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Full Length Research Paper

A study on the development of creativity of teachers in Shaanxi Universities in China in the context of demographic variables

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This study was to explore the current state of creativity among university teachers in Shaanxi, China. The study was based on creativity systems theory and a questionnaire survey was conducted with a convenience sample of university teachers in Shaanxi Province. A total of 711 teachers from 30 universities were sampled to compare the effects of demographic variables such as gender, title, subject background, and creativity award experience on statistical differences in creativity, and SPSS was used to analyse the effects between teachers' cognitive needs and creativity in the university context. The results of the study revealed that there were significant differences between title, subject background, and creativity award experience on creativity and cognitive needs of university teachers in Shaanxi; and there was a positive and significant effect of cognitive needs of university teachers on creativity.

Key words: Teacher creativity, need for cognition, Shaanxi University teachers.

INTRODUCTION

In the field of education, teachers are considered to be an important pillar of any educational institution. Teachers play a vital role in ensuring the success and effectiveness of the education system (Zainal and Matore, 2019). Teacher creativity has long been recognised as an important factor in developing creative and innovative learners (Craft, 2015; Saibon et al., 2017; Doyle, 2019). With the growing recognition of the importance of knowledge creation and exploratory, utilisation learning, creativity in schools and teachers has become an important issue in improving the quality of education

(Da'as, 2021). As a result, the need for creative teachers has been a hot topic worldwide (Khodabandeh and Jamali, 2019).

Despite the importance of teachers' creativity to the quality of teaching and learning in our knowledge society, interest in creativity in education has increased. In practice, however, it remains elusive and is often reduced to an area separate from other educational goals (Spendlove, 2008). This is the result of barriers of varying nature that are complex and difficult for educators to address (Henriksen et al., 2017). At all levels of

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education, traditional teaching methods that retain the power of the teacher do not allow learners to be creative in their changing life rushes (Gaspar and Mabic, 2015).

For teachers, the school environment continues to become increasingly stressful with little to no effort aimed to direct alleviating the problem. High stress and negative experiences can reduce teachers' creative resources such as creative beliefs, influences, thinking and behaviour (Anderson, 2020). Further, two decades of classroom observation research illustrate how most school environments still lack the conditions that foster opportunities for creative growth (Katz-Buonincontro and Anderson, 2018; Pitts et al., 2018).

Therefore, the aim of this study is to better investigate the current situation of creativity among university teachers in Shaanxi universities and to identify the factors affecting creativity.

The systemic theory of creativity explains that creativity is the result of an interactive process between three elements: the individual, the field and the discipline, which, in the case of schooling, include factors such as the background, experience and experience of the individual teacher, and the type of school or subject department in the field, and that these environmental factors may generate creativity in their interaction with the individual teacher. For example, Khana and Kamranb (2021) found that teacher creativity differed by demographic variables such as gender, highest professional qualification, and subject of focus in the research area of creativity. Henriksen (2016) found that teacher creativity differed in terms of creativity award experience. Martinsen (1995) argues that particular experiences and messages contribute to creativity and may also hinder creativity development, with more creative expression due to experience, but may also be limited to past experiences and hinder originality. Scholars have found that creativity is complex and Thurlings et al. (2015) in their study suggested that the factors that influence teachers' creativity are demographic, personal and organizational factors. Zainal and Matore (2019) study identified a total of 46 factors that is; demographic, personal or individual and organizational that has an impact on teachers' creative behavior.

Therefore, this study sought to examine whether there were significant differences in the control variables on the creativity and cognitive demands of university teachers, using the background variables of teacher gender, title, discipline, and creativity award experience, which were considered as control variables. This is one of the motivations for this study.

Some researchers have found that individuals with high cognitive demands show higher levels of curiosity (Sadowski and Cogburn, 1997; Watt and Blanchard, 1994). Dollinger (2003) argues that individuals with higher cognitive demands are willing to invest more time and effort in dealing with complexity in order to cope with vaguely defined problems, and that creative ideas

generated by higher cognitive demand are likely to have a positive predictive effect on fluency and flexibility in dealing with divergent thinking tasks (Butler et al., 2003). Cognitive demand is a positive predictor of the quality of problem solutions, and originality (Medeiros et al., 2014). Wu and Wu (2017) found a positive relationship between cognitive demand and innovative behavior through a survey of 179 individuals. However, there are inconsistent findings in related studies. For example, when some researchers used an experimental research model to validate this, they found no correlation between the two (Hester et al., 2012; Mumford et al., 2012). "Tok (2010) mentioned that although prospective teachers were aware of the importance of thinking, their level of cognitive demand was low. Polat and Tmkaya (2010) found no significant relationship between prospective teachers' cognitive level demand and problem solving skills."

Creativity is the result of interaction between individuals and complex situations. This paper is based on the characteristics of teachers' cognitive needs. Although cognitive needs have attracted a lot of attention from scholars in psychology and many other fields, few people pay attention to the role of cognitive needs in the context of teacher training (Arpaci and Bardakci, 2015). Suer and Kinay's (2019) study also found that research based on the relationship between prospective teachers' individual creative states and their cognitive level needs has not been identified. From this perspective, this study sought to identify the relationship between teachers' creativity and their cognitive needs in Shaanxi universities and to examine the important role of teachers' cognitive factors in this interactive process. These insights could help shape new directions for future research and support teacher development (Anderson et al., 2021).

LITERATURE REVIEW

Creativity

While there are many different definitions of creativity (Craft, 2003), Runco (2007) argues that creativity is a unique human trait, which reflects our cognitive ability to adapt to changing circumstances and our ability to effectively combine and improve the ideas we are exposed to. Russ (2011) has also proved that creativity is a process of both cognitive thinking and emotional feeling. Wu et al. (2017) believes that creativity is people's ability to think, solve problems, and produce original products with social or personal value. This process involves the interaction between personal characteristics and background, so as to develop new thinking and obtain innovative results. Regier and Savic (2020) believe that creativity provides individuals with new solutions and products and brings new or unexpected results.

Puangrimaggalatung (2021) argues that creativity is the

product of an individual's interaction with his or her surroundings, an ability to create new combinations based on data, details or elements that already exist or have been established, namely all of one's life experience and knowledge.

In a sense, creativity is the application of imagination. Innovation is the practice of putting new ideas into practice; innovation is the application of creativity. This study therefore defines creativity as the practice of teachers putting new ideas into teaching and work in their teaching work.

Need for cognition

Some studies believe that cognitive need is the intrinsic motivation for individuals to participate in and enjoy hard cognitive activities or information processing (Cacioppo et al., 1984; Petty et al., 2009). Borg (2006) defines teacher cognition as a network of beliefs, knowledge, and ideas about their profession. Dickhauser and Reinhard (2006) conclude that cognitive needs are important variables affecting motivational processes and should be included in models describing the relationship between self-concept and individual beliefs or behaviors. Suer and Kinay (2019) argue that cognitive need refers to stable intrinsic motivation that develops over time. Previous studies have shown that individuals with high cognitive needs tend to process information categorization more carefully (Cacioppo et al., 1983; Xiao et al., 2021), individuals with high cognitive needs tend to devote more efforts to applying logical thinking and critical thinking (Austin et al., 2016). People with high cognitive needs may enjoy solving challenging puzzles or problems, conducting research on topics of interest and thinking about their own ideas (Coutinho et al., 2005; Curseu, 2011; Steinhart and Wyer, 2009).

According to the aforementioned literature cognitive demand is one of the antecedents that induce creativity and is the predictive variable proposed in this study. Based on the above definition and connotation of cognitive demand, this study defines cognitive demand as the extent to which teachers prefer to engage in cognitive thinking during their teaching activities.

Relationship between control variables and teachers' creativity

Thurlings et al. (2015) in their study suggested that the factors that influence teachers' creative behavior are demographic (gender, teacher age, school demographics, teaching experience, teacher qualification and student level), personal and organizational factors. The study by Khana and Kamranb (2021) investigated the creativity of 155 teacher-teachers in different regions of Pakistan, including 65 males and 90 females in the period, and

found statistically significant differences in attitudes towards creativity on demographic variables such as teacher gender, highest professional qualification, and subject of focus. It was found that there were significant differences in teachers' attitudes towards creativity in the specialist subjects taught. Teachers who taught drawing subjects such as art had higher attitudes towards creativity than other teachers. The study conducted by Akkanat and Gokdere (2015) found that 13 chemistry teachers had established good beliefs about creativity and creativity in relation to intelligence. Furthermore, the findings of Al-Nouh et al. (2014) show that English teachers have positive attitudes towards creative thinking and what are happening in the classroom. Studies by Rubenstein et al. (2018) and Snell (2013) all concluded that experienced teachers have higher levels of creativity and innovation than less experienced teachers. Bandura (1997) found that attributes of the work environment (e.g. rewards, support, warmth, recognition, etc.) perceived directly or indirectly by work members may also influence their motivation and behavior. Hoy and Miskel (2001) also concluded that rewards for past performance, personal life experiences and social influences contribute to the development of one's intrinsic motivation. According to Amabile (1983), creativity is enhanced if rewards are more intrinsically derivative or if individuals are primarily motivated by the work itself because it is fun, enjoyable or satisfying. Henriksen's (2016) survey study also found that the study participants were National Teacher of the Year finalists/awardees and were seen as representatives of teachers who were both effective and creative because they were original, innovative and valuable.

Based on the above analysis, this study proposes the hypothesis that:

H1.1. There is a significant difference in creativity by gender.

H1.2. There is a significant difference in creativity between different job titles.

H1.3. There is a significant difference in creativity between different disciplinary backgrounds.

H1.4. There is a significant difference in creativity between different creativity award experiences.

The relationship between control variables and teachers' cognitive needs

Previous research has shown that Gencdogan (2001) found that in a study conducted with teacher candidates from different departments of the university, female participants had higher levels of cognitive demand than male participants.

Whereas the results of other scholarly studies found that the cognitive demand levels of their participants did not indicate a significant difference according to gender (Güngör et al., 2018; Demirta-Madran, 2012; Saracaloglu

and Cengel, 2013). In another study, Snell (2013) found that teachers' level of experience did not lead to differences in their perceptions.

Gencdogan (2001) found in his study that the level of cognitive needs varied by professional variables, with students in the Department of Counseling and Guidance having higher levels of cognitive needs than students in the Department of History. Güngör et al. (2018) found that participants' levels of cognitive needs showed significant differences based on departmental variables, with participants in the Department of Physical Education and the Department of Physical Education Teaching having significantly higher than participants from the Department of Sport Management and Coaching Education. Pascarella et al. (2013) argued that the reason for the positive indirect effects of the American Academy of Arts and Sciences on both dimensions of cognitive need is conveyed through comprehensive exposure to clear and structured classroom instruction and deep learning experiences for students. In addition, several scholars have argued that research on the relationship between psychological well-being and cognitive demand suggests a positive relationship between cognitive demand and well-being, life satisfaction and self-efficacy (Cavasoz and Campbell, 2008; Coutinho and Woolery, 2004), and that well-being can be derived from award-winning experiences. Therefore, this study inferred that the award-winning experience of creativity of university teachers in Shaanxi has an impact on cognitive demand. Based on the above analysis, this paper proposes the following hypothesis:

H1.5. There is a significant difference in the cognitive needs of teachers of different genders.

H1.6. That there is significant differences in the cognitive needs of teachers with different job titles.

H1.7. That there is significant differences in the cognitive needs of teachers with different subject backgrounds.

H1.8. Significant differences in the cognitive needs of teachers with different award-winning experience in creativity.

Cognitive demand and teacher creativity

Cacioppo and Petty (1982) have described cognitive demand as an individual difference in the intrinsic motivation of individuals to engage in information and cognitive activities. People with high cognitive demands are more intrinsically motivated than those with low cognitive demands to engage in brainstorming activities (Cacioppo and Petty, 1982) and to engage in discussions about the quality of messages (Cacioppo et al., 1984), and in the process they also display deeper thinking and stronger attitudes and behaviours in relation to the messages (Cacioppo et al., 1986), and thereby enhancing creativity. Dollinger (2003) argues that, given the complex nature of creativity, individuals with higher cognitive

demands are willing to invest more time and effort in dealing with complexity in order to cope with ill-defined problems, and creative thinking is likely to become higher as a result. As cognitive demand increases, the tendency for individuals to think about many things, including their own ideas, increases (Petty et al., 2009). Cognitive demand is a positive predictor of the quality of problem solutions, and originality (Medeiros et al., 2014). Ideas generated by cognitive demand have a positive predictive effect on fluency and flexibility in responding to divergent thinking tasks (Butler et al., 2003).

Because individuals with high cognitive demands have higher levels of personality self-control (Bertrams and Dickhauser, 2009), tend to seek, acquire, think about and reflect on relevant information when solving cognitive tasks (Cacioppo and Petty, 1982; Cacioppo et al., 1996; Coutinho et al., 2005), invest more cognitive resources in information processing (Enge et al., 2008; Fleischhauer et al., 2010), have a more rational decision-making style (Curseu, 2006), are more likely to come up with good ideas and new thoughts, or have new ways of solving the problems they encounter, and show a higher level of Creativity. In addition, Fleischhauer et al. (2010) suggest that the motivation of individuals with high cognitive demands to actively explore their environment should provide more effective ways of coping with uncertainty and the demands of everyday life. The results of Sure and Kinay's (2019) study demonstrate that prospective teachers' cognitive demands are a significant predictor of their personal level of innovation and that there is a relationship between positive and moderate levels of cognitive demands and their personal innovation status were positively and moderately significantly related to each other. Teachers' qualities can generate cognitive flexibility, which in turn leads to creative behaviours, including innovative teaching (Baer, 2020). The results of Sürer and Kinay (2019) also showed a significant positive relationship between teachers' cognitive level needs and their individual innovation status, with teachers' cognitive level needs being a significant predictor of their individual innovation status. Therefore, Hypothesis 2 is proposed: Teachers' cognitive demands have a positive and significant effect on creativity.

METHODOLOGY

Research framework

This study was to explore the impact of teachers' cognitive needs and creativity, and the differences in teachers' cognitive needs and creativity under demographic variables. The framework of the study is shown in Figure 1.

Subjects

This study was conducted with university teachers in Shaanxi, China. One hundred and fifty pre-test questionnaires were

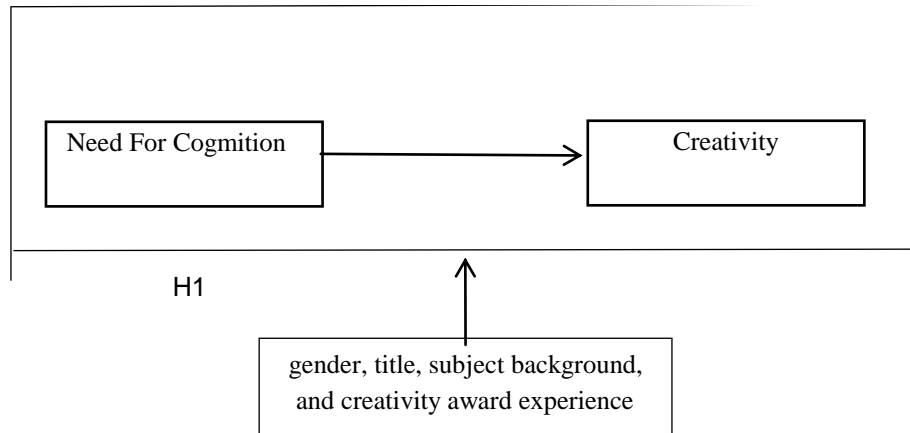


Figure 1. Research framework.
Source: Author.

distributed and 131 valid samples were recovered, with an effective rate of 87.3%. The formal questionnaire was distributed to 900 teachers, a total of 30 questionnaires were distributed to 30 universities, 30 questionnaires were distributed to each university, and 711 valid samples were recovered, with an effective rate of 79%. The data collected was then statistically analyzed.

Research tools

Creativity scale

Teacher creativity is measured using the Creativity Scale developed by Zhou and George (2001). The scale has 13 items, such as "able to suggest new ways to achieve goals" and "proposes creative solutions to problems". The scale is scored on a 5-point Likert scale, with 1-5 indicating 'very unlikely to meet' to 'very likely to meet'. This scale has been used by scholars to measure teacher creativity (McCharen et al., 2011; Fidan and Oztürk., 2015; Makhrus et al., 2022). The internal consistency of the scale was 0.926, 0.952, and 0.937, respectively. This study created a Chinese version of the Creativity Scale using a reverse translation (Brislin, 1980), which had a Cronbach's alpha coefficient of 0.960. In addition, the corrected total item correlations, item deletions, Cronbach's alpha value, and the t-values for the items all met the criteria.

Formal scales were analyzed using validation factors in order to test for reliability, validity and goodness of fit. The factor loadings for the items ranged from 0.713 to 0.800, with a construct reliability (CR) value of 0.950, which exceeded the assessment criterion of 0.70. The average variance extracted (AVE) value of 0.594 exceeded the assessment criterion of 0.50 (Fornell and Larcker, 1981), indicating good reliability and validity. In terms of goodness of fit, CMIN/DF=5.738, RMSEA=0.082, RMR=0.016, SRMR=0.032, GFI=0.921, AGFI=0.890, NFI=0.943, CFI=0.953, RFI=0.932, IFI=0.953, PNFI=0.786, PGFI = 0.658 are all above the minimum recommended by scholars (Doll et al., 1994; Hair et al., 1998), indicating a good theoretical model fit.

Need for cognition scale

Teachers' cognitive needs were measured using the Cognitive Needs Scale developed by Cacioppo and Petty (1984). The

scale has a total of 18 items and the sample question is "I prefer complex to simple problems". The scale is measured on a 5-point Likert scale, with 1 being strongly disagree and 5 being strongly agree, and was used by Suer and Kinay (2019) in their investigation of the relationship between prospective teachers' levels of cognitive demand and their state of personal innovativeness, which had a Cronbach's alpha coefficient of 0.79. This study A Chinese version of the Cognitive Needs Scale was created using a reverse translation (Brislin, 1980), which had an internal consistency coefficient of 0.884. A Chinese version of the Cognitive Demand Scale was created for this study using a reverse translation (Brislin, 1980), which had an internal consistency coefficient of 0.884. After item analysis of the scale, questions 6, 7, 12, 13, 16, 17 and 18 were removed based on three criteria: the corrected total item correlation, the Cronbach's alpha value after item deletion, and the t-value criterion for the items. All items met the criteria after the secondary item analysis.

The validation factor analysis formal scale was used to test its reliability, validity and fit. The factor loadings for the items ranged from 0.713 to 0.887, and the construct reliability (CR) values for "cognitive confidence" and "cognitive complexity" were 0.897 and 0.920 respectively, exceeding the assessment criterion of 0.70. The mean variance extracted (The mean variance extracted (AVE) values of 0.593 and 0.697 exceeded the assessment criterion of 0.50 (Fornell and Larcker, 1981), indicating good reliability and validity. In terms of goodness of fit, CMIN/DF=4.691, RMSEA=0.072, RMR=0.020, SRMR=0.040, GFI=0.952, AGFI=0.926, NFI=0.962, CFI=0.970, RFI=0.951, IFI=0.970, PNFI=0.752, PGFI = 0.620 are all above the minimum recommended by scholars (Hair et al., 1998), indicating a good theoretical model fit.

RESULTS

Descriptive statistics

A total of 900 questionnaires were sent out in this study, and a total of 711 valid questionnaires were obtained. Among them, 277 were male teachers and 434 were female teachers; in terms of titles, associate professors accounted for the most with 260 and lecturers the least with 98; in terms of years of teaching experience, 306

Table 1. Distribution of demographic variables for the positive test (N=711).

Demographic variable	Category	Number of people	(%)
Gender	Male	277	39.0
	Female	434	61.0
Title	Teaching Assistants	206	29.0
	Lecturer	98	13.8
	Associate Professor	260	36.6
	Professor	147	20.7
Discipline	Science and Engineering	49	6.9
	Management	92	12.9
	Social Sciences	114	16.0
	Economics	69	9.7
	Art	387	54.4
Creativity award-winning experience	No	223	31.4
	Provincial Awards	132	18.6
	National Awards	69	9.7
	Both	287	40.4

Source: Author collated from this study.

Table 2. Differences in teachers' creativity, cognitive needs by gender (N=711).

Variable	Gender	Number of people	Average	Standard deviation	t
Creativity	Male	277	4.068	0.540	1.139
	Female	434	4.117	0.585	
Need For Cognition	Male	277	4.300	0.519	1.129
	Female	434	4.345	0.519	

Source: Author

were the most with less than 5 years, 123 with 6-10 years, 224 with 11-20 years and 58 with more than 20 years; in terms of subject backgrounds, art accounted for the most with 387 and economics the least with 69; creativity awards In terms of experience, no award experience was the highest with 223, provincial awards were 132 and national awards 69, both of which were 287. Table 1 shows the distribution of demographic variables for the positive test.

Difference analysis

Analysis of differences in creativity and cognitive needs by gender

An independent sample t-test was conducted to test whether there were significant differences in creativity, cognitive needs between teachers of different gender

backgrounds. From the results of the analysis in Table 2, it was found that the different genders did not reach significance in creativity ($t=1.139$, $p > 0.05$) and cognitive needs ($t=1.129$, $p > 0.05$), therefore, there is no significant difference in creativity and cognitive needs between genders, therefore, H1.1 and H1.5 are not valid.

Analysis of differences in creativity, cognitive demand across background variables

A one-way ANOVA was conducted to test the situation of differences in creativity and cognitive demand across job titles, subject backgrounds and experience of winning creativity awards. From the results of the analysis in Table 3, it was found that there were significant differences in creativity ($F=5.372$, $p < 0.01$) and cognitive demand ($F=3.902$, $p < 0.01$) between the different titles. A post-hoc comparative analysis by Scheffe's method

Table 3. Differences in teachers' creativity, cognitive needs across job titles (N=711).

Variable	Title	Number of people	Average	Standard deviation	F	Hindsight comparison
Creativity	Teaching assistants	206	4.032	0.630	5.372*	4>3
	Lecturer	98	4.148	0.613		
	Associate professor	260	4.027	0.425		
	Professor	147	4.230	0.593		
Need for cognition	Teaching assistants	206	4.289	0.593	3.902*	4>3
	Lecturer	98	4.386	0.549		
	Associate professor	260	4.257	0.406		
	Professor	147	4.420	0.552		

** indicates $p < 0.01$. 1: Assistant Professor 2: Lecturer 3: Associate Professor 4: Professor.

Source: Author

Table 4. Differences in teachers' creativity, cognitive needs across subject backgrounds (N=711).

Variable	Discipline	Number of people	Average	Standard deviation	F	Hindsight comparison
Creativity	Science and engineering	49	4.165	0.506	14.523***	5>4
	Management	92	3.993	0.725		
	Social sciences	114	3.898	0.557		
	Economics	69	3.793	0.762		
	Art	387	4.208	0.424		
Need for cognition	Science and engineering	49	4.319	0.528	6.990***	5>4
	Management	92	4.291	0.631		
	Social sciences	114	4.188	0.519		
	Economics	69	4.116	0.698		
	Art	387	4.398	0.429		

*** indicates $p < 0.001$. 1: Science and Technology 2: Management 3: Social Sciences 4: Economics 5: Arts.

Source: Author

showed that professors were at a better level in terms of creativity and cognitive demand, and assistant professors were at a lower level in terms of creativity. Therefore, H1.2 and H1.6 hold.

From the results of the analysis in Table 4, it was found that there were significant differences in creativity ($F=14.523^{***}$, $p<0.001$) and cognitive needs ($F=6.990^{***}$, $p<0.001$) between disciplinary backgrounds. A post-hoc test by Scheffe's method showed that the arts category had an overall higher level of creativity and cognitive demand. Therefore, H1.3 and H1.7 hold.

From the results of the analysis in Table 5, it was found that there was a significant difference in creativity ($F=3.761$, $p<0.05$) and cognitive demand ($F=2.860$, $p<0.05$) for the creativity acquisition experience. A post-hoc test by Scheffe's method showed that both the provincial and national award experience had higher levels of creativity and cognitive demand overall. Therefore, H1.4 and H1.8 hold.

Correlation analysis and differential validity

The Pearson correlation coefficient analysis revealed that there was a positive correlation between creativity and cognitive confidence of Shaanxi university teachers ($r=0.744$, $p<0.001$); a positive correlation between creativity and cognitive complexity of Shaanxi university teachers ($r=0.437$, $p<0.001$); and the correlations between all variables or constructs reached significance ($p<0.001$). In addition, none of the correlation coefficients between the variables were greater than 0.8, indicating that there was no co-linearity. This also indicates that there is a correlation between the variables and that further regression analysis can be performed to test the causal relationship between the variables.

The means of the teacher creativity ($M=4.087$, $SD=0.558$) and cognitive demand constructs were ($M=4.339$, $SD=0.556$) ($M=4.292$, $SD=0.618$), respectively. The overall situation of teachers' creativity and cognitive

Table 5. Differences in teachers' creativity, cognitive demands on the experience of acquiring creativity (N=711).

Variable	Creativity award-winning experience	Number of people	Average	Standard deviation	F	Hindsight comparison
Creativity	No	223	4.000	0.650	3.761*	4>1
	Provincial Awards	132	4.080	0.549		
	National Awards	69	4.066	0.594		
	Both	287	4.164	0.459		
Need for cognition	No	223	4.248	0.578	2.860*	4>1
	Provincial Awards	132	4.320	0.513		
	National Awards	69	4.282	0.585		
	Both	287	4.380	0.447		

* indicates $p < 0.05$. 1. None 2. Provincial awards. 3. National awards 4. Both.

Source: Author

needs are above the median of the five-point scale 3, thus indicating that the creativity and cognitive needs of teachers in Shaanxi universities are at a moderate to high level. Fornell and Larcker (1981) suggest that the number of AVE square roots for each construct that is greater than the number of correlation coefficients for each construct must be at least 75% of the overall number of comparisons. From the results data in Table 6, it appears that the square root of the AVE of each construct in this study is greater than the standardised correlation coefficient outside the diagonal, and therefore the model has good discriminant validity between the study constructs.

Regression analysis

In this study, the demographic variables of title (based on professors), disciplinary background (based on arts), and creativity award experience (based on both awards) were included in the first tier; the cognitive demand variable was included

in the second tier, and the independent variables were entered into the model as Enter in each step. As can be seen from Table 7, model one has an adjusted R^2 of 0.099 and an overall explanation of 9.9%, while model two shows that cognitive demand is a significant positive predictor of creativity, controlling for the background variable ($\beta = 0.628$, $t = 22.211$, $p = 0.000$), with an adjusted R^2 of 0.471 and an overall explanation of 47.1%.

DISCUSSION

The results show that the genders did not reach significant differences in terms of teachers' creativity and cognitive needs. In terms of creativity, this is inconsistent with past research. For example, Al-Nouh et al. (2014) found that teachers showed high attitudes towards creativity. There were more talented men than women in creative tasks in science, art, literature, music and technological development (Eysenck, 1995; Reiss, 1999), while women contributed more than

men in writing, dance or drama (Baer, 2005; Eysenck, 1995). In relation to the current situation of creativity among university teachers in Shaanxi in this study, we analyse the reasons for this. In terms of creativity, the number of female teachers in the study is higher, with the majority being under 30 and 30-40 years old, which may be related to the fact that they have a lot of family and work commitments and fail to show creativity; in terms of cognitive demand, the results of this study are not consistent with the results of Curşeu's (2011) study. It concluded that there is a slight interaction between cognitive demand and gender, and that cognitive demand positively affects women more than men. Therefore, hypotheses H1.1 and H1.5 are not valid.

The different job titles reached significant differences in creativity, cognitive needs. This is in line with Khana and Kamranb's (2021) study which found statistically significant differences in teachers' creativity highest professional qualification (different job titles) background variables on attitudes towards creativity and Henriksen's (2016) findings that National Teacher

Table 6. Correlation analysis and differential validity of teachers' creativity, cognitive demand (N=711).

Variable	Creativity	Cognitive confidence	Cognitive complexity
Creativity	0.771		
Cognitive confidence	0.744***	0.770	
Cognitive complexity	0.437***	0.581***	0.835
Average	4.087	4.339	4.292
Standard deviation	0.558	0.556	0.618

*** indicates $p < 0.001$. Diagonal values are square roots of AVE.

Source: Collated from this study.

Table 7. Regression analysis of teacher background variables, cognitive demand on creativity (N=711).

Parameter	Creativity			
	Model 1		Model 2	
	β	t	β	t
Teaching assistants	-0.071	-1.368	-0.051	-1.265
Lecturer	0.015	0.341	-0.006	-0.174
Associate professor	-0.170	-3.578***	-0.076	-2.072*
Science and engineering	-0.023	-0.619	0.004	0.128
Management	-0.132	-3.522***	-0.086	-2.990**
Social sciences	-0.198	-5.309***	-1.108	-3.746***
Economics	-0.219	-5.923***	-1.118	-4.128***
No	-0.154	-3.294**	-0.057	-1.573
Provincial awards	-0.089	-2.060*	-0.038	-1.133
National Awards	-0.054	-1.406	-0.013	-0.457
Need for cognition			0.628	22.211***
R ²	0.112		0.479	
After adjustment R ²	0.099		0.471	
F-value	8.799***		58.475***	

*** indicates $p < 0.001$, ** indicates $p < 0.01$, * indicates $p < 0.05$.

Source: Author.

of the Year finalist/award winner teachers are creative. There were also significant differences with cognitive demand in terms of job title (Gencdogan, 2001; Pascarella et al., 2013). Professorial titles had better levels of creativity and cognitive demand than other titles; title assistant teachers were at a lower level of creativity. The professorial title, however, has relatively longer work and seniority, and relatively more experience, and is a little more sensitive and insightful in terms of innovative change in schools. Teachers with more than 20 years of teaching experience score higher on average. Therefore, H1.2 and H1.6 hold.

The different subject backgrounds reached significant differences in creativity, and cognitive demand. This is in line with the study's finding of statistically significant differences in creativity (Khana and Kamranb, 2021) for the teacher-focused subject background variable, and in cognitive demand (Pascarella et al., 2013) and cognitive demand for the teacher's professional background. The

arts category had the highest levels of creativity and cognitive demand overall; the management category was at a lower level in terms of creativity. The distribution of the number of female teachers and the two background items in the arts category was relatively high among the subjects of this study. Therefore, H1.3 and H1.7 hold.

Creativity acquisition experiences reached significant differences in creativity, cognitive demand. This is in line with the findings of Henriksen (2016) and Cavasoz and Campbell (2008). The situation of receiving both provincial awards and national awards experience was overall higher in levels of creativity, cognitive demand, and climate of innovation, and the mean of none was higher, but both were lower than the three situations of provincial awards, national awards and both. The largest number of respondents to this study was under the age of 30, at 365, accounting for 51.3% of the sample. The probable reason for this is that younger teachers did not get a place in the awards when they participated less

frequently in competitions and had less experience. Therefore, H1.4 and H1.8 hold true.

The significant differences produced by the control variables on the variables in this study may be attributed to the personality, teaching experience and years of experience, professional background and award-winning experience of university teachers in Shaanxi. Therefore, the differences caused by the control variables should be considered in the development of creativity among university teachers, which is more conducive to the development and improvement of university teachers' creativity.

The study found that the effect of teachers' cognitive needs on creativity was statistically significant, indicating that teachers' cognitive needs positively influenced their creativity, meaning that teachers with higher cognitive needs would have higher creative performance. This result is in line with Bandura's (2001) social cognitive theory and self-efficacy theory, as higher individual teachers' cognition is more likely to lead to more effective work and further increase teachers' creativity. Therefore, H2 holds true.

Conclusion

In this study, demographic variables included gender, job title, discipline and creativity award experience. After the empirical study, it was found that university teachers' titles and disciplinary backgrounds had significant differences on teachers' creativity and cognitive needs, respectively; university teachers' gender had significant differences on perceived organizational innovation climate; and university teachers' creativity award experience had significant differences on teachers' creativity and cognitive needs, respectively. This suggests that the contextual variables are also partially important factors in promoting creativity among university teachers in Shaanxi. Analysis of the differences brought about by the control variables can help to better develop strategies for the cultivation and development of college teachers' creativity.

The results of the study showed that the cognitive demands of Shaanxi university teachers had a significant positive effect on creativity. Teachers in Shaanxi universities are said to enjoy the responsibility of tackling problems that require a great deal of thought and enjoy completing a task that introduces a new approach to problem solving. They are willing to think abstractly about problems, to find good sources of ideas to come up with new ways to improve teaching and learning, and to derive satisfaction from long hours of difficult thinking, as well as to show creativity in their work. The influence of cognitive needs on the creativity of university teachers at the teacher level should therefore be taken into account. At the individual teacher level, the impact of teachers' cognitive needs is most evident, so two aspects of improving the initiative of Shaanxi university teachers and

constantly improving the keen creative insight of Shaanxi university teachers are considered for improving teachers' cognitive needs.

Recommendations

The research shortcomings of this paper are mainly in the following two areas. The context of this study is universities in Shaanxi Province, China, and the research method only uses questionnaires. Due to the constraints of time, energy, economic conditions and many other factors, the selected questionnaire survey samples are mainly from 30 universities in Shaanxi Province. The samples from the eastern regions and economically developed regions were not surveyed. Therefore, the sample data obtained is not comprehensive enough, which will also affect the general applicability of the results of this study.

Although most of the scales used in this study are based on more mature research findings in the field from abroad and are widely used, there is a certain relevance to the study of university teachers in Shaanxi, China. Subsequent development of scales for individual university teachers' creativity in the Chinese context could be considered.

In today's fast-paced world of education and educational reform, enhancing teacher creativity is a key issue in order for education to remain relevant in achieving its goals. Future research could also consider the creativity of individual teachers in higher education under other contextual variables and other factors that influence teacher creativity.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

An investigation of the relationship between digital obesity and digital literacy levels of individuals in the context of Turkey

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The concepts of digital obesity and digital literacy, which are interconnected in influencing human beings, can find their place in all areas of life with the virtualized life industry in the globalizing world. Having these competencies, awareness can be explained by the orientation process between these concepts and the individual. In this direction, this study, which aims to examine the relationship between digital obesity and digital literacy levels of individuals, has been carried out, taking into account the existing orientation process. In the study, which was designed as a quantitative research, the relational survey model was used. The research was carried out with 549 participants. The results indicate that the level of digital obesity and digital literacy significantly predict the level. In addition, age, gender and educational status seem to play a partly mediating role in the relationship between digital obesity and digital literacy.

Key words: Digital obesity, digital literacy, individual, virtual, addicted.

INTRODUCTION

When we look at the history of humanity, information has always been seen as the most important input of the production process in the process of meeting the needs. It can be said that reaching or reaching information, which is expressed as the most important input, has changed throughout the historical process and reached the present day. This variability can be explained with individual and social development and awareness levels. In other words, in today's world, it can be said that the

developments in the field of digitalization and technology applications emphasize the access of information by coding in digital format and by virtual methods. It can be said that the individual, who has the opportunity to access information quickly and easily with these methods offered by digital technology, triggers this technology and its applications to be the center of his/her life and start using it, in a multidimensional way. Digital technology, which is used excessively due to the features it contains,

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has led to the emergence of the concepts of digital addiction or obesity. Digital obesity, which is accepted as a disease by various circles, can be explained as the use of digital tools to negatively affect the physical, mental and spiritual structure of the individual. The prevention of digital obesity, which negatively affects human health, can be achieved by gaining the awareness of individuals to use digital reasonably and consciously. It can be said that digital literacy has an important function in raising this awareness. Digital literacy can contribute to the prevention of digital obesity in terms of the benefits provided by the individual regarding the correct, effective and ethical use of digital. Therefore, individuals with high digital literacy skills are expected to have low levels of digital obesity. Within the scope of the study, it can be said that the literature review is shaped on the axis of digital literacy and digital obesity.

Digital Literacy

Digital literacy was first defined by Gilster as the ability to understand and use the information in the digital environment in different ways (Gilster, 1997; Aabo, 2005). In this direction, it is possible to diversify the definitions of the concept of digital literacy as the skills and competencies that make up digital literacy are changing in parallel with the developments in technology. In that case, it would be appropriate to approach the definitions of digital literacy from a dynamic perspective. As a matter of fact, the related term is accepted as an umbrella type of literacy that includes complex cognitive, psycho-motor and affective skills and integrated sub-disciplines and literacy that individuals need to have in order to work effectively in digital contexts (Eshet, 2002; Calvani et al., 2008), can be evaluated as a result of this dynamic change process. Due to its dynamism, it can be said that digital literacy, which is guided by the technological developments in the world, includes various competencies. Having these competencies listed as access, analysis, evaluation, creation, reflection and action (Hobbs, 2011) are accepted as a basic criteria for being digitally literate. However it cannot be said to be sufficient as it can be stated that this literacy has many types. It can be said that in order to be a good digital literate, it is necessary to have basic knowledge and skills related to the information, visual, media, technology and computer literacy that digital literacy covers (Wilson, 2011). For an individual to be qualified as a digital literate must be aware of the information they need, know how to reach it and how to use it when it reaches it. In other words, it is mandatory to be information literate. The situation is no different in the context of other literacies. For example, it can be stated that a media literate individual needs the skills required by digital literacy while knowing and benefiting from the diversity, distribution forms and sources of media resources (Gambarato, 2017). The close relationship between computer literacy

and digital literacy has sometimes even led various researchers to use both literacy interchangeably. This may be due to the fact that the first computer comes to mind when it comes to digital tools, that is, the computer represents digitalization and digital tools. This can be given as evidence of the interaction between digital literacy and other types of literacy.

Digital obesity

It can be said that digital media and online devices, which are increasingly used in all areas of daily life, have some advantages in terms of communication, time and space in terms of individual and social aspects (Koçoğlu et al., 2022). However, it can be stated that these advantages bring along a dependency based on excessive use of these media and devices. The internet environment and the effective use of digital devices have led to the emergence of a new type of addiction, "digital addiction". Although the consequences of this addiction vary, digital obesity may be the most striking result. It can be said that digital obesity refers to the situation that occurs as a result of excessive use of digital tools. It is seen that individuals who are digitally obese will inevitably encounter some physiological, spiritual, developmental, emotional, sociological and psychological problems (Mustafaoğlu et al., 2018; Koçoğlu et al., 2022). It can be stated that the number of individuals facing related problems is increasing with each passing day. These problems, bodily disorders, introversion, loneliness and dislike of oneself and so on. Many studies conducted around the world show that the number of digital obesity has reached alarming proportions and that digital obesity negatively affects physical, social, psychological, emotional and cognitive development (Scherer, 1997; Harris et al., 2015; Koçoğlu et al., 2022). The first thing to do to eliminate this negativity is to determine some strategies for the use of internet-based digital devices. Related strategies are expressed as strategies to address digital addiction; acknowledging that technology companies drive the individual to addiction with some applications, planning the usage times of social media accounts, preventing our workspaces from being taken over by digital tools, and discovering the power of silence (Peper and Harvey, 2018). It can be said that the concept of digital literacy, which enables these strategies to create awareness on the individual, is very important for the digital obesity process. As a matter of fact, digital literacy is not only aimed at using digital tools. It also includes the use of digital tools from a critical point of view (Buckingham, 2008). This situation prevents the individual from becoming digitally obese due to excessive and unnecessary use of digital. It can be said that individuals and societies with digital literacy skills have a fairly high level of executive cognition in using digital strategies. In this study, the relationship between the concepts of digital literacy and obesity was evaluated and

it was aimed to Decipher the level of interaction between the concepts. The aim of the study was to Decipher the relationship between the concepts of digital literacy and obesity. The field type is examined, it is seen that obesity is related to digital literacy and digital work separately (Martin, 2006; Dobson and Willinsky, 2009; McVay et al., 2019; Chase and Laufenberg, 2011; Hino et al., 2020). However, there has not been a study on the relationship between digital literacy and digital obesity. Dec. As a matter of fact, digital literacy is considered to be important in preventing digital obesity, which is gradually increasing its impact all over the world. With the related study, it is aimed to create awareness about this issue by determining the effect of digital literacy on digital obesity.

Limitations and assumptions of the study

The research was carried out with a study group of 549 people. Two different scales were used as data collection tools in the study. These mentioned information are the limitations of the study. In the research, it was assumed that the data collection tools were suitable for the purpose of the research and that the participants gave sincere answers.

METHODS

Research pattern

The research was carried out in relational screening model through the applied scales. Relational screening is a model in which variables and parameters are interrelated and information is systematically integrated. A cause-effect relationship is established between the variables (Cohen et al., 2007; Karasar, 2012). In the research, a relational screening model was used as a possible necessity of a study that examines the relationship between digital obesity and digital literacy of individuals in the context of cause and effect.

Sample of the research

The population of the research consists of individuals over the age of 18 living in Turkey. The sample of the study consists of 549 participants determined by simple random sampling from the universe and in line with the principle of voluntary participation. In simple random sampling, there is a probability that individuals are large enough to represent the group and each has an equal chance of being included in the sample (Kerlinger, 1999). The sample of the study was calculated as at least 384, using the "Sample Size Calculator" (Surveysystem, 2021), accepting a 95% confidence interval and a 5% margin of error. It can be said that the sample group participating in the research is at an acceptable level. While 38% of the participants were male (209) and 62% were female (340); 37% aged 18-25 (204), 10% aged 26-30 (59), 17% aged 31-35 (94), 11% aged 36-40 (61), 16% are between the ages of 41-50 (91), 4% are between the ages of 51-55 (27), 13% are 55 and over (13). According to the educational background of the participants, 2% primary school (11), 4% secondary school (20), 11% high school (64), 10% associate degree (54), 57% licence (310) and finally 16% have a postgraduate (90) education level. According to the income level of the participants, 40% is 0-5000 TL (222), 41%

is 5001-10000 TL (227), 12% is 10001-15000 TL (68), and 7% is 15001 and above (32) have a socioeconomic level.

Data collection tools

The "Digital Obesity Scale" developed by Koçoğlu, Demir and Ulukaya Öteleş (2021) was used to determine the digital obesity levels of the participants. The "Digital Literacy Scale" developed by Bayrakçı and Narmanlioğlu (2021) was used to determine the digital literacy levels of the participants. In addition, the demographic information form prepared by the researchers (gender, age, educational status and income status) includes questions about the information of the participants. The Cronbach's Alpha internal consistency coefficients calculated within the scope of the reliability of the scale were calculated as 0.91, 0.81, 0.81, 0.60 and 0.61 for the ego surfing, dependency, accessibility, content loading and reference dimensions, respectively, and 0.93 for the overall scale. The Digital Literacy Scale, developed by Bayrakçı and Narmanlioğlu (2021), consists of 29 items and 6 factors (ethics and responsibility, general knowledge and functional skills, daily use, professional production, privacy and security, social dimension). The items in the scale were prepared according to the Likert-type five-point rating category and were as follows: I strongly agree (5), agree (4), undecided (3), disagree (2), strongly disagree (1). The Cronbach Alpha reliability coefficient of the scale is 0.91. All of the students studying in this class participated in both the quantitative and qualitative part of the research. Necessary permissions (E-23688910-050.01.04-2200121075) were obtained before the research data were collected.

Data collection and analysis

The data collection process of the research was carried out online in order to reach the maximum number of participants and to provide the accepted number with 95% confidence interval and 5% margin of error. Therefore, in the first stage, the researchers transferred the scale items to google form. Afterwards, the participants' access to the online link link was provided. Participants participated in the research voluntarily. The response time of the form is approximately 15-20 minutes and the data acquisition time is 30 days. After the data of the study were collected by means of scales, the extreme values were cleared, the skewness and kurtosis coefficients were checked and examined in terms of normality assumption. In addition, it was determined that the necessary conditions for the analysis of the data were met. The data were first examined in terms of validity and reliability. Exploratory factor analysis (Büyüköztürk, 2011; Field, 2009) was performed with SPSS to determine the construct validity of the scales, and Cronbach's Alpha coefficients (0.89 and 0.86) were found to be appropriate to determine their reliability. In addition, it was determined that the descriptive statistical values and Kolmogorov-Smirnov normality test results showed a normal distribution of the data. In the research model; correlation analysis and hierarchical multiple regression analysis were performed because it was aimed to examine the effect of digital obesity levels of participants as a dependent variable and digital literacy levels as an independent variable.

RESULTS

Descriptive analysis of variables and correlation matrix

The data on the arithmetic mean, standard deviation,

Table 1. Arithmetic mean, standard deviation, standard error and correlation values of the variables examined within the scope of the research.

S/N	Variable	\bar{X}	S	SD	1	2
1	Digital obesity	3.86	0.78	0.47	1	
2	Digital literacy	2.46	1.81	0.65	-0.293*	1

Source: Author.

Table 2. Multiple regression analysis of participants' prediction of digital obesity and digital literacy behaviors.

S/N	Model	Dependent variable: Digital Obesity						
		Independent variable	B	Std. error	Beta	T	p	f
1	(Constant)		102.583	2.791		36.760		
	Digital Obesity		0.357	0.050	0.293	13.314	0.000	
	Gender		-1.096	1.143	-0.034	-0.764	0.445	
	Age		-1.910	1.435	0.450	-4.244	0.000	
	Education status		1.127	0.623	0.080	1.808	0.071	7.100
	Income status		0.640	0.944	0.035	0.678	0.498	
2	(Constant)		104.761	3.414		30.684	0.000	
	Digital Literacy		0.241	0.034	0.293	7.168	0.000	
	Gender		4.121	1.755	0.105	2.348	0.019	
	Age		-1.436	0.550	-0.134	-2.609	0.009	
	Education status		-2.481	0.763	-0.145	-3.153	0.001	5.919
	Income status		0.971	1.154	0.44	0.841	0.401	
	R ² change		0,050					

Source: Author.

standard error values and the relationships between the variables regarding the digital obesity and digital literacy levels of the participants are presented in Table 1. According to Table 1, participants' digital obesity perceptions are "I agree" (4) high and their digital literacy perceptions are "Disagree" (2) low. When the relationships in the correlation matrix are examined, digital obesity perceptions and digital literacy have a weak negative relationship ($r=-0.293$, $p<0.001$).

Effect of digital obesity on digital literacy behavior

The findings and results of the multiple linear regression analysis conducted to investigate the mediating effect of participants' digital obesity levels on digital literacy behaviors are presented in Table 2. According to Table 2, after controlling for gender, age, educational status, income level and perceived digital literacy demographic variables, participants' digital obesity scores were added to the model by direct determination (enter) method. As a result of the multiple regression analysis, the effect of digital literacy on digital obesity decreases from $\beta=0.357$

to $\beta=.241$. The fact that this effect is significant indicates that demographic variables are the partial mediator variable in this relationship. In other words, digital literacy has an impact on digital obesity behavior. The situation showing this effect is shown in Figure 1. According to the regression coefficients, the predictor variables were digital obesity perceptions and age ($\beta = -1.910$); There is a significant relationship between digital literacy perceptions and gender ($\beta=4.121$), age ($\beta=-1.436$), educational status ($\beta=-2.481$).

DISCUSSION, CONCLUSION AND SUGGESTIONS

In this study, which examines the relationship between digital literacy and obesity levels in the context of Turkey, it can be said that remarkable results have been achieved. In the study, digital literacy and digital obesity were examined together and some important results were obtained. According to the hierarchical multiple regression analysis results, it can be stated that the digital literacy levels of the participants affect the digital obesity levels through various partial mediator variables, and this effect



Figure 1. Standardized beta coefficients in the mediating effect of perceived digital literacy on participants' digital obesity behavior (** $p < .001$).

Source: Author.

brings about the emergence of a significant relationship between the two concepts. This relationship, which emerged in the study, can be considered as an important finding in determining the interaction levels of the participants with the digital world.

One of the important results obtained in the study is the decrease in digital literacy levels in parallel with the increase in the digital obesity levels of the participants. The findings that the participants had high levels of digital obesity are supported by other research findings in the literature. In the studies conducted by Senecal et al. (2020) and Hu et al. (2021), they reported in their studies that the rate of digital obesity in the world has been increasing since the last fifty years. The results of the studies on digital obesity in different fields, emphasizing that the increasing rate of digital obesity in the world brings along a growing problem of chronic diseases and economic burden, are similar to the finding in the study, which expresses the rate of digital obesity. This similarity can be shown as the most important proof that the situation in Turkey, which is taken as a criterion in obtaining the findings in the study, does not differ from the rest of the world. In addition, according to the "Information Society Statistics" published by the Turkish Statistical Institute in 2021, internet access in Turkey is 94.9%, website ownership is 53.7% and household internet access is 90.7%. These data, which show the current digital view of Turkey, can be given as an indication that Turkey is not behind the age and the world in digitalization. It can be said that all these data support the finding of high digital obesity levels of the participants obtained in the study. However, the same cannot be said for digital literacy. Although more than half of the participants are between the ages of 18 and 40, it can be considered as a remarkable result that the level of digital literacy was lower than digital obesity in the study. It can be said that this result reveals evidence for a multidimensional reconsideration of the statement "The young population, who are mostly in the Z generation, is easy to integrate into digital platforms and technologies" in the study conducted by Prensky (2001). It can be stated that the principled statements such as "every

individual who is digitally obese has or should have a level of digital literacy" loses its importance with this result obtained in the study.

Based on the results and findings obtained in the study, the fact that the digital literacy rate in Turkey is lower than digital obesity which shows that the metacognitive levels of the participants regarding the use of digital platforms and technologies are insufficient. In order to eliminate the problems caused by this inadequacy, it has been suggested that activities to improve digital literacy competencies should be carried out by relevant institutions and organizations.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interest.

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Full Length Research Paper

Sustainable interior design learning during the Covid-19 era: From theory into practice

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The three pillars of sustainability, social, environmental and economic developments, are global trends in education. The emergence of the COVID-19 pandemic is a critical indication of nature's resistance. Developing a sustainable interior design learning approach is not a prerequisite for a sustainable education perspective but may bring solutions to environmental concerns. Therefore, developing a curriculum for teaching green interior design is vital for SID. This study proposes a curriculum framework for teaching sustainable interior design from theory to practice based on sustainability theory and green interior rating standards. Students must consider Covid-19 based on WHO and LEED green rating standards for their design project. A study was conducted to examine the learning processes and outcomes of students. This study offers a new perspective on the development of sustainable interior design in education.

Key words: Sustainable interior design, Covid-19 era, sustainable design education, case study.

INTRODUCTION

Sustainability is a holistic assessment of the economy, society and environment to approach the United Nations Sustainable Development Goals (SDGs) by 2030 (UNO, 2015). Interior design education is now more than just teaching design theories and aesthetics; instead, instructors should lead students to enhance and inspire knowledge and skill of creative sustainability from their broad expertise. With the growing awareness of environmental sustainability among interior design scholars, interior design education programs need to be updated and established to allow for transferring green environmental contextualisation into the elements of internal spaces (Celadyn, 2017). The COVID-19

pandemic altered people's lives, including their way of life, and significantly impacted education and employment. People were forced to spend much time indoors; hence, they know how important environmental health and sustainability are (Zaher, 2020). SID education can use the pandemic experience to develop an innovative green interior curriculum.

Sustainable development in education

Education for Sustainable Development (ESD) is becoming more widely recognised worldwide as an

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essential component of quality teaching and learning for sustainable development. The United Nations declared 2005-2014 as the Decade of ESD (UNESCO, 2005). The goal of ESD is to achieve the SDG framework in five aspects: policy, learning environments, building capacities of educators, and youth and local-level action (UNESCO, 2019). The initiative aimed at educating for a more sustainable future.

Sustainable interior design curriculum framework

Interior design includes the design stage-space planning, interior design, and interior integration and the construction stage-the furnishing of ceilings, walls and floor and technical work for water, electricity, etc. In other words, the interior design contains two complementary levels – aesthetics and practice (Chou et al., 2021). On this basis, the SID curriculum focuses on green innovation of interior space of a structure to satisfy lifestyles behaviour and health standards, as well as to fulfil architectural aims and the internal orientation and development of activities without harming the environment (Celadyn, 2017). According to the US Green Building Council (USGBC), Leadership in Energy and Environmental Design (LEED) (USGBC, 2020) for green interior design and construction rating system, "ID+C" defines "interior design and construction". Therefore, regards to SID education, the learning scope includes green concepts and sustainable construction practises, from theory to practice. Currently, LEED is included in the SID curriculum, and students are encouraged to develop their design concepts by following this international interior design rating system. In addition, the COVID-19 epidemic affected education and business activities and altered all aspects of people's lives. As a result of the COVID-19 epidemic, people are becoming more aware of indoor environment quality. World Health Organisation (WHO) announced the infection prevention standards for residences, public areas, and commercial spaces. Several architects and designers have embedded green interior standards and combined WHO policies in their architecture and interior design cases (Zaher, 2020). Therefore, in terms of the development of SID education, the WHO standard is also critical to secure people's health and promote sustainable development. By incorporating virus prevention measures into the design curriculum, students can learn about the importance of taking precautions to prevent the spread of the virus and apply these measures in their design projects. Moreover, such education can help to promote responsible citizenship and community health, which are crucial in the current global context. The purpose of the research is to: formulate a SID curriculum framework from theory to practice based on SID theory, the WHO infection prevention policy and LEED green interior rating standard for leading students in developing their design projects;

examine the students' learning processes and outcomes based on SID theory; and identify the prospects for green interior design education.

LITERATURE REVIEW

In this chapter, the research reviewed SID theory in the structure of development orientation for formulating the teaching and learning framework.

SID theory

The United Nations (1987) indicated that people could ensure their needs are met through sustainable development and contribute to a sustainable future. The green design considers consequences during production, construction and disposal and the impacts on the environment and people's health throughout the operation. Therefore, instructors can guide students to apply SID knowledge and skills in the design process to achieve sustainable development. Promoting green education has become a critical concern in the Covid-19 era.

Scholars (Chou et al., 2021; Kusumarini, 2011) asserted that SID includes three pillars of sustainability; economic interior, social interior, and economical interior, including the internal and external environment (within the scope of the building). The SID theory aims to develop a sustainable interior space by balancing people's health, indoor environment quality, and resource waste reduction.

Theoretical framework of SID curricular

The SID consists of three pillars-Internal Environmental Interior, Internal Social Interior and Internal Economic Interior. The SID curricular framework focuses on these three internal aspects based on SID theory as follows (Table 1):

1. Environmental Interior of LEED standards: students need to choose and decide the best design strategies with the design standards of LEED and WHO.
2. Social Interior of LEED standards: students must consider communication and integration between users and the indoor environment with the design standards of LEED and WHO.
3. Economic Interior: Benefits from design decisions with LEED and WHO design standards.

METHODOLOGY

Case study

Dhurakij Pundit University (DPU), one of the leading international

Table 1. Theoretical framework of SID curricular.

SID three-pillars	Internal environmental interior	Internal social interior	Internal economic interior
Dimensions	Indoor environment	People	Profit
Theoretical dimensions	Design decisions for the interior environment	Social relationships between people and indoor space	Benefits from design decisions
Items of LEED green interiors for hospitality spaces	Materials and resources; indoor environmental quality; innovation	Integrative Process; location and transportation; regional priority	Water efficiency; energy and atmosphere
Items of Design Strategies for Covid-19 Prevention: Technical and Maintenance Services	Water disinfection; dishwashing and laundry equipment; ventilation and air conditioning; dispensers; waste management	Communication	Benefit from practicing design strategies

Source: Author

and private schools, is accredited by the Ministry of Higher Education, Science, Research and Innovation of the Thai government body in Thailand. The Creative Design programme of the university adopts sustainable development and green innovation curriculums to align with the goal of ESD. This study conducted a case study method to examine the phenomena within its context for insight into illustrating, comparing, assessing and understanding unique aspects of a research objective. The target population is a group of third-year undergraduate students Creative Design program at the university. The registration procedures for the third-year undergraduate Creative Design program typically involve several steps. First, students must have completed the prerequisite courses for the program, typically in their first and second years of study, including art, interior design, management, graphic design and product design. Once they have met these requirements, they can apply for admission to the course. Many students in this program are interested in pursuing careers in design or related fields, and are eager to develop their skills and knowledge to prepare for the workforce. The number of students from the third-year undergraduate Creative Design programme is 18-two dropped out, and one took a similar class before. Therefore, a group of 15 students was selected as a sample who attended the "Spatial Theory and Composition" design course. Students were required to develop a semester design project and present their project at the end of the semester. The course includes the fundamentals of environmental sustainability, design theories and methods.

SID curricular framework

The project brief requested students to design a green service apartment while keeping the Covid 19 environment in mind. As shown in Figure 1, the SID curricular framework includes expert validation and three phases for students to develop the green project. The expert validation research method was carried out by using a validation procedure that relies on the modified Delphi expert consensus for reviewing six categories of Learning of Outcome Assessments (LOA). In this research, five faculty members of the design department with over ten years of teaching experience were invited to examine six categories based on the standards of LEED and WHO (Table 1). According to scholars, a consensus ratio is reached between 51% and 80% of the agreement by experts in terms of Delph's content validation (Eubank et al., 2016). After two rounds of review by experts, the consensus ratio was more than 80% of the experts' agreement (Lin, 2015). All experts agreed with the six categories of LOA.

Phase 1: The students participated in group discussions and shared their understanding of green interior design based on the three pillars of SID sustainability. Collaborative learning helps students build their skills and creative thinking of SID. While designing, the students were encouraged to explore SID for further discussion.

Phase 2: In the practice stage, students explored their green design based on international green interior rating standards, considering Covid-19management in the accommodation sector (WHO, 2021). Students engaged in individual discussions with the instructors to develop their green concept effectively.

Phase 3: Finally conclusion stage, students presented their green service apartment design concepts. The evaluation of students' learning outcomes was based on the SID theory, green rating standards and the design strategies considering Covid-19infection prevention.

Students were required to carefully follow the LEED green interior and WHO standards to create their design concepts. The evaluation of learning outcomes was categorised into four levels: 1=poor (0-1 green items), 2=average (2-3 green items), 3=good (3-4 green items), and 4=excellent (above five green items). In terms of the reliability of phase 1 and Phase 3, the value of Coefficient Alpha was $\alpha = 0.81$ and 0.84 . According to scholars, the Coefficient Alpha of 0.80 and above is better (Cronbach, 1951).

RESULTS AND DISCUSSION

Students' learning outcome assessment

The results and discussions on the student's learning outcomes are as follows:

1. LOA of LEED Green Interiors: As shown in Table 2, in phase 1, the highest score is "Economic Interior of LEED standards" (M=2.00, SD=0.00). Most students understood how to conserve resources, particularly water and energy. In phase 3, the "Environmental interior of LEED standards" (M=3.20, SD=0.56) scored the greatest among all the standards.
2. LOA of WHO standards: As shown in Table 2, in phase 1, The lowest score was "Economic Interior of WHO

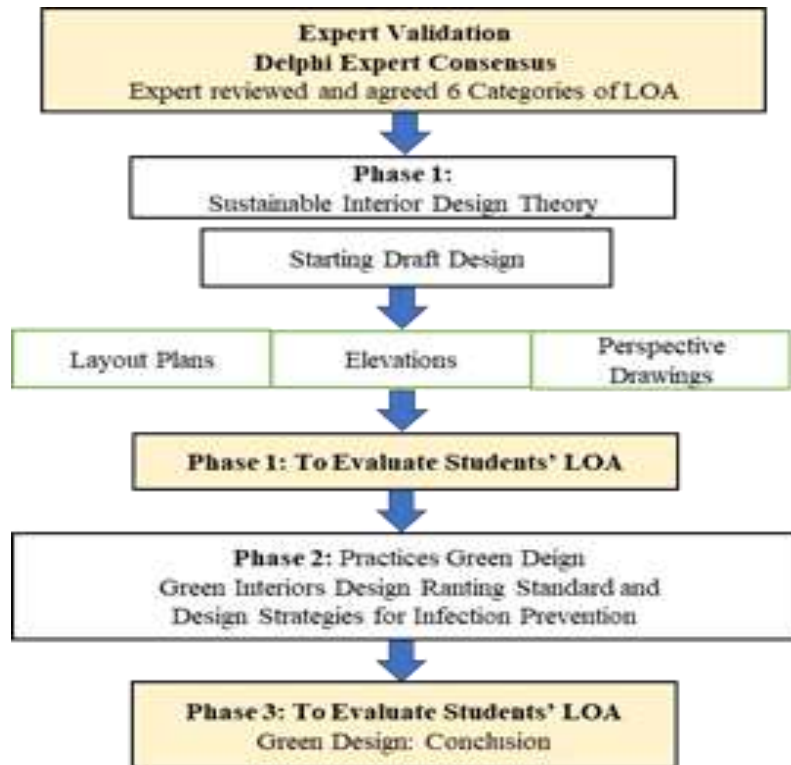


Figure 1. SID curricular framework.
Source: Author

Table 2. Descriptive statistics of students' design project score.

	SID 3 Pillars	N	Minimum	Maximum	Mean	Std. Deviation
Phase 1	1. Environmental Interior of LEED standards	15	1	2	1.67	0.49
	2. Environmental Interior of WHO standards	15	1	2	1.80	0.41
	3. Social Interior LEED standards	15	1	2	1.80	0.41
	4. Social Interior of WHO standards	15	1	2	1.87	0.35
	5. Economic Interior of LEED standards	15	2	2	2.00	0.00
	6. Economic Interior of WHO standards	15	1	2	1.27	0.46
Phase 3	1. Environmental Interior of LEED standards	15	2	4	3.20	0.56
	2. Environmental Interior of WHO standards	15	2	3	2.13	0.35
	3. Social Interior of LEED standards	15	2	3	2.40	0.51
	4. Social Interior of WHO standards	15	2	3	2.53	0.52
	5. Economic Interior of LEED standards	15	2	3	2.47	0.52
	6. Economic Interior of WHO standards	15	2	3	2.20	0.

Source: Author

standards" was the lowest score (M=2.13, SD=0.35).

3. Comparison of LOAs of LEED Green Interiors and WHO standards: Regarding the indoor environment, LEED and WHO standards have a similar concept-design for human health. Therefore, combining these two standards to develop design concepts could be a solution

to improve students' perceptions.

4. Comparison of Phase 1 and Phase 3: As shown in Tables 3 and 4, the results of paired sample t-test showed that the score in phase 3 (M=2.51, SD=0.35) increased compared to phase 1 (M=1.73, SD=0.24), $t(14)=12.08$, $p\text{-value} \leq 0.05$. In phase 3,

Table 3. Paired samples statistics of students’ design project score.

	SID 3 Pillars	Mean	N	Std. Deviation	Std. error mean
Pair 1	Phase 1 Overall standards	1.73	15	0.24	0.06
	Phase 3 Overall standards	2.51	15	0.35	0.09

Source: Author

Table 4. Paired samples test of students’ design project score.

		Paired differences					t	df	Sig. (2-tailed)
		Mean	Std. deviation	Std. error mean	95% Confidence interval of the difference				
					Lower	Upper			
Pair 1	Phase 1 Overall standards– Phase 3 Overall standards	-0.78	0.25	0.06	-0.92	-0.64	-12.08	14	0.000

Source: Author



Figure 2. Student’s Design Project-Green service apartment with garden.
Source: Fine and Applied Arts Program, DPU.

students implemented green design strategies in their design projects after the design courses. The students tried combining aesthetics with functional aspects of green design standards. For example, when selecting the paints, some students considered toxic emissions and anti-virus or chose lighter shades to increase daylight reflection. In terms of management, some chose smart home systems to monitor water and energy consumption and a reservation system for social distancing and security.

Students’ green design project evaluation

In this green design project, two students excel among their peers (Figures 2 and 3). The design approaches are as follows:

1. Environmental interiors strategies: 3R design strategies-recycling, reusing and reducing the material for

the ceiling, wall flooring and furniture; the large operable windows designed to promote daylight and ventilation; separating the interior public areas (living room and dining room) and private areas (bedroom) at different floors; segregation of operational and domestic waste.

2. Social interiors Strategies: providing disinfection and cleaning supplies at the entrance; installing UV water filters, air filters and UV lighting for anti-virus and air quality; providing a bicycle lane.

3. Economic Interior Strategies: Indoor Environmental Quality- Using air filters and UV lighting for anti-virus and air quality; water-efficient equipment and reusing grey water; installing solar energy systems on the roof and light sensors for energy savings.

Summary of SID learning outcomes

Based on the findings of the study, strategies for



Figure 3. Student's Design Project-Green service apartment with skylight window and blinds.
Source: Creative Design Program, DPU.

expanding green interior design education are as follows:

1. **Environmental Aspect:** As indicated in Table 2, most students are interested in expanding their design knowledge to create a healthy, eco-friendly interior environment. Scholars propose that the core value of SID development is balanced social, economic, and environmental development. Some green policies and education will fail if SID focuses on environmental development without social and economic support. Green innovation can be a solution for the holistic development of SID in three dimensions: resource reuse and recycling to preserve the environment, the use of eco-friendly materials free of harmful components to protect people's health, and the use of fewer resources or energy during production processes to gain green benefits.

2. **Social Aspect:** Green design management has been a significant priority in the Covid-19 era to improve the relationship between people and the environment and enhance human health. Transdisciplinary learning, since it integrates several curricula, could be a method to enable students to integrate knowledge from various disciplines to develop a better understanding of the actual world. By cooperating with design firms, educators can assist students in developing design and business management models for a more authentic learning experience.

3. **Economic Aspect:** Developing SID in the real world has always required understanding the sustainable economy. Future courses will include real-world case studies and seminars with managers and experts to help students build a new perspective on green business. Students must understand how to use scarce natural resources wisely to advance SID and realise greener benefits.

In summary, as a result of the coronavirus epidemic, people are becoming more conscious of how human activities impact the environment. The pandemic has highlighted the need for healthy and sustainable design solutions that prioritise human health and well-being. SID education can play a crucial role in this by equipping students with the knowledge and skills to create healthier and more sustainable indoor environments. This includes understanding the principles of sustainable design, such as using renewable materials, minimising waste, and reducing energy consumption. It also involves incorporating biophilic design principles, such as incorporating natural light and greenery into indoor spaces, which have been shown to improve mental health and cognitive function. Moreover, SID education can also help students stay informed about the latest trends and technologies in sustainable design, such as the use of intelligent home systems and passive design strategies. By understanding and implementing these strategies, students can help create indoor environments that are healthier, more energy-efficient, and cost-effective.

Conclusion

SID education has become integral to the sustainable age. Ruff and Olson (2009) asserted that design educators are responsible for building the foundation for sustainability. While students embrace the knowledge, educators must also lead them to sustainable real-world project practises based on the theory. SID education can rebuild and raise awareness of the environmental effects of the COVID-19 pandemic so that eco-friendly products can be used to create a healthy indoor

environment (Zaher, 2020). SID is the highest guiding concept for policy execution in interior design education that includes "designaesthetics" to create a positive living quality and "practical design" applying green environmental standards and reducing environmental impact.

The research developed a SID curriculum framework based on SID theory. In terms of future curricula, SID practice relies on collaboration with design firms or associations to bridge the gap between learning and reality. In addition, universities can provide graduates and designers with continuing education regarding SID. This is because SID is becoming increasingly important in design industries and can have a significant impact on the environment, health, and sustainability of our communities. Overall, providing SID education can benefit both students and universities by preparing students for the evolving job market, contributing to the sustainability of our communities, and promoting a culture of environmental responsibility.

CONFLICT OF INTERESTS

The author has not declared any conflict of interest.

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