:629-638.

Governments C (2009).Green skills agreement: An agreement between the Australian Government and the state and territory governments. Council of Australian Governments. http://hdl.voced.edu.au/10707/66884.

He X, Liu Y (2018).The public environmental awareness and the air pollution effect in Chinese stock market. Journal of Cleaner Production 185(1):446-454.

Jeon S, Strietska-Ilina O, Hofmann C, Haro MD (2011). Skills for green jobs: A global view. International Labour. https://www.eldis.org/document/A60376

Kanyimba AT, RichterBW, Raath SP (2014).The effectiveness of an environmental management system in selected South African primary schools. Journal of Cleaner Production 66(1):479-488.

Karimzadegan H, Meiboudia H (2012). Exploration of environmental literacy in science education curriculum in primary schools in Iran. Procedia - Social and Behavioral Sciences 46(1):404-409.

Kirstges, Torsten (2002). Basic questions of 'sustainable tourism': Does ecological and socially acceptable tourism have a chance? Current Issues in Tourism 5(3-4):173-192.

Knibb H, Paci C (2013). The Greening of Canada's College Curriculum. A Pan-Canadian Survey.TVET Asia.http://tvet-online.asia/wp-content/uploads/2020/03/knibb_paci_tvet6.pdf

Kollmuss A, Agyeman J (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? Environmental Education Research 8(3):239-260.

Landward Research Ltd, Aitchison K (2015). Adapting green skills to vocational education and training: Questionnaire report.. Future Business Journal 3(1):5-18.

Laroche M, Bergeron J, Barbaro-Forleo G (2001). Targeting consumers who are willing to pay more for environmentally friendly products. Journal of Consumer Marketing18(6):502-520.

Laurett R, Paço A, Mainardes EW (2019). Sustainable consumer lifestyles/sustainable consumption. Responsible Consumption and Production 5(7):56-64.

Lee K (2008). Opportunities for green marketing: Young consumers. Marketing Intelligence and Planning 26(6-7):573-586.

Li YY(2015). Green skills development: Background, connotation and strategies. Career Technical Education 36(15):11-17.

Lin CD, YangZL, HuangXT (2003). Dictionary of Psychology.Shanghai Education Press. 10.16719/j.cnki.1671-6981.2004.05.033.

Liu YF (2016). Status quo, problems and suggestions of green skills development in vocational education-A survey report from 9 major categories of vocational education. Vocational and Technical Education in China 26(30):24-28.

Major L, Namestovski Ž, Horák R, Bagány Á, Krekić VP (2017).Teach it to sustain it! Environmental attitudes of Hungarian teacher training students in Serbia. Journal of Cleaner Production 154:255-268.

Nunnally JC (1967). Psychometric theory.2d Ed. McGraw-Hill.

Ojo AO, Raman M, Downe AG (2019). Toward green computing practices: A Malaysian study of green belief and attitude among Information Technology professionals. Journal of Cleaner Production 224(1):246-255.

Ones DS, Dilchert S (2012). Managing human resources for environmental sustainability. Managing Human Resources for Environmental Sustainability 12:1416.

Pagiaslis A, Krontalis AK (2014). Green consumption behavior antecedents: Environmental concern, knowledge, and beliefs. Psychology and Marketing 31(5):335-348.

Pavlova M (2018). Fostering inclusive, sustainable economic growth and "green" skills development in learning cities through partnerships. International Review of Education64(3):339-354.

Peng X, Yang L (2016). Behind eco-innovation: Managerial environmental awareness and external resource acquisition. Journal of Cleaner Production139:347-360.

Pedersen DM (1999). Dimension of environmental competence. Journal of Environment Psychology 19(3):303-308.

Perron GM, Côté RP, Duffy JF (2006). Improving environmental awareness training in business. Journal of Cleaner Production 14(6):551-562.

Rajiani I (2016). Ability, motivation and opportunity as determinants of green human resources management innovation. Research Journal of Business Management 10(1):51-57.

Ragheb A, El-Shimy H, Ragheb G (2016). Green architecture: A concept of sustainability. Procedia - Social and Behavioral Sciences 216:778-787.

Sakr DA, Sherif A, El-Haggar SM (2010). Environmental management systems' awareness: An investigation of top 50 contractors in Egypt. Journal of Cleaner Production 18(3):210-218.

Sern LC, Adamu HM, Salleh KM (2019). Development of competency framework for Nigerian TVET teachers in tertiary TVET institutions.Journal of Technical Education and Training 11(1):11-18.

Steele F (1980). Defining and developing environmental competence. Advances in Experimental Social Processes 2(1):225-244.

Shrouf F, Gong B, Ordieres-Meré J (2017). Multi-level awareness of energy used in production processes. Journal of Cleaner Production 142:2570-2585.

Somarriba-Chang MDLA, Gunnarsdotter Y (2012). Local community participation in ecotourism and conservation issues in two nature reserves in Nicaragua. Journal of Sustainable Tourism 20(8):1025-1043.

Subramanian N, Abdulrahman MD, Wu L, Nath P (2016). Green competence framework: Evidence from China. The International Journal of Human Resource Management 27(2):151-172.

Stevens J, Plowright P, Adhya A (2010). Defining sustainable urbanism: Towards a responsive urban design. Technology & Sustainability in the Built Environment.https://cap.ksu.edu.sa/sites/cap.ksu.edu.sa/files/attach/tsbe_1_e_02.pdf

Tang LW (2021). Green skills development and China's path selection from an international perspective. China Vocational and Technical Education 26(9):12-19.

Vicente-Molina MA, Fernández-Sáinz A, Izagirre-Olaizola J (2013). Environmental knowledge and other variables affecting pro-environmental behaviour: Comparison of university students from emerging and advanced countries. Journal of Cleaner Production 61(15):130-138.

Wang, Yao-Fen (2016). Modeling predictors of restaurant employees' green behavior: Comparison of six attitude-behavior models. International Journal of Hospitality Management 58:66-81.

Wang M, Zhao X, Gong Q, Ji Z (2019). Measurement of regional green economy sustainable development ability based on entropy weight-topsis-coupling coordination degree-A Case Study in Shandong Province, China. Sustainability 11(1):145-162.

Wu MH, Thongma W, Leelapattana W, Huang ML (2016). Impact of hotel employee's green awareness, knowledge, and skill on hotel's overall performance. Advances in Hospitality and Leisure 5(1):65-81.

Xu GM (2015). Teaching reform of civil engineering major in higher vocational colleges based on BIM. Higher Vocational Research of Changzhou Engineering Vocational and Technical College 2:14-17.

Zolkifli MA, Kamin Y, Latib A, Buntat Y, Awang Z (2016).Generic green skills:Industry and perspectives.Technical education and vocational training.http://tvet-online.asia/wp-content/uploads/2020/03/zolkifli_etal_tvet6. Pdf

Zsóka Á, Szerényi ZM, Széchy A, Kocsis T (2013). Greening due to environmental education? Environmental knowledge, attitudes, consumer behavior and everyday pro-environmental activities of Hungarian high school and university students. Journal of Cleaner Production 48(7):126-138.

Zubir MZM, Lai CS, Zaime AF, Lee MF, Ibrahim B, Ismail A (2021). Dimension of green skills: Perspectives from the industry experts. Journal of Technical Education and Training 13(1):159-166.

Appendix 1. Green skills questionnaire for University students.

Dimension	Question for measurement	Options
Understanding of green knowledge	1 I understand what environmental protection is.	1 2 3 4 5
	2 I possess professional knowledge of topics such as energy, waste, resource efficiency, and sustainable development.	1 2 3 4 5
	3 I possess knowledge of topics such as energy conservation and ecosystem protection.	1 2 3 4 5
	4 I possess knowledge of environmental management responsibility.	1 2 3 4 5
Mastery of green skills	1 I possess knowledge of environmental protection skills.	1 2 3 4 5
	2 I possess management or work skills related to energy, waste, resource efficiency, and sustainable development.	1 2 3 4 5
	3 I possess skills related to energy conservation and ecosystem protection.	1 2 3 4 5
	4 I possess skills related to environmental management responsibility.	1 2 3 4 5
Application of green skills	1 I can use environmental skills effectively in my studies and life.	1 2 3 4 5
	2 I can apply the knowledge and skills related to energy, waste, resource efficiency, and sustainable development in management or at work.	1 2 3 4 5
	3 I can apply the skills related to energy conservation and ecosystem protection in my studies and life.	1 2 3 4 5
	4 I can apply the skills related to environmental management responsibility in my studies and life.	1 2 3 4 5
Green skills development	1 My professional knowledge continues to improve.	1 2 3 4 5
	2 My professional skills continue to improve.	1 2 3 4 5
	3 The resources of the school are effectively helping me grow professionally.	1 2 3 4 5
	4 The diverse and sufficient platforms, as well as the opportunities provided by the school, are sharpening my ability in professional practices.	1 2 3 4 5

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Review on the effect of online education on job motivation

Ramazan Eğriboyun*, Meral Asilhan, Bekir Cerit, Yasin Temiz, Canan Hancıoğlu Ünal and Emek Ekim Ekici

Ministry of National Education, Turkey.

The aim of this study is to compile the literature in the context of business motivation of the online education process, the importance of which is once again understood in educational sciences during the pandemic process. When literature is looked at, it is clearly seen that the importance and effectiveness of distance education has increased with the pandemic. As a result, the quality and quantity of distance education has been questioned before, it is seen that distance education is considered as an opportunity with the pandemic.

Key words: Distance education, business motivation, pandemic.

INTRODUCTION

Job motivation

While motivation is defined as an internal force that initiates an individual's actions and behaviors, work motivation plays a similar role for work-life situation and quality. In addition, work motivation can be counted among the generally accepted standards for business and life. Motivation researchers have discussed work motivation in many studies as well as motivation theories (Rainey, 2000). There is still a need to learn more about this in terms of employee motivation to work.

On the other hand, work motivation is a very important issue for the development, improvement of education and training. Literature on motivations to work are (a)motives, motivations for equipment (content); (b) positive attributes, job role and broader environment (context); (c)

selective and effort (process) related mechanisms and priorities. From a broader perspective, many determining factors play roles in this process, including the larger aspects, processes, and work environment, apparently as it relates to motivation (Kanfer et al., 2017).

Another study discusses the July 2004 "Academy of Management Review" Special Topic Forum on the Future of Job Motivation Theory. The researcher thinks that while the forum opens up new research guidelines to help understand what motivates employees to work, it says little about why employees should be motivated to work. There is a direct link between early developments in motivation theory and the history of philosophical and psychological ethics. It is stated that motivational efforts can exert control over individual moral autonomy. Making the connection between meaningful work and work

motivation theory will encourage further research and exploration for so-called meaningful work. The researcher draws attention to the connection between employee motivation and productivity in individual and group performance (Michaelson, 2005).

Major motivational theories, on the other hand, are classified as those that deal with either external causes or internal processes. The later helps explain motivation, while the first identifies levels for improving employee motivation and performance. Seven key strategies for improving work motivation are distilled from extrinsic theories. Explanatory programs for the implementation of these strategies, programs aimed to create organizations where employees are both better satisfied and more productive have been defined. Suggestions are made to improve the science and technology of work motivation (Katzell and Thompson, 1990).

Distance education and online education

With distance education, there has been a rapid change in education systems in the world. There has been a compulsory transition from face-to-face education to online education. With this transition, virtual classrooms have emerged in homes. While there are online courses in virtual classroom environments, virtual classroom management is of great importance in terms of effective learning and teaching. When we look at the history of distance education, it was also known as the letter teaching method in the early days. It is a teaching method based on the educational relationship between the teacher and the student. Lessons, assignments and exams are sent by mail at regular intervals (Geray, 1978). The convergence of information technology and enabling technologies has had a serious impact on the lifestyle of every individual and has become more dependent on this emerging technology. Using portable devices such as iPods, laptops, tablets and smartphones with a wireless network strengthens mobility and mobile learning, thus allowing the process of teaching and learning beyond the traditional classroom. For example, in one study, although technology was used for e-learning in the early stages of information technology, later internet courses were opened instead of class rooms. Communication with another group was limited to email only. This e-learning period was limited to special places (eg classroom) and users were asked for their opinions on the learning process and information distribution, and a positive activity was observed in the results (Hasan and Singhal, 2020).

Adult education provided by universities using online education methods is undoubtedly inseparable from traditional universities with higher dropout rates. Dropping out of school at a distance learning university is due to professional, academic, health, family and personal reasons. Limiting drop-out is very important, and therefore the ability to predict student dropouts can be very useful. A study attempting to determine the most appropriate comprehensive learning algorithm for students' drop-out predictions using the most informative features investigated the reasons for drop-out to determine on a large scale if students were affected by the distance education they received over time and to detect these changes. The data used was provided by the Greek Open University Student Registry and additional data were collected through an interview-based questionnaire. The most informative features were found to be student gender, attendance at the first face-to-face meeting, and grades for the first two written assignments. Based on these features, a web-based application that can automatically recognize students who are likely to drop out has been created and developed to help teachers identify students at risk even at the beginning of the academic year (Pierrakeas et al., 2020).

Distance Learning is the education where teachers and learners are not physically in the same environment and communication is provided over the internet network. In distance education, education can take place synchronously or asynchronously. It offers educational opportunities to large audiences. In this respect, it provides economy. Open and distance learning is to provide marginalized students with equal opportunity to learn and understand learning materials across borders. Playing an important role in its promotion, technology provides teachers and students with greater flexibility because it often works beyond time and distance. The advanced nature of technology makes the educational process more useful and also provides teachers with innovative technology-based applications and tools to enhance students' knowledge to promote open and distance learning. An important aspect of the adoption and use of technology in education is that it is based on open and distance education (Sezgin, 2021; İşman, 2008).

Technological innovative methods directly change student and teacher interaction. The unlimited use of technology in learning provides students with the condition and opportunity to communicate with their teachers anytime and anywhere to solve educational problems. For this reason, while emphasizing some other important aspects of technology to encourage unlimited learning in addition to distance education, studies investigating the adoption, use and impact of technology in open and distance education continue today (Ali and Alam, 2020). However, in the studies on service quality or customer satisfaction in the context of open and distance education in Malaysia, there are findings that the technological problems experienced or that may be experienced during education directly affect the quality of education (Amin and Piaralal, 2020). Independent study habits may not be beneficial for underdeveloped individuals. Feedback and corrections regarding learning difficulties and learning deficiencies may not be made at

the same time as the problems experienced.

Virtual classrooms and education

In the virtual classroom environment, the teacher can present the lesson live, share the course materials and visuals on the screen, the students can communicate with each other and with their teachers in the correspondence area, and the students can watch the lesson later on video. . microphone and camera audio and video. For this reason, e-learning can be much more effective than other one-way, passive learning methods (Kavrakoğlu, 2002). Teaching in the virtual classroom environment provides great convenience for teachers and students. The most important advantage of virtual classrooms over real classrooms is that they offer the opportunity to be involved in the learning environment from all over the world (Ebbers et al., 2003).

Virtual classroom environments have advantages and disadvantages. It is possible to encounter problems arising from infrastructure deficiencies such as slow internet, constant internet interruptions, camera, microphone and computer hardware in virtual classroom environments. McBrien et al. (2009) stated that there are technical problems regarding the use of technology in virtual classrooms; however, they state that the problems in the course follow-up can be solved by solving them in a short time. In a traditional classroom setting, shy students cannot express their thoughts openly. One of the biggest advantages of the virtual classroom environment is that students in this structure can express their thoughts comfortably and actively participate in the lesson through correspondence or microphone. Virtual classrooms, which are an interactive environment, are environments where the student is active in the lesson, in a teacher-student cooperative structure, where content-student interaction can be provided at a high rate according to needs, and which supports student participation in the lesson. Virtual classrooms, which offer an interactive educational environment, contribute 50% to success (Çakırer, 2002).

Studies on virtual classroom environment in the literature have generally focused on students' success and motivation. Atici (2004) aimed to determine the effect of virtual learning environments based on social knowledge building on student achievement and attitudes. It has been concluded that the virtual learning environment developed within the scope of this research has a facilitating effect on learning and increases teacher-student communication in the virtual classroom environment. Özmen (2012) aimed to determine the effect of social network supported distance education applications on student achievement and student views. In the research, there were groups participating in social distance education applications, participating in social network supported distance education applications and participating in face-to-face environment. It has been concluded that social network-supported distance education applications are more effective in gaining behaviors at cognitive domain knowledge level, but behaviors at cognitive domain understanding level do not differ between groups. In the qualitative dimension of the study, it was concluded that the students generally expressed positive opinions about social networks and distance education.In the research conducted by Yılmaz (2015), it was aimed at determing the effect of virtual classrooms on student achievement and the opinions of students about virtual classrooms. As a result of the research, it was concluded that virtual classroom environments can be used by students.it positively affect student success, create a flexible environment for students with the recording feature in virtual classrooms, and students can learn at their own pace. In this study, students were positively affected by the virtual classroom environment. Since it is possible to show different 3D materials and environments in live classrooms, it is stated that two-way interaction is provided.

In addition to studies examining academic achievement, there are also studies with different variables. Bolliger et al. (2010) investigated the effect of digital media tools (sound, video, picture, etc.) on student motivation in an online environment. As a result of the research, it was seen realized that digital media tools motivates students towards the lesson.

Significant differences were identified in terms of different demographic characteristics such as class, gender, and previous experience. Li (2012) investigated the relationship between students' undesirable behaviors in virtual classrooms, teacher techniques, and various in-class communication processes and outcomes. As a result of the research, it was stated that different demographic characteristics such as age, number, registration status and previous learning status differ in students' perceptions of online media use, and teacher techniques also affect learning.

As regards undesirable behaviors of the students it was concluded that the methods used by the teachers contributed to the learning of the students.

These rapid developments in technology and the emergence of different educational demands have increased the use of virtual classrooms. The deficiencies and inadequacies in the face-to-face education system have paved the way for alternative distance education and courses to be taught in the virtual classroom environment. Educational institutions all over the world and in our country has started to use distance education, and it has become widespread especially in universities. Later, it became widespread in other education levels due to distance education conditions.With this change, it is stated that the adaptation of institutions aiming to adapt to the needs of the age is realized with e-learning, which is rapidly adopted (Duran et al., 2006). Although virtual classroom environments have an important place in the

field of distance education in terms of their features and benefits in education, it is seen that the researches on this subject are not sufficient. It is important for the development of new research and applications that it contributes to the determination of the positive, negative and deficient aspects of the courses taught in the virtual classroom with the distance education system. In this direction, the aim of the research is to reveal the opinions of administrators, teachers and parents about the distance education process in secondary school, and thus to contribute to the development process of the distance education system by identifying the deficiencies and to make determinations.

DİSCUSSİON

While the quality and quantity of distance education was questioned before, distance education was re-evaluated as trying to bring the necessary qualifications to individuals by taking advantage of the opportunities offered by the rapidly developing information and communication technologies has triggered the development of different learning-teaching environments. In addition to these developing technologies, changes in the living conditions and habits of individuals necessitated new searches in the field of education. This situation also affects the motivation of the employees. At this point, it is a modern education approach that offers equal educational opportunities to everyone, provides education everywhere, at all ages, aims to meet the educational needs of individuals and society, and supports individual learning by using technology in education (Kaya, 2002).

With online education, the necessity of this situation has been understood once again. In order to respond to the changing educational needs of the digitalized world, various authorities see distance education, which is a form of education independent of time and space, as a solution to the understanding of contemporary education (Özen and Karaman, 2001). Distance education, which aims to meet the learning needs of disadvantaged groups, to educate a large number of learners economically and to meet the workforce needs in a short time, has become an effective high-level learning environment with individual and social learning activities.

Online education is an education and training system in which information is presented to individuals far from each other, time and space flexibility is provided, communication and interaction is ensured with technological tools and applications. It is a form of education in which the learner interacts with the environment, applications and materials offered by information, communication and instructional technologies, teaching staff, content, other learners and environments regardless of time and place. These sub-components are clearly different from the learning,

teaching and communication methods of traditional education components. While learners in distance education have a role responsible for their own learning processes and the management of learning processes, educators have the role of directing, planning and implementing teaching. The communication method, on the other hand, provides various media support, dialogue and interaction that play a role in closing the physical gap between the instructor and the learners (Anderson and Garrison, 1998; Moore, 1989). When distance education is examined in terms of the effectiveness of the learning-teaching process, it is seen that this process is generally based on interaction and interaction is discussed from different contexts (Anderson and Garrison, 1998). The more interactive the offered distance education components are with each other, the higher the success, motivation, persistence and positive attitudes of the learners in the learning process. Likewise, thanks to the interactions established, the instructors can follow the development of the learners in the learning environments, give feedback and evaluate the appropriateness of the teaching strategies presented.

According to the literature, the effective and efficient execution of online courses depends on the technical knowledge of the instructor and having a student-centered, reflective and innovative attitude. Therefore, in order for simultaneous distance education environments to be as effective and successful as face-to-face education in meeting the needs of learners with different learning levels and styles; they need to know how to develop their technical skills, how to design and implement interactive activities and curricula, and how to solve problems that online students may encounter (Martin and Parker, 2014).

Conclusions

In conclusion, Students' collaborative activities and interactions within the community are important factors to consider for the functioning of the community. This is also an indispensable condition for the work motivation of the employees.

Dabbagh (2007) stated the characteristics that online learners should have as follows: Having a strong academic self-image, being effective in using distance education technologies, exhibiting strong interpersonal communication skills, understanding the value of interaction and collaborative learning, controlling distance learning internally. In addition, the high motivation and positive attitudes of the learners involved in the learning process also affect the quality of the educational process. Learners should be able to direct and motivate themselves in the learning process, plan the learning process and perform the learning they need. Learners should be able to communicate with their teachers, administrators and peers and create communication

channels when necessary. For this reason, measurement and evaluation can be made in the current situation by developing online measurement tools regarding the effects of online education. The study can be applied on different sample groups with quantitative methods. Measurement tools related to the subject can be developed. Awareness-raising in-service training on online education can be given. Distance education can be prepared for another possible distance education situation by taking place within the legal legislation. By continuing some of the existing education applications as distance education, the technology use skill levels of student teachers and administrators can be increased.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

Anderson T, Garrison DR (1998). Learning in a networked world: New roles and responsibilities. In C. Gibson (Ed.), Distance Learners in Higher Education. Madison, WI.: Atwood Publishing pp. 97-112.

Ali MI, Alam A (2020). Acceptance, Use and Effect of Technology in Open and Distance Education. Studies in Indian Place Names 40(3):417-426.

Amin M, Piaralal SK (2020). Antecedents and consequences of service recovery satisfaction: perspectives on open and distance learning in Malaysia. International Journal of Business Innovation and Research 21(1):56-78.

Atici B (2004). The effect of virtual learning environments based on social knowledge construction on student achievement and attitudes. Unpublished doctoral thesis. Firat University Institute of Social Sciences. Department of Educational Sciences, Elazig.

Bolliger DU, Supanakorn S, Boggs C (2010). The effect of podcasting on student motivation in the online learning environment. Computers and Education 55(2):714-722.

Çakırer MA (2002). E-learning in the information society and the advantages of its application in Turkey. Open and Distance Education Symposium. pp. 23-25. https://aof20.anatolia.ed.tr/

Dabbagh N (2007). Online learner: Features and pedagogical implications. Contemporary Problems in Technology and Teacher Education 7(3):217-226.

Duran N, Önal A, Kurtuluş C (2006). New Approach Learning Management Systems in E-Learning and Corporate Education. Academic Informatics. http://ab.org.tr/ab06/bildiri/165.pdf

Ebbers M, Balague D, Ganguly B, Noyes D, Salm P (2003). Using the IBM Lotus virtual classroom: A best practice guide for e-learning. IBM Redbooks, International Technical Support Organization.

Geray C (1978). Public Education, Ankara: A.U. EBF Publication No: 73.

Hasan N, Singhal V (2020). Emergence of Mobile Learning: FutureforDistance Learning. Our legacy, 68(1):9476-9480.

İşman A (2008). Distance Learning. Pegem Academy.

Kanfer R, Frese M, Johnson RE (2017). İşle ilgili motivasyon: Bir asırlık ilerleme. Uygulamalı Psikoloji Dergisi 102(3):338.

Katzell RA, Thompson DE (1990). İş motivasyonu: Teori ve uygulama. Amerikalı psikolog 45(2):144.

Kavrakoğlu I (2002). Importance and Method of E-Learning. Journal of Human Resources 9:23-25.

Kaya Z (2002). Distance education, Pegem Publishing, Ankara.

Li L (2012). Student Misbehaviors and Teacher Techniques in Online Classrooms: Instrument Development and Validation. PhD Thesis, Ohio University.

Martin F, Parker MA (2014). Use of synchronous virtual classrooms: Why, who, and how. MERLOT Journal of Online Learning and Teaching 10(2):192-210.

McBrien JL, Jones P, Cheng R (2009). Virtual Spaces: Employing a Synchronous Online Classroom to Facilitate Student Engagement in Online Learning. International Review of Research in Open and Distance Learning 10(3). ISSN:1492-3831.

Michaelson C (2005). Meaningful motivation for work motivation theory. Management Review Academy 30(2):235-238.

Moore MG (1989). The Effects of Distance Learning: A Summary of the Literature: Paper for the Congress of the United States, Office of Technology Assessment. The Office.

Özen Ü, Karaman S (2001). System design in web-based distance education. Akdeniz İİ BF Journal 2(81):102.

Özmen B (2012). The Effect of Social Network Supported Distance Education Applications on Student Success and Views. Master Thesis. Fırat University, Institute of Educational Sciences, Elazig.

Pierrakeas C, Koutsonikos G, Lipitakis AD, Kotsiantis S, Xenos M, Gravvanis GA (2020). The Variability of the Reasons for Student Dropout in Distance Learning and the Prediction of Dropout-Prone Students. In Machine Learning Paradigms. Springer, Cham. pp. 91-111.

Rainey HG (2000). Work motivation. In Handbook of Organizational Behavior, Revised and Expanded. Routledge pp. 41-64.

Sezgin S (2021). Analysis of the emergency distance education process: Prominent concepts, problems and lessons learned. Anadolu University Journal of Social Sciences 21(1):273-296.

Yilmaz O (2015). The effects of live virtual classroom on students' achievement and students' opinions about "Live Virtual Classroom". Distance Education. Turkish Online Journal of Educational Technology 14(1):108-115.

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