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Comparing Pupils' Learning Skills and Learning Styles Across Cultures

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Abstract

Learning skills and styles are a global innovation collaboration that brings to life the revolutionary notion of deep learning as conceptualized by global educational reform experts. This study aimed to look into students' learning styles and skills in secondary schools across different societies and cultures. 249 students participated in this study, 125 students from Spain, and 124 from Thailand. The tools used for the learning skills had 30 items, with a reliability value of 0.82. The 42-item learning styles questionnaire had a reliability score of 0.97. This finding discovered that Asian and European pupils in various civilizations and cultures had distinct learning styles. In contrast, although the students are from different cultures and environments, they had similar learning skills. After one semester, the students in both countries showed considerable improvements in their learning skills. This implies that culture influenced learning styles but not learning skills and that instructors at school had an important role in activating students' learning skills.

Introduction

Learning is a lifelong, continuous, and never-ending action that should be integral to how courses are taught at the school. A 21st-century education concentrates on teaching students the skills they need to survive in this new world while also developing in them the courage to put those abilities to use. Given the abundance of knowledge coming to pupils, 21st-century skills emphasize making sense of it, distributing it, and effectively applying it. Students must excel in extra subjects such as foreign languages, the arts, geography, science, and social studies (National Education Association, 2010). Educators must supplement all of those topics with the "Six Cs" to educate students about citizenship and the global workforce. Now for the Six Cs: when people talk about deep learning or 21st-century talents, there are some modest variants on the subject, but the greatest ones incorporate a limited number of intellectual and personal/interpersonal characteristics and capacities. Character, citizenship, communication, collaboration, critical thinking, and creativity are the Six Cs stated (Fullan & Scott, 2014). All six of these components are required in a 21st-century classroom, which is called Fullan and Scott's New Pedagogies for Deep Learning initiative model. These abilities are ageless and highly respected in the classroom and all professions. Furthermore, each learner's learning style determines how they begin to concentrate on, process, integrate, and remember new concepts and challenging knowledge (Dunn & Burke, 2006). Everyone's interaction with these components is distinct. It is critical to determine what is most likely to excite each student's concentration to enhance long-term memory and retention, how to keep it going, and how to accommodate his or her natural processing style. To uncover these underlying inclinations and styles, a complete learning style model that identifies each individual's strengths and preferences across the whole range of physiological, social, psychological, emotional, and environmental components is required (Pashler et al., 2009). The seven learning styles include visual, aural, verbal, logical, physical, social, and solitary. According to the Multiple Intelligences Theory (Gardner, 1993), which can be called Gardner's Multiple Intelligences Learning Styles, this model showed that humans may learn about the world through language, logical-mathematical analysis, geographical representation, musical thinking, using our bodies to solve issues or generate things, knowing other people, and understanding ourselves by including visual-spatial, body-kinesthetic, musical, interpersonal, intrapersonal, linguistic, and logical-mathematical.

Secondary education is the final stage in school, most students do not know their abilities of themselves, so teachers can identify learning styles and develop the learning skills of students to know their potential and abilities of their own. Identifying and developing students to know their potentials are key for the teacher to help the parents and students accomplish their goals. In this state, the teachers can give way to an approach that is better suited to develop the talents and potential of all students enrolled at the school. This is to be accomplished by providing the appropriate support and opportunities for students to grow intellectually, and to genuinely succeed in school and beyond. Possible sources for additional training and areas for further skill development that the student will need to focus on while still in school. When students' learning styles and talents are assessed simultaneously, defining the student's learning will assist them in growing and thriving today and in the future.

In Spain, secondary school is separated into two cycles: twelve to fourteen years old and fourteen to sixteen years old. There are core obligatory studies and elective subjects in each cycle ESO (Educación Secundaria Obligatoria) refers to the first four years of compulsory education. Children could leave school after this term or when they reach the age of sixteen, whichever comes first. Students are taught a wide range of secondary topics, including an option in which they can select between French and English. Secondary education in Spain was quite traditional until recently, with a lot of rote learning and regular quizzes and examinations. The addition of project work, regular evaluation, and more current and relevant syllabuses has resulted in significant advances. However, much still depends on individual instructors' approaches, and there has been a general lack of investment in retraining and resources to ensure the scheme's success. Students have the option to study for the Bachillerato (high school), begin intermediate vocational training tailored toward a certain career, or discontinue schooling entirely at the age of sixteen (OECD. 2021).

Secondary education in Thailand is available to pupils aged twelve to eighteen, who attend secondary schools from Matthayom 1 to Matthayom 6. Lower and upper secondary education are separated into six years, with only the lower half, Matthayom 1-3, being required. Matthayom 4-6 students can choose between vocational and academic paths, with the former providing an alternative for students who do not meet the required grade for admittance into the upper secondary academic stream. Secondary schools, like Thai elementary schools, use a grading system that ranges from A-F or 4-1, with F or 0 denoting a system failure. Students who receive a passing grade after Matthayom 3 and choose to continue their academic education through Matthayom 4-6 may study optional topics alongside core subjects, as is common in most Western educational systems. Thai language, mathematics, technology, physical education, social sciences, art, music, and foreign languages are among the fundamental subjects taught at primary and secondary schools (OECD/UNESCO, 2016).

Learning skills and styles are a global innovation collaboration that brings to life the revolutionary notion of deep learning as conceptualized by global educational reform experts (OECD, 2016). The authors hope to investigate students' learning styles and skills in secondary schools in Spain and Thailand albeit they have very different societies and cultures. Furthermore, utilizing Fullan and Scott's New Pedagogies for Deep Learning initiative model, it was possible to study students' learning skills. In addition, Gardner's Multiple Intelligences learning style model was employed to identify the learning styles of the students. The researchers concentrate on secondary school pupils since they must have chosen whether to work or study at a higher level shortly. If students are aware of their learning styles and skills, they will be able to choose a better path in the future. Furthermore, researchers want to minimize student dropout at higher levels of education because when students study and discover that manner is not appropriate for their ability. Indirectly, the researchers want to assist parents of students in reducing expenditures because knowing their children's skills and styles quickly reduces chances of changing the way they study at a high level, which the parent must spend more money on.

Method

Analysis units

This study's population is comprised of students in Mallorca of Spain and Bangkok Thailand, aged 14-17 years, who attended last year’s secondary education schools in 2022-2023. Spain, the Santa Monica in the academic year 2022, totaling 125 people (71 girls and 54 boys) in 5 classrooms. Thailand, the Demonstration School of Ramkhamhaeng University in the academic year 2022, totaling 267 people (123 girls and 144 boys), 10 classrooms.

The study was carried out with 249 students from two countries. 125 students (71 girls and 54 boys) 5 classrooms from Santa Monica (Mallorca, Spain), and 124 students (50 girls and 74 boys) 5 classrooms from the Demonstration School of Ramkhamhaeng University (Bangkok, Thailand), obtained by group randomization, aged 14-17 years, who attended last year’s secondary education schools in 2022-2023, consisting of the study group.

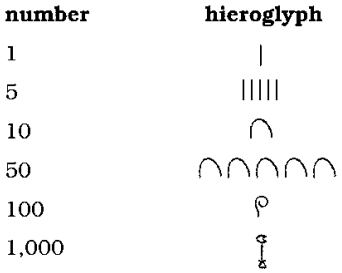
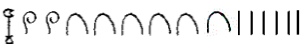
Instruments

Learning Skills

The learning skills test consists of 30 items, and the result of reliability values was 0.82. The items were accepted including character, citizenship, communication, collaboration, critical thinking, and creativity, each subject comprised five items (Tab. 1). This exam was multiple-choice, with each item having one correct answer (one score), and focusing on the learning skills necessary to reach a person's goal. The multiple-choice method was chosen due to its strengths in terms of effectiveness, ease of analysis, and measurement feasibility (Maryani et al. 2021). The authors created this to learn more about the skills of secondary school students, the instrument

utilized in this investigation. This test was created by applying Fullan and Scott's New Pedagogies for Deep Learning initiative model frameworks.

Table 1: Contains some examples of questions used to test the learning skills

Learning skills	Questions
Character	In class, the teacher takes the hard work for students, how do you do? 1. I call to ask my friend about the method for doing it. 2. I search for the key by using the internet. 3. I wait to see my friend tomorrow. 4. I try to do it by myself until I can do it.
Citizenship	When you have new friends from different countries, what is the first thing that you think to do? 1. I harder adjust to understand people. 2. I can learn a lot from people in other countries. 3. I can't talk with people in other countries. 4. I haven't any idea, just say hello when we see each other.
Communication	What are you doing, when are you talking with people? 1. I speak with them and pay attention to their body language. 2. I like to talk with them but don't make eye contact with them. 3. I often do not concentrate on people I don't know. 4. I prefer to talk to people whom I know.
Collaboration	How will you manage it when the teacher always assigns a problem to each group to solve? 1. I routinely participate in group problem-solving activities with an open mind, sharing my ideas with others. 2. I just listen to the opinion of everybody on my team but I do not do anything more. 3. I often write a conversation with my friend because I don't have anything to do. 4. I often joke to make everybody enjoy it
Critical thinking	The Egyptians created a writing system known as hieroglyphics, which employed image symbols to represent numbers and things. The hieroglyphs for the numbers 1 to 1,000 are as follows:  there was no symbol for zero. Someday, you see the picture in the museum,  What number that they want to tell you? 1. 1,255 2. 1,257 3. 1,266 4. 1,267
Creativity	When the teacher writes the recommendation for your work, what do you often do? 1. Correct like the teacher recommended. 2. Correct the recommendation and make it better. 3. Ignore some recommendations that you think are not important. 4. Ask your friends who have the same recommendation as you.

Learning Styles

The researchers utilized a questionnaire, we had created to learn more about the first cycle of secondary school students' styles. The questionnaire's overall reliability (Cronbach alpha coefficient) was 0.97. The test tested the pupils' learning styles by using Gardner's Multiple Intelligences learning style model, and 42 items were accepted including visual-spatial, body-kinesthetic, musical, interpersonal, intrapersonal, linguistic, and logical-mathematical, each indicator included 6 items (Tab. 3). The five-point Likert scale (1-strongly disagree, 2-disagree, 3-neutral, 4- agree, 5-strongly agree) was answered to the students to indicate whether they agree or disagree with each item. The student who scored a mean less than 1.50 was classified under minimal, 1.5-2.49 was classified under poor, 2.5-3.49 was classified under moderate, 3.50-4.99 was classified under strong, and more than 4.50 was classified under excellent. Siddiquei & Khalid (2021) demonstrated that a 5-point Likert-type scale was experimentally produced to build the Learning Style Scale for test learning styles.

Procedure

The students assessed their learning skills within 1-2 weeks of starting the class (pre-test). The same test was repeated after 3 months (post-test). Furthermore, the learning styles were examined during the same week as the post-test. Statistical data analysis was carried out with IBM-SPSS ver. 26 Statistical Software. Analysis of data and each topic, using the sample's mean and standard deviation, and t-test for independent samples. In addition, the dependent t-test was computed in this study

Results and Discussion

This study assesses students' learning skills and styles in Spain and Thailand. To facilitate the communication of these results, they are grouped into (1) comparing the pre-test total of students' learning skills between Spain and Thailand (Tab. 2), (2) reaching each indicator of the learning skills of students' learning skills pre-test between Spain and Thailand (Tab. 3), (3) comparing the post-test total of students' learning skills between Spain and Thailand (Tab. 4), (4) reaching each indicator of the learning skills of students' learning skills post-test between Spain and Thailand (Tab. 5), (5) comparing pre-and post-test of students' learning skills in Spain and Thailand (Tab. 6), (6) comparing students' learning styles between Spain and Thailand (Tab. 7), and (7) comparing each item of students' learning styles between Spain and Thailand (Tab. 8). Means, standard deviation, p, and t-tests are depicted.

Table 2. Comparing the total of the pre-test of students' learning skills between Spain and Thailand

	Countries	N	$\bar{X}$	*SD*	*t**	*p*
Learning skills	Spain	125	0.56	0.13	0.25	0.80
	Thailand	124	0.57	0.16		

* *There is a statistically significant level of 0.05.*

The researchers considered students' learning skills within a couple of weeks before starting the lesson. On average, participants in Thailand (M = 0.57, SD = 0.16) experienced slightly greater learning skills than in Spain (M = 0.56, SD = 0.13). This difference was not significant. t (96.65) = 0.25, p = 0.80; however, it did represent a small effect size r = 0.03.

Table 3. Comparing the pre-test of each indicator of learning skills between the students in Spain and Thailand

Learning skills	Countries	$\bar{X}$	*SD*	*p*	*t**
Character	Spain	0.57	0.26	0.63	0.48
	Thailand	0.60	0.25		
Citizenship	Spain	0.60	0.24	0.67	-0.43
	Thailand	0.58	0.26		
Communication	Spain	0.56	0.24	0.76	-0.30
	Thailand	0.54	0.25		
Collaboration	Spain	0.64	0.20	0.83	-0.21
	Thailand	0.63	0.21		
Critical thinking	Spain	0.54	0.24	0.42	0.81
	Thailand	0.58	0.26		
Creativity	Spain	0.48	0.31	0.73	0.35
	Thailand	0.50	0.32		

* *There is a statistically significant level of 0.05*.

Table 3 presents the pre-test preliminary study including an investigation of differences based on learning skills 6 Cs. The indicators of learning skills were compared between students in Spain and Thailand, there were not showing any significant differences in all indicators of learning skills (p>0.05). The mean of character in Spain was 0.57 (SD = 0.26) and in Thailand was 0.60 (SD = 0.25). For citizenship, the mean in Spain was M = 0.60 (SD = 0.24) and in Thailand was M = 0.58 (SD = 0.26). The mean of communication in Spain was 0.56 (SD = 0.24) and in Thailand was 0.54 (SD = 0.25). For the collaboration, the mean in Spain was M = 0.64 (SD = 0.20) and in Thailand was M = 0.63 (SD = 0.21). The mean of critical thinking in Spain was 0.54 (SD = 0.24) and in Thailand was 0.58 (SD = 0.26). For creativity, the mean in Spain was M = 0.48 (SD = 0.31) and in Thailand was M = 0.50 (SD = 0.32).

Table 4. Comparing the post-test of the total of students' learning skills between Spain and Thailand

	Countries	N	$\bar{X}$	*SD*	*t**	*p*
Learning skills	Spain	125	0.58	0.10	1.64	0.11
	Thailand	124	0.62	0.13		

** There is a statistically significant level of 0.05*.

The learning skills of students have been assessed again, there was not a statistically significant difference in the average learning skills between student's Spain (M = 0.58, SD = 0.10) and student's Thailand (M = 0.62, SD = 0.13), t (94.59) = 1.64, p = 0.11; however, it did represent a small effect size r = 0.17.

Table 5. Comparing the post-test of each indicator of learning skills between the students in Spain and Thailand

Learning skills	Countries	$\bar{X}$	*SD*	*p*	*t**
Character	Spain	0.61	0.27	0.04	-2.04
	Thailand	0.51	0.25		
Citizenship	Spain	0.64	0.21	0.06	1.93
	Thailand	0.73	0.24		
Communication	Spain	0.55	0.26	0.44	0.78
	Thailand	0.59	0.26		
Collaboration	Spain	0.58	0.22	0.001	3.43
	Thailand	0.72	0.19		
Critical thinking	Spain	0.60	0.26	0.30	-1.04
	Thailand	0.55	0.25		
Creativity	Spain	0.48	0.24	0.07	1.84
	Thailand	0.58	0.28		

** There is a statistically significant level of 0.05.*

Table 5 indicates the comparing post-test of each indicator of students' learning skills 6Cs between Spain and Thailand. There were showing significant differences in character (p=0.04) and collaboration (p=0.001), however, there were not showing significant differences in citizenship (p=0.06), communication (p=0.44), critical thinking (p=0.30), and creativity (p=0.07). In detail, the mean of students' character in Spain was 0.61, and in Thailand was 0.51. The mean of citizenship of pupils in Spain was 0.64 and in Thailand was 0.73. The average of students' communication in Spain was 0.55 and in Thailand was 0.59. The mean of students' collaboration in Spain was 0.58 and in Thailand was 0.72. The mean of critical thinking of pupils in Spain was 0.60 and in Thailand was 0.55. The average of students' creativity in Spain was 0.48 and in Thailand was 0.58.

Table 6. Comparing each indicator of learning skills between pre-and post-test in Spain and Thailand

Learning skills	Countries	Spain		*p*	*t**	Thailand		*p*	*t**
	test	$\bar{X}$	*SD*			$\bar{X}$	*SD*		
Character	Pre-	0.41	0.23	0.095	-1.71	0.30	0.21	0.000	-7.71
	Post-	0.50	0.27			0.60	0.25		
Citizenship	Pre-	0.38	0.23	0.070	-1.85	0.38	0.20	0.000	-4.74
	Post-	0.47	0.26			0.58	0.22		
Communication	Pre-	0.31	0.15	0.000	-4.47	0.24	0.23	0.000	-6.85
	Post-	0.49	0.25			0.54	0.25		
Collaboration	Pre-	0.36	0.22	0.001	-3.67	0.42	0.24	0.000	-5.03
	Post-	0.56	0.24			0.64	0.21		

Critical thinking	Pre-	0.33	0.21	0.000	-3.88	0.41	0.25	0.000	-4.01
	Post-	0.52	0.25			0.58	0.26		
Creativity	Pre-	0.26	0.19	0.000	-4.52	0.30	0.21	0.000	-3.92
	Post-	0.48	0.31			0.50	0.32		
Total	**Pre-**	**0.34**	**0.11**	**0.000**	**-6.96**	**0.34**	**0.10**	**0.000**	**-11.22**
	Post-	**0.50**	**0.13**			**0.57**	**0.16**		

** There is a statistically significant level of 0.05.*

Furthermore, the researchers examined students' learning skills in Table 6 to analyze their improving learning skills. This study suggested that pupils' learning skills in Spain and Thailand differed between pre-and post-test. In Spain, in the summary of pupils' learning skills, there was a statistically significant difference in the average of learning skills between the pre-test (M = 0.34, SD = 0.11) and post-test (M = 0.50, SD = 0.13), t (49) = -6.96, p = 0.000. Each indicator was evaluated and found that there were not showing significant differences in character and citizenship (p>0.05), however, there were significant differences in communication, collaboration, critical thinking, and creativity (p<0.05). The means of character in the pre-test was 0.41 (SD = 0.23) and in the post-test was 0.50 (SD = 0.27)and testing for the mean for both tests concluded that the average of character was not significantly different at p =0.095(t= -1.71). In addition, the means of citizenship in the pre-test was 0.38 (SD = 0.23) and in the post-test was 0.47 (SD = 0.26)and testing for the mean for both tests concluded that the average of character was not significantly different at p =0.07(t= -1.85). However, the communication was a statistically significant difference in the average between the pre-test (M = 0.31, SD = 0.15) and post-test (M = 0.49, SD = 0.25), p = 0.000. (t = -4.47). The collaboration was a statistically significant difference in the average between the pre-test (M = 0.36, SD = 0.22) and post-test (M = 0.56, SD = 0.24), p = 0.001. (t = -3.67). The critical thinking was a statistically significant difference in the average between the pre-test (M = 0.33, SD = 0.21) and post-test (M = 0.52, SD = 0.25), p = 0.000. (t = -3.88). Finally, creativity was a statistically significant difference in the average between the pre-test (M = 0.26, SD = 0.19) and post-test (M = 0.48, SD = 0.31), p = 0.000. (t = -4.52). In Thailand, in the summary of pupils' learning skills, there was a statistically significant difference in the average learning skills between the pre-test (M = 0.34, SD = 0.10) and the post-test (M = 0.57, SD = 0.16), t (50) = -11.22, p = 0.000. Each indicator was evaluated and found that there were showing any significant differences in all indicators of learning skills (p<0.001) by the mean of character in the pre-test was 0.30 (SD = 0.21) and the post-test was 0.60 (SD = 0.25). The average citizenship in the pre-test was 0.38 (SD = 0.20) and the post-test was 0.58 (SD = 0.22). The communication, the mean in the pre-test was 0.24 (SD = 0.23) and the post-test was 0.54 (SD = 0.25). The mean of collaboration in the pre-test was 0.42 (SD = 0.24) and the post-test was 0.64 (SD = 0.21). The average critical thinking in the pre-test was 0.41 (SD = 0.25) and the post-test was 0.58 (SD = 0.26). Finally, for creativity, the mean in the pre-test was 0.30 (SD = 0.21) and the post-test was 0.50 (SD = 0.32).

Table 7.Comparing students' learning styles between Spain and Thailand

	Countries	N	$\bar{X}$	*SD*	*t**	*p*
Learning styles	Spain	125	3.83	0.64	-2.06	0.04
	Thailand	124	3.62	0.34		

** There is a statistically significant level of 0.05.*

Legend*: Excellent 4.50 – 5.00; Strong 3.50 – 4.49; Poor 2.50 – 3.49; Moderate 1.50 – 2.49; Minimal 1.00 – 1.49*

The learning styles of the students were assessed, the students in both countries showed strong learning styles and this study found that participants in Spain (M = 3.83, SD = 0.64) could be specifying their learning styles of themselves better than those in Thailand (M = 3.62, SD = 0.34). This difference was significant t (74.38) = -2.06, p = 0.04; however, it did represent a small effect size r = 0.23.

Table 8. Contains some examples of questions used to test the learning skills

Questions	Spain		Thailand		*t**	*p*
	$\bar{X}$	S.D.	$\bar{X}$	*SD*		
Visual-Spatial						
I can readily grasp and follow a map's directions.	3.28	0.57	3.65	1.13	2.07	0.04
I believe that seeing something in my head is the greatest method for me to remember it.	3.84	1.10	4.22	0.88	1.90	0.06
Flow charts, branching programs, and contingency planning strategies appeal to me.	3.70	1.04	3.43	0.92	-1.38	0.17
I enjoy working on and solving jigsaw puzzles and mazes.	3.96	1.07	2.65	1.15	-5.95	<0.001

I adore doodling; even my notes are filled with images and arrows.	2.68	1.30	3.12	1.41	1.62	0.11
I like to utilize textual material on the board, complemented by visual aids and prescribed reading.	3.86	1.16	3.43	0.92	-2.06	0.04
Total	**3.55**	**0.74**	**3.42**	**0.59**	**-1.04**	**0.30**
Body- Kinaesthetic						
In class, I prefer to utilize posters, models, or actual practice and other exercises.	4.00	1.16	3.08	0.91	-4.43	<0.001
I am quite comfortable touching, embracing, and shaking others' hands.	2.18	1.22	3.82	1.21	6.78	<0.001
During learning sessions, I grasp items with my hand.	3.54	1.15	3.80	0.92	1.28	0.20
I like working with my hands and creating things.	3.80	0.99	4.12	0.68	1.88	0.06
When I am taught how to do something and allowed to try it, I learn best.	3.90	1.20	3.76	0.74	-0.68	0.50
I often learn that acts influenced by feelings are just as sound as those based on careful consideration and research.	4.14	0.83	3.65	1.18	-2.43	0.02
Total	**3.59**	**0.72**	**3.71**	**0.48**	**0.92**	**0.36**
Musical						
My greatest memory is of listening to a lecture that included facts, explanations, and conversations.	3.88	1.48	3.47	1.00	-1.62	0.11
I can do well in academic disciplines by listening to lectures and cassettes.	3.84	1.13	3.22	1.17	-2.72	0.008
I'd rather hear an excellent lecture or speech than read about the same subject.	4.10	1.09	3.14	1.46	-3.76	<0.001
I would rather receive the news broadcast on the radio or online than read about it in the newspaper or internet.	3.16	1.09	3.22	1.36	0.23	0.82
When given pairings of sounds, I can detect if they match.	3.86	1.05	3.57	0.75	-1.60	0.11
Oral directions are easier for me to follow than written ones.	4.22	1.09	3.78	0.90	-2.19	0.03
Total	**3.84**	**0.76**	**3.40**	**0.61**	**-2.90**	**0.005**
Interpersonal						
In group activities, I frequently chose the reader.	4.36	0.96	3.51	1.21	-3.91	<0.001
When my friends are having trouble, they want to chat with me.	4.32	1.06	3.98	1.10	-1.59	0.12
I enjoy debating or discussing topics with my friends because I want to gain new opinions from them.	4.18	1.02	4.10	0.88	-0.43	0.67
I am more inclined to pitch in and provide suggestions in a study group working on challenging topics.	3.32	0.96	3.65	1.02	1.66	0.10
When working on a collective assignment, I like group brainstorming in which everyone offers ideas.	3.96	0.93	3.94	0.79	-0.11	0.91
I enjoy getting together with other friends to discuss and hang out.	4.36	0.82	4.16	0.97	-1.15	0.25
Total	**4.08**	**0.47**	**3.89**	**0.61**	**-1.81**	**0.07**
Intrapersonal						
My friends tend to have a lot of reasons to change my opinion.	4.36	0.96	3.37	0.82	-5.54	<0.001
I don't mind upsetting people's sentiments as long as the work is completed.	4.10	1.09	3.22	1.21	-3.87	<0.001
In conversations with others, I frequently find myself to be the most dispassionate and impartial.	3.16	1.10	3.43	1.08	1.25	0.21
Self-reflection, independence, and working alone helped me learn more effectively.	3.86	1.05	4.04	1.06	0.86	0.40
I prefer to solve difficulties by going somewhere quiet and thinking about a possible solution.	4.22	1.09	3.53	1.19	-3.04	0.003
When I'm alone, I frequently converse, sing, and hum to myself.	4.36	0.80	4.41	0.73	0.34	0.73
Total	**4.01**	**0.73**	**3.67**	**0.57**	**-2.64**	**0.01**

Linguistic						
I recall things better when I write them down multiple times.	4.00	1.18	3.69	0.81	-1.56	0.12
For simple comprehension, I like to write things down or take notes.	3.94	1.19	3.55	1.12	-1.71	0.09
I can comprehend a new article better if I read about it in a magazine or on the internet. rather than listening to a radio or internet report about it.	3.88	1.02	3.27	1.08	-2.89	0.005
I prefer reading about an intriguing subject to learning about it.	3.50	1.17	3.88	0.71	1.99	0.05
Writing or reading poetry, history, or fiction is one of my hobbies.	4.18	1.29	2.71	1.43	-5.44	<0.001
When I have free time, I like playing word games with my buddies.	3.76	1.08	3.37	1.20	-1.71	0.09
Total	**3.88**	**0.83**	**3.41**	**0.49**	**-3.42**	**0.001**
Logical-Mathematical						
Before making a decision, I prefer to consider a variety of options.	4.02	1.15	4.12	0.86	0.48	0.63
I'm curious about the fundamental assumptions, concepts, and theories underlying the planning of things and occurrences.	3.26	0.99	3.75	0.80	2.72	0.008
I am concerned with the interpretation of evidence that is accessible to me and avoids leaping to conclusions.	3.94	1.06	3.49	0.95	-2.25	0.03
Decisions based on a careful review of all available facts, in my opinion, are sounder than those based on intuition.	3.92	1.12	3.86	0.72	-0.30	0.76
I am eager to find solutions using a rational approach.	3.80	0.86	3.76	0.89	-0.20	0.84
I prefer to study in a class that includes experiments since it makes things easier to grasp.	4.02	0.89	4.00	0.89	-0.11	0.91
Total	**3.83**	**0.54**	**3.83**	**0.46**	**0.03**	**0.97**

** There is a statistically significant level of 0.05.*

Table 8 gives the total of each indicator as well as the item's details in different countries. When the indicators of learning styles were compared between students in Spain and Thailand, there were no significant differences in visual-spatial, body-kinaesthetic, interpersonal, and logical-mathematical ($p > 0.05$). However, there was a significant difference between Spain and Thailand in musical, intrapersonal, and linguistic ($p < 0.05$), in which Spanish students outperformed Thai students in these indicators. The students in Spain showed strong in all indicators of learning styles, furthermore, the students in Thailand showed strong in body-kinaesthetic, interpersonal, intrapersonal, and logical-mathematical. However, they showed poorly in visual-spatial, musical, and linguistic.

The means of Visual-Spatial in Spain was 3.55 (SD = 0.74) and in Thailand was 3.42 (SD = 0.59) and testing for the mean for both counties concluded that the average of both counties was not significantly different at 0.05 level. However, we found that there was a significant difference in some topics, which demonstrates that the students in Thailand could readily grasp and follow a map's directions better than in Spain ($t= 2.07$, $p = 0.04$). In contrast, students in Spain could enjoy working on and solving jigsaw puzzles and mazes ($t= -5.95$, $p <0.001$) and like to utilize textual material on the board, complemented by visual aids and prescribed reading ($t= -2.06$, $p = 0.04$) better those than in Thailand. The means of body-kinaesthetic in Spain was 3.59 (SD = 0.72) and in Thailand was 3.71 (SD = 0.48) and testing for the mean for both counties concluded that the average of both countries was not significantly different at 0.05 level. The researchers' study in depth found that Spanish students were more utilize posters, models, or actual practice and other exercises In class (significant at $t= -4.43$, $p <0.001$) and often find that acts influenced by feelings are just as sound as those based on careful consideration and research (significant at $t= -2.43$, $p =0.02$) than Thailand students., however, Thailand students was more quite comfortable touching, embracing, and shaking others' hands (significant at $t= 6.78$, $p <0.001$) than Spanish students. The means of musical in Spain was 3.84 (SD = 0.76) and in Thailand was 3.40 (SD = 0.61) and testing for the mean for both counties concluded that the average of both countries was significantly different at 0.05 level. It demonstrates that students in Spain were listening more to lectures and cassettes, they could do well in academic disciplines ($t= -2.72$, $p = 0.008$), and would rather hear an excellent lecture or speech than read about the same subject ($t= -3.76$, $p < 0.001$) and oral directions was easier for them to follow than written ones ($t= -2.19$, $p = 0.03$) than the students in Thailand. The means of interpersonal in Spain was 4.08 (SD = 0.47) and in Thailand was 3.89 (SD = 0.61) and testing for the mean for both counties concluded that the average of both countries was not significantly different at 0.05 level. However, we found that there was a

significant difference in one topic, which demonstrates that students in Spain more frequently chose the reader in group activities than in Thailand (t= -3.91, p<0.001). The means of intrapersonal in Spain was 4.01 (SD = 0.73) and in Thailand was 3.67 (SD = 0.57) and testing for the mean for both counties concluded that the average of both countries was significantly different at 0.05 level. It demonstrates that students in Spain could tend to have a lot of reasons to change their opinion from their friends (t= -5.54, p <0.001), they didn't mind upsetting people's sentiments as long as the work was completed (t= -3.87, p <0.001) and they prefer to solve difficulties by going somewhere quiet and thinking about a possible solution (t= -3.04, p = 0.003) greater than the students in Thailand. The means of linguistics in Spain was 3.88 (SD = 0.83) and in Thailand was 3.41 (SD = 0.49) and testing for the mean for both counties concluded that the average of both countries was significantly different at 0.05 level. It demonstrates that students in Spain were more able to comprehend a new article better if they read about it in a magazine or on the internet rather than listening to a radio or internet report about it (t= -2.89, p = 0.005), and their hobby was writing or reading poetry, history, or fiction (t= -5.44, p <0.001) than the students in Thailand. In contrast, students in Thailand could prefer reading about an intriguing subject to learning about it (t= 1.99, p = 0.05) better than in Spain. The means of Logical-Mathematical in Spain was 3.83 (SD = 0.54) and in Thailand was 3.83 (SD = 0.46) and testing for the mean for both counties concluded that the average of both countries was not significantly different at 0.05 level. However, we found that there was a significant difference in some topics, which demonstrates that students in Thailand could be curious about the fundamental assumptions, concepts, and theories underlying the planning of things and occurrences. (t= 2.72, p = 0.008) better than in Spain. In contrast, students in Spain could be concerned with the interpretation of evidence that was accessible to them and avoided leaping to conclusions (t= -2.25, p = 0.03) better than in Thailand.

Conclusion

This study has achieved its objectives. Firstly, to study the learning styles of pupils in secondary schools across different societies and cultures, researchers found that the students in Spain could specify their learning styles of themselves better than in Thailand. We discovered that Thailand students demonstrated higher body-kinaesthetic than Spanish students based on just one indicator. In addition, the logical-mathematical between both countries had the same mean. Furthermore, Spanish students had greater visual-spatial, musical, intrapersonal, interpersonal, and linguistic abilities than Thai students. We conclude that pupils in various civilizations and cultures have distinct learning styles. As pointed out by Bhatnagar and Sinha (2018), every individual was defined by a learning style that evolves, and the learning style may be influenced by diverse cultural environments.

Secondly, studying pupils' learning skills in secondary schools across different societies and cultures, researchers comparing the learning skills between both countries found that the pre-and post-test of learning skills (Six Cs) of students between both countries were not significant differences at the 0.05 level. However, after they received training character and collaboration between Spain and Thailand were significant differences at 0.05. The students in Spain had more character than the students in Thailand, on the one hand, the students in Thailand had more collaboration than the students in Spain. As a consequence, students in both countries had four measures of learning skills that did not differ considerably, one indication that differed slightly, and one indicator that differed dramatically. We indicated that although the students are from different cultures and environments, they had similar learning skills. However, this finding differs from those of Ajisuksmo and Vermunt (1999), cultural variables may have caused significant trouble or misunderstanding when students themselves had to think about their orientations to their studies. Furthermore, the learning skills of each country were considered, we found that the Six Cs of the students in Thailand were developed and there were significant differences at the 0.05 level. In addition, the students in Spain could develop the Six Cs the same in Thailand, however, the character and citizenship were not significant differences at the 0.05 level. Such that, the students in both countries showed their learning skills had significantly increased. This implies that culture influenced learning styles but not learning skills and that the teachers in school had an important role in activating students' learning skills. According to Gultom, et al. (2020), the adoption of teaching skills is supposed to pique students' interest in learning more effectively.

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