

DIFFICULTIES FACED BY GEOGRAPHY TEACHERS IN USING CONCEPTUAL MAPS OF ALL SCHOOL STAGES FROM THE POINT OF VIEW OF THE TEACHERS THEMSELVES IN THE IRBID DISTRICTS OF EDUCATION IN IRBID GOVERNORATE

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Abstract

This study aimed to explore the levels of difficulty faced by geography teachers when using conceptual maps as a teaching method. An analytical descriptive method was adopted, and the study sample comprised 204 male and female geography teachers from the education districts in Irbid Governorate.

The results revealed that geography teachers encountered medium-level difficulties in using conceptual maps across all stages in public schools, as perceived by the teachers themselves. These difficulties were attributed to a lack of emphasis on conceptual maps during university education, leading to less inclined graduates to utilize them as a teaching tool in the geography curriculum.

Furthermore, the findings indicated no statistically significant differences at the $\alpha = 0.05$ level between the difficulties faced by geography teachers in using conceptual maps concerning gender, years of experience, or the interaction between these variables.

The study recommended revising undergraduate study plans for geography students in Jordanian universities to include multiple courses that simulate practical teaching environments in schools. This would better prepare future teachers to handle classroom situations effectively. Additional recommendations included reducing geography teachers' workloads, providing training on applying conceptual maps in teaching, and encouraging the Ministry of Education to hire qualified staff to alleviate teacher workload.

Keywords: Conceptual Maps, Geography Education, Teacher Training, Teaching Difficulties, Educational Strategies.

Introduction

Modern educational processes increasingly priorities student needs and interests, incorporating findings from empirical research in education and psychology. These studies emphasise the importance of the student as an active participant in learning, moving away from the outdated view of students as mere recipients of information (Huteibat, 2008, p. 15).

A teacher's ability to effectively convey concepts is pivotal for assessing student progress. When students grasp

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fundamental concepts, their chances of academic success and ability to solve problems increase. This process largely depends on the method through which concepts are introduced. Teaching methods aligned with students' conceptual frameworks enable them to connect new learning experiences with previously acquired knowledge, fostering meaningful learning. Using conceptual maps as a teaching tool exemplifies this approach (Shamlati, 2004, p. 10).

Conceptual mapping, introduced in the 1960s by Joseph Novak at Cornell University, draws on Ausubel's theory of meaningful learning, which focuses on the hierarchical organization of concepts and advanced organizers. This strategy reflects the hierarchical nature of human cognition, aiding in representing and clarifying psychological structures. Since its inception, conceptual mapping has gained prominence as an effective teaching method across various curricula (Azab, 2004, p. 32).

Mheidat and Al-Mahasna (2009, p. 94) define conceptual maps as "multi-dimensional schematic diagrams representing the structure of concepts in a text, organized sequentially in a hierarchical form." The central concept appears at the top, followed by less general concepts, with links illustrating their relationships. Similarly, Atallah (2001, p. 133) describes conceptual maps as tools for organising ideas and clarifying relationships between concepts in a curriculum, enhancing students' understanding and knowledge organization.

Conceptual maps are visually constructed using shapes (e.g., ovals, circles, or squares) to represent concepts, with linking words such as "consists of" or "constituted from" indicating relationships. These links are visually represented by lines connecting concepts in a hierarchy. Examples of conceptual maps include specific events or objects that represent concrete instances of concepts (Al-Khatayba, 2005).

The value of conceptual maps as a teaching strategy lies in their ability to

1. Organise information: Simplify complex information into logical, understandable structures.
2. Clarify relationships: Highlight connections between ideas, fostering comprehensive understanding.
3. Stimulate critical thinking and creativity: Encourage unconventional thinking and discover new relationships between concepts.
4. Aid planning and decision-making: Facilitate analysis of complex information to identify key factors and relationships.

5. Enhance memory and recall: Present information visually, making it easier to remember and retrieve.
6. Support teaching and learning: Simplify and clarify concepts, improving comprehension and learning outcomes (Kinchin & Hay, 2014).

The effectiveness of conceptual maps as a teaching tool largely depends on the teacher's competency and ability to apply them successfully. Teachers are central to the success of curricula, while external factors such as resources and teaching conditions may influence the use of such tools. In geography education, where visual aids such as maps, charts, and aerial photographs are essential, teachers face unique challenges that may complicate the use of conceptual maps.

Based on these considerations, the current study aims to identify the difficulty geography teachers have using conceptual maps across all school stages.

Study Importance

The importance of this study stems from the significance of its subject matter. As a modern educational tool, conceptual maps play a vital role in enhancing academic achievement, improving students' understanding and retention of concepts, and fostering creative and deductive thinking. By addressing these aspects, conceptual maps contribute to the fulfilment of key educational goals.

This study aims to uncover teachers' difficulties and challenges in utilizing conceptual maps. Identifying such challenges is essential for two primary reasons:

1. To address weaknesses by proposing practical solutions.
2. To highlight strengths and provide strategies for reinforcement and further development.

Additionally, the significance of this study is underscored by the following

- Responding to contemporary educational trends: The study aligns with the current emphasis on reconsidering curricula and adopting innovative teaching methods that promote meaningful learning. The conceptual map strategy is one such method.
- Curriculum development: Insights from this research may enhance geography curricula across all school stages, ensuring alignment with the conceptual map strategy in teaching.

- **Procedural model introduction:** The study presents a procedural framework for identifying geography teachers' challenges in using conceptual maps. This framework may be generalized to other curricula or applied to different educational contexts and study populations.

Study Objectives

This study aimed to explore, from the geography teachers' perspective, the difficulties they encounter when using conceptual maps as a teaching method. Specifically, the study sought to:

1. Identify the challenges related to conceptual map construction, use, and application.
2. Examine difficulties arising from sharing the preparation of conceptual maps with students.
3. Investigate challenges stemming from the school environment and its impact on the effective use of conceptual maps.

Study Problem

The study problem was identified by reviewing previous research and the researcher's personal experience, including discussions with postgraduate students during academic engagements. Additionally, the problem became evident through observed weaknesses among teachers, particularly geography teachers in effectively using conceptual maps. These weaknesses were hypothesized to stem from the difficulties faced by teachers in employing conceptual maps as a teaching tool.

The study was designed to address the following research questions

1. What are the difficulties geography teachers face in using conceptual maps across all stages, as perceived by the teachers in the education districts of Irbid Governorate?
2. Are there statistically significant differences in the mean scores of difficulties geography teachers face in using conceptual maps across all stages based on gender, years of experience, and the interaction between these variables?

Definitions of Terms

1. Difficulty

Defined as any factor that negatively impacts technology or educational aids, hindering their optimal application to achieve desired educational goals (Al Mikhlaifi, 2008, p. 18).

2. Procedural definition

In this study, difficulties refer to factors that adversely affect or limit geography teachers' effective use of conceptual maps, as identified through the study tool.

3. Conceptual Map

A diagram illustrating relationships between concepts, represented as boxes or circles connected by lines or arrows labelled with linking phrases. Broad concepts are positioned at the top of the map, with subordinate concepts arranged hierarchically below (Al Farisi, 2003, p. 35).

4. Procedural definition

In this study, geography teachers structured conceptual maps to represent the relationships between general and subsidiary concepts in topics covered in basic and high school geography curricula.

5. Geography Teachers

This refers to geography teachers working in schools across the education districts of Irbid Governorate in the Hashemite Kingdom of Jordan.

6. All Stages

According to the Jordanian education system, this term encompasses all grade levels in public schools, from the basic to the high school stage.

Study Limitations

This study is subject to the following limitations:

1. **Focus:** The study is restricted to identifying the difficulties geography teachers face in using conceptual maps as a teaching method.
2. **Participants:** The study is limited to male and female geography teachers working in government schools.
3. **Geographic Scope:** The study focuses exclusively on schools in the Irbid Governorate, Jordan.

4. **Content:** The study investigates difficulties related to conceptual maps and excludes other teaching aids.

5. **Timeframe:** The study is limited to the academic year 2023–2024.

Previous Studies

The researcher reviewed several studies related to the topic of this study

(Al-Athamat and Maqabla, 2021) The study aimed to discover the level of conceptual maps used and the level of secondary school students' motivation. The study followed an analytical descriptive method, with a sample of 308 12th-grade male and female students in Jordan. The study results showed that the level of use of conceptual maps was high, the internal motivation level was high, the level of external motivation was low, and statistically significant differences were found at the level of the overall use of conceptual maps attributed to the gender variable in favour of female students, differences between academic tracks in favour of the scientific track were found, interaction between academic track and gender variables existed with differences in favour of the scientific track for male students with results also showing that conceptual maps explained 51% of internal motivation and 71% of external motivation.

A systematic review study (Vural & Aydin, 2021) investigated the importance of concept mapping in e-learning environments in various countries, including the USA, the United Kingdom, Turkey, and South Korea. Analysis of the results of the numerous studies showed concept mapping to play an important role in facilitating learners' acquisition of knowledge and developing cognitive skills such as problem-solving and critical thinking. The results showed that learners using concept mapping improved understanding and knowledge retention. The study also highlighted some challenges of applying concept mapping in e-learning while recommending improved effectiveness. The value of this systematic review lies in the insight it reveals in discussing benefits and potential disadvantages to learners and instructors.

A study by (Sabbaghan and others, 2013) aimed to discover the importance of conceptual maps in learning organic chemistry in Iran. Different conceptual maps were drawn up with distinguishing linkages. These maps were used to teach 208 university students. Results showed that conceptual maps played a significant role in teaching organic chemistry and that the more cohesively linked the concept map, the greater the ability to improve student education; thus, the study drew attention to the importance of care being taken in designing concept map characteristics and content.

A study (Charskey & Ressler, 2011) aimed to discover the impact of conceptual maps on improving student motivation to learn through computer games. The study tested three groups of ninth-grade students. The concept map was applied to explain game concepts to Group One, while a concept map for a historical subject was applied to Group Two. Group three students were allowed to play the computer game without being introduced to a concept map. Analysis results showed that group one displayed a reduction in motivation and playing, while group two showed an increase in motivation and playing. Group three showed more motivation than the two groups. The study recommended that good care and attention be exercised when preparing conceptual maps relative to the subject taught.

A study by (Mih & Mih, 2011) aimed to achieve constant self-learning and learning reinforcement. To this end, the study was conducted with the participation of 67 ninth-grade students in the United States of America, who were distributed into three groups. The first group was shown a concept map to be used in teaching a geography lesson; the second group was shown a concept map for a biology lesson, and the third group was a control group. Results showed that students in groups one and two gained better self-learning abilities, and their learning was reinforced. Based on these results, the study recommended that conceptual maps be used in teaching geography and biology.

The study (Mustafa, 2009) aimed to study the reality of mathematic creativity in the Palestinian curriculum and the effectiveness of conceptual maps and their development for creativity for seventh-grade students. Upon data analysis, the study tool showed the existence of differences of statistical significance in the reality of creativity in mathematics in the Palestinian curriculum and the effectiveness of the use of conceptual maps in the development of student creativity, a difference between before and after results and retention of the experiment group at all levels and the total grade. Based on the above, the study recommended holding training courses for supervisors on concept map strategy.

A study by Obaidat (2009) investigated the effect of using a concept map strategy based on cognitive thinking skills in improving textual mathematical problems alongside the academic self-concept of students with learning difficulties in the Kingdom of Saudi Arabia. Finally, the study concluded that such an effect existed, thus recommending conceptual map strategies.

A study (Gurlitt & Renk, 2008) aimed to discover the impact of the cohesion

effect within the concept map concepts on cognitive achievement among students. To this aim, the study designed conceptual maps, some of which were cohesive – links between concepts were clear and cohesive - while others were non-cohesive. The two types were applied to teaching students in randomly chosen schools and universities in Germany. Results showed that cohesive conceptual maps contributed to activating student knowledge of the subject taught, while the non-cohesive maps did not. The study recommended that links between concepts be clarified since highlighting the main concepts in the lesson or subject and subsequently placing them in a hierarchical order from general to specific is insufficient; links need to be cohesive for the concept map to achieve its purpose.

A study by (Al Hteibat, 2008) aimed to discover the effective use of conceptual maps and brainstorming in developing creative thinking skills of seventh-grade female students in the Islamic Education subject in Jordan. Upon application of the study tools and the analysis of their results, differences of statistical value existed between averages of the three study groups' performance (conceptual maps, brainstorming, regular) on creative thinking, which were attributable to teaching strategies in favour of brainstorming strategy relative to conceptual maps, in favour of conceptual maps in comparison with the regular method. In conclusion, the study recommended the importance of using concept map strategy and brainstorming in teaching due to the evidence of their effectiveness in developing creative thinking.

A study by (Novak and others, 2008) aimed to identify principles of concept map strategy and how they may be constructed and used. Using the descriptive method, the study addressed the rooting concept in mapping theory and several theoretical and applied trials. Additionally, it researched the significance of conceptual maps to learners. In conclusion, it found that conceptual maps were not merely diagrams to further understanding but a tool to aid learners in finding and acquiring new knowledge. Given the results, the study recommended that further theoretical and applied studies be carried out in conceptual maps.

A study by (Al Shukraji & Al Taai, 2007) identified the effect on fourth-grade female students in Mosel of using conceptual maps and their grasp of geographic concepts. To this aim, the two researchers prepared nine conceptual maps, teaching plans, and a test of the concepts. The empirical design included two groups: one experimental and a control group. The first used conceptual maps, while the second used regular teaching. Sixty-one female students took the concept test. Upon analysis, results showed a better understanding of geography concepts for the first group than for the control group. The study recommended further research in this field based on the results.

A study (Canas & Navak, 2006) aimed to apply new recommendations regarding the structure and use of mechanisms for conceptual maps in order to achieve their purpose more efficiently. It reviews the traditional principles of conceptual maps while also investigating teachers' difficulties in using them. The study concluded that teachers' most prominent difficulty was that no global standard method or principles existed for constructing maps. The study recommended that greater attention be exercised in preparing conceptual maps and establishing global standards for these maps.

A study by (Habashneh, 2006) aimed to identify the effect of individual and cooperation. Learning is based on conceptual maps, expressive writing, and the attitude of basic education students in Jordan towards essay and composition writing. Analysis of both study tool results showed that differences of statistical value existed between means for three female student groups in their expressive writing performances, in favour of the two empirical groups in which conceptual maps strategy was applied. The study recommended using these maps as a teaching aid due to their evident benefit to the female students in the study.

The study by (Al Deirshawi, 2006) aimed to identify the most important problems that face eleventh grade (1st-year high school) geography teachers from the teachers' viewpoint in the Damascus and Al Hasaka governorates. A questionnaire was used as the study tool to achieve the study goal. Ninety-six teachers participated in the questionnaire. The study recommended that educational specialists and geographers revise the geography textbook alongside competent teachers to create a better school textbook in form and content that includes modern and novel concepts since the most significant challenge teachers face is the content nature of the teaching material.

A study (Laight, 2005) prepared a questionnaire and applied it to several medicine and pharmacy students at Portsmouth University in Great Britain to discover their viewpoint on the method and importance of conceptual maps in improving their cognitive achievement and applied skills. Results proved that students received conceptual maps with satisfaction because they contributed to increasing learning motivation and participated in the educational process in honing their practical skills. The study recommended adopting concept mapping as a teaching method, even in medicine and biology.

A study (Zalloum, 2004) aimed to discover the effect of using conceptual maps in teaching the new general science textbooks on the retention of students in the upper basic education level in Palestine, their grades and interaction in the classroom, and the effect of the student gender variable. Statistics showed that differences of statistical value existed in students' accumulative grades attributable to the teaching method and in favour of the experimental group. Consequently, it was strongly recommended that teachers use a concept map strategy.

A study (Azab, 2004) investigated the impact of using conceptual maps on second-grade students' acquisition of geographic concepts and the development of inferential thinking. The study was based on an empirical method in applied teaching by designing two groups, one experimental and the other a control group, consisting of 30 students. In an achievement test, the study showed differences in statistical mean value in the empirical group students' grades compared with the grades in the control group in favour of the empirical group. The study recommended using conceptual maps as a teaching aid in teaching geography, which is important to student acquisition of the required knowledge and concepts. A study (Ahlberg, 2004) aimed to identify the conceptual roots of conceptual maps and their ability to establish sustainable development in students in Finland. This was achieved by discovering the students' viewpoints on the role of conceptual maps in sustainable development. The study tool was a questionnaire designed by the researcher and distributed to 205 school and university students. Results were positive in illustrating the role played by conceptual maps in establishing sustainable development concepts in students' minds, ensuring they would carry these concepts forward and practice them in the future. The study recommended that it was necessary to adopt conceptual maps in the educational process and perform more studies on the subject.

A study by Puntambekar and others (2004) aimed to discover the impact of concept map use in improving student understanding of navigation and its practical application. Participants were 18 high school students in the United States of America divided into two groups; one group was shown a concept map, and the other was not. The study showed that the first group's performance was noticeably better than the second group's. The study recommended using conceptual maps even in applied and practical lessons such as navigation.

In a study by (Bani Yaseen, 2002), the aim was to discover the impact of the use of a concept map method in teaching geography in the development of academic achievement and creative thinking in tenth-grade students in Jordan. The study tool was a questionnaire distributed to 48 students in a school in Amman. Study results showed statistically significant differences in student achievement and development of their creative thinking in geography, attributed to the teaching methods, namely, conceptual maps, in favour of the experimental group. The study subsequently recommended adopting the concept map method as a teaching method for geography in Jordan.

Armani and Rocci (2000) carried out a study to identify the importance of conceptual maps in electronic learning by addressing the results of prominent studies in this area. The study adopted the descriptive method, and its results showed that conceptual maps played a significant role in knowledge acquisition and honing skills in electronic learning in subjects such as designing information models, communication programs, and understanding subjects. Subsequently, the study recommended performing applied studies to test the relationship between conceptual maps and supporting e-learning in countries worldwide.

(Al Qaroot, 1998) This study aims to investigate the impact of conceptual maps on immediate and delayed student achievement in learning the hereditary unit of the tenth-grade biology curriculum in the Jeneen governorate in Palestine. Study results showed differences in statistical value in tenth-grade students' immediate achievement between the traditional teaching method and the concept map method, favoring the latter. Based on study results, it is recommended that the conceptual map teaching method be used, given its practical impact on improving student achievement.

Comments On Previous Studies

Most previous studies have focused on the impact of conceptual map usage on variables such as academic achievement, creativity, deductive thinking, motivation, and self-education (Azab, 2004; Mustafa, 2009; Obaidat, 2009; Makayla, 2021). This study, however, concentrates on identifying the difficulties teachers face in utilising conceptual maps. While some studies have used tools other than questionnaires, this research relies on a questionnaire for data collection. Furthermore, while the descriptive method has been used in previous research to study the impact of conceptual map usage or the difficulties teachers encounter, this study explicitly applies the analytical descriptive method.

Additionally, prior research has varied in subject areas, including biology, chemistry, e-learning, medical sciences, and applied sciences such as navigation (Sabbaghan et al., 2013; Mustafa, 2009; Al Hteibat, 2008). This study,

in contrast, focuses on geography teachers to investigate the use of conceptual maps within this particular field.

Study Methodology

This study employs an analytical descriptive method to identify the difficulties faced by geography teachers when using conceptual maps. The method involves using statistical measures such as repetition, percentages, and standard deviations to quantify these difficulties, as well as organizing and categorizing the responses from the study participants.

Population and Study Sample

The study population consisted of geography teachers from the Irbid Governorate district of education, estimated at 230 teachers. Given the relatively small population, all teachers were invited to participate, and by the end of the questionnaire collection process, after excluding responses that were unsuitable for statistical analysis, 204 questionnaires were deemed valid. This represents approximately 89% of the study population. Table 1 provides a detailed overview of the study sample's characteristics.

(Table 1) demonstrates that the distribution of the study sample according to gender was balanced. There were 106 male teachers (51.96%) and 98 female teachers (48.04%). Regarding years of experience, the highest proportion was in the 5–10 years' category, with 75 teachers (36.76%). The second largest group was teachers with more than 10 years of experience, numbering 67 teachers (32.84%), while 62 teachers (30.39%) had less than 5 years of experience.

Study Tool

The study utilized a field survey in the form of a specially designed questionnaire to achieve its objectives. The questionnaire addressed four main difficulties:

1. Constructing a conceptual map
2. Using the conceptual map
3. Student participation in constructing conceptual maps
4. General difficulties related to the school environment

To ensure the tool's validity and reliability, a panel of judges was consulted, and Cronbach's alpha was calculated to assess internal consistency, as shown in Table 2. The study tool underwent further verification by a group of 9 experts. After receiving feedback and reaching an agreement of over 80% among the judges, necessary modifications were made. The clarity and comprehensibility of the questionnaire paragraphs were then tested with the study participants before they were distributed to the study sample.

As indicated in (Table 2), the overall estimated coefficient of consistency for the study tool was 0, considered a high-reliability level. The consistency coefficients for the various dimensions of the study tool ranged between 0.75 and 0.79, all of which fall within an acceptable range for applying the tool in this study.

Validity of The Questionnaire

The validity of the questionnaire's construction was further confirmed by calculating the Pearson correlation coefficient between the scores of each questionnaire dimension and the total score. Additionally, the correlation coefficient between individual item scores and the total score of the respective

Table 1. Characteristics of the study sample.

Variable	Category	Frequency	Percentage (%)
Gender	Male	106	51.96%
	Female	98	48.04%
Total		204	100%
Years of experience	Less than 5 years	62	30.39%
	5 - 10 years	75	36.76%
	More than 10 years	67	32.84%
Total		204	100%

Table 2. Cronbach's Alpha coefficient of internal consistency.

Dimensions	Internal consistency
One is difficulties in constructing conceptual maps.	0.78
Two: difficulties regarding conceptual mapping activities when participating with students.	0.79
Three: The difficulty in using conceptual maps.	0.75
Four: General difficulties related to conceptual maps as a teaching method.	0.77
The study tool overall.	0.86

Table 3. The correlation coefficient between the dimension score and the total score of the questionnaire.

Dimensions	Internal consistency
One: difficulties in constructing concept maps	**0.68
Two: difficulties with conceptual map drawing activities when participating with students	**0.66
Three: Difficulties faced when using conceptual maps	**0.70
Four: General difficulties stemming from concept maps as a teaching method	**0.63

dimension was computed. Table 3 provides the correlation coefficients for each dimension with the total score, offering further support for the validity of the questionnaire.

** As indicated in (Table 3), the Pearson correlation coefficient between the score of each questionnaire dimension and the overall score ranged between 0.63 and 0.70. These values were found to be statistically significant at the $\alpha = 0.01$ level, suggesting a strong and reliable relationship between the individual dimensions and the total score of the questionnaire.

Table 4 presents the correlation coefficient values between individual item scores and the total score of the respective dimension. The statistical significance of these values further supports the validity of the questionnaire's construction.

(Table 4) clearly shows that the correlation coefficients between item scores and the dimension scores under which the items are listed ranged from 0.400 to 0.811. These values were statistically significant at the $\alpha = 0.01$ level, indicating high internal consistency. This further demonstrates the validity of the questionnaire, affirming that it can be trusted for application in the current study.

Questionnaire Correction

The questionnaire comprised 34 items, each followed by a 5-point Likert scale to reflect the participants' level of agreement. The scale was as follows:

- (Strongly disagree) 1 point
- (Disagree) 2 points
- (Neither agree nor disagree) 3 points
- (Agree) 4 points
- (I strongly agree) 5 points

To simplify evaluation and interpretation, the 5-point Likert scale was transformed into a standard scale of three categories:

- Weak (less than 2.33)
- Medium (2.33 to 3.66)
- High (greater than 3.66)

This classification was based on Abu Saleh's (2004) work, providing a clearer framework for analyzing the responses.

Statistical Analysis

Statistical analysis was carried out using the Statistical Package for Social Sciences (SPSS) V20 to address the study questions. The following methods were implemented:

- Pearson Correlation Coefficient: This was used to verify the internal consistency and validity of the study instrument (the questionnaire).
- Cronbach's Alpha: This equation was applied to measure the questionnaire's consistency coefficients, providing insights into the instrument's reliability.
- Simple Descriptive Statistics: These included frequencies and percentages to describe the study sample based on demographic information. Additionally, means and standard deviations were calculated to assess the average responses of study participants for each item within a dimension. Overall means and standard deviations were used to understand the variance in participant responses to each questionnaire item.
- F-test (One-Way ANOVA): This test was employed to determine whether there were statistically significant differences between the mean responses of study participants for the dimensions based on personal and professional variables (e.g., years of experience) divided into more than two categories.

Table 4. The correlation coefficient between item scores and the total dimension score.

Item number	Correlation coefficient	Item number	Correlation coefficient	Item number	Correlation coefficient
1	0.488**	13	0.680**	25	0.635**
2	0.645**	14	0.547**	26	0.469**
3	0.644**	15	0.562**	27	0.585**
4	0.400**	16	0.730**	28	0.458**
5	0.575**	17	0.531**	29	0.749**
6	0.811**	18	0.530**	30	0.428**
7	0.516**	19	0.625**	31	0.635**
8	0.541**	20	0.674**	32	0.469**
9	0.697**	21	0.574**	33	0.555**
10	0.749**	22	0.759**	34	0.486**
11	0.721**	23	0.743**		
12	0.776**	24	0.540**		

** A statistical significance exists at the level of significance $\alpha = 0.01$

Table 5. Mean and standard deviation for items related to difficulties constructing conceptual maps in descending order according to means.

Rate	No.	Item	Mean	Standard deviation	Level
1	6	Connecting with lines between concepts placed in boxes or shapes represents difficulty in constructing conceptual maps as a teaching method.	3.71	1.09	High
2	4	You find difficulty in organising and categorising concepts hierarchically from generalised to specific in the concept map	3.69	0.97	High
3	2	There is difficulty in deducing the concepts that should be included in the concept map based on the subject	3.67	0.86	High
4	5	It is challenging to use hierarchy to construct conceptual maps in a vertical line, with general concepts at the top and branch concepts related to the central concept below.	3.64	0.97	Medium
5	1	You find difficulty in defining the subject the concept map should address out of the many subjects in the geography curriculum	3.61	0.78	Medium
6	8	You find difficulty in adjusting conceptual maps in light of feedback from students.	3.59	1.02	Medium
7	3	Drawing the concept map on the board, projector, or computer can make it difficult to adopt conceptual maps as a teaching method.	3.58	1.07	Medium
8	7	Writing the appropriate words on the lines to describe the connecting relationship between concepts in the concept map model is challenging.	3.54	1.09	Medium
9	9	Giving students enough time to study the concept map and deduce generalisations and ideas represents a difficulty in continuously adopting concepts as a teaching method.	3.35	1.01	Medium
10	10	You find difficulty in performing a final evaluation to verify concept organisation and learners' understanding of the map	3.34	0.93	Medium
		Difficulties in constructing conceptual maps.	3.59	0.60	Medium

- Scheffe Test: In cases where the one-way ANOVA test identified significant differences between the categories of a variable, the Scheffe test was used for pairwise comparisons to explore which specific categories showed significant differences.

- Independent Samples T-Test: This was used to compare the mean responses between two independent groups, specifically to assess whether there were statistically significant differences between male and female participants regarding their responses.

- These statistical techniques allowed comprehensive data analysis to answer the research questions effectively.

Results of the Study

1. Results for Question One

What difficulties do geography teachers face in using conceptual maps for all stages, from the teachers' perspective, in education districts throughout Irbid Governorate?

2. Answering Question One

To address this question means and standard deviations were calculated for the following difficulties:

- Difficulties in constructing conceptual maps

- Difficulties in constructing conceptual maps with student participation

- Difficulties in using conceptual maps

- General difficulties related to conceptual maps as a teaching method

- Difficulties in constructing maps

These calculations were designed to determine the degree of difficulty that geography teachers face in these areas. Table 5 presents the mean and standard deviation for items related to difficulties in constructing conceptual maps. This data allows for a deeper understanding of

geography teachers' challenges while implementing conceptual maps in their teaching practice.

(Table 5) presents the mean and standard deviations for items related to the difficulties in constructing conceptual maps. The means for the items varied from 3.34 to 3.71, reflecting the range of difficulty levels reported by the teachers.

- Item 6, which states, "Connecting between concepts placed in boxes or shapes with lines represents a difficulty in constructing conceptual maps as a teaching method," received the highest rating with a mean of 3.71 and a standard deviation of 1.09. This indicates that teachers found constructing

conceptual maps the most challenging.

- Item 10, which states, "You find difficulty in performing a final evaluation to verify concept organization and learners' understanding of the map," received the lowest rating, with a mean of 3.34 and a standard deviation of 0.93. While still considered difficult, it was rated less challenging than other items.

The overall mean for difficulties in constructing conceptual maps was 3.59, with a standard deviation of 0.60. This indicates that, on average, teachers faced a moderate level of difficulty in constructing conceptual maps. The relatively low standard deviation also suggests that the responses were fairly consistent across participants.

Difficulty of concept map construction activities when students participate

(Table 6) presents each item's mean and standard deviation related to difficulties in constructing conceptual maps with student participation. The means for these items ranged from 3.68 to 3.40, indicating moderate difficulty in engaging students in conceptual map construction.

- Item 1, which states, "There is difficulty in making students read the lesson and choose concepts necessary for understanding meanings, then writing these concepts on the blackboard followed by a discussion with students about which idea or concept is more general," was rated highest with a mean of 3.68 and a standard deviation of 0.791. This suggests that teachers found involving students in this aspect of conceptual map construction particularly challenging.
- Item 6, which states, "There is difficulty in making students repeat concept map construction steps when moving onto other subjects," received

the lowest rating with a mean of 3.40 and a standard deviation of 0.842, indicating that while it was still perceived as a difficulty, it was less challenging than other items.

The overall mean for difficulties in constructing conceptual maps with student participation was 3.54, with a standard deviation of 0.738. This reflects a moderate difficulty in involving students in constructing conceptual maps, with relatively consistent responses from participants.

Difficulties using conceptual maps.

(Table 7) presents the mean and standard deviation for each item related to difficulties in using conceptual maps. The means for these items ranged from 3.22 to 3.96, indicating a varied but generally moderate level of difficulty in utilising conceptual maps.

- Item 2, which states, "There is difficulty in choosing the appropriate method for displaying conceptual maps to students," received the highest rating with a mean of 3.96 and a standard deviation of 0.87. This suggests that teachers found this aspect of conceptual maps the most challenging.
- Item 10, which states, "Chaos amongst students while using conceptual maps makes it difficult to achieve the purpose of using conceptual maps," received the lowest rating with a mean of 3.22 and a standard deviation of 0.91. Although considered a difficulty, it was rated less significant than other challenges.

The overall mean for difficulties in using conceptual maps was 3.60, with a standard deviation of 0.58. This indicates that teachers generally faced moderate difficulties in this area. The relatively low standard deviation suggests a consistent view among participants on the challenges they face when using conceptual maps in teaching.

Table 6. Mean and standard deviations for items related to difficulties constructing conceptual maps with student participation, in descending order according to mean.

Rate	No.	Item	Mean	Standard deviation	Level
1	1	It is difficult to make students read the lesson and choose concepts necessary for understanding meanings. Then, they write these concepts on the blackboard, followed by a discussion with students about which idea or concept is more general.	3.68	0.791	High
2	3	After preparing the hierarchically arranged concepts, you may find it difficult to arrive with students at the new linking words that form the relationships shown by the linking lines in the map.	3.60	0.927	Medium
3	2	You find difficulty wording more generalised concepts students highlighted and subsequently writing branch concepts (more specific).	3.57	0.808	Medium
4	5	The difficulty exists in reconstructing concept lists to arrive at a good representation of relationship meanings students understand.	3.51	0.856	Medium
5	4	Students searching for links between concepts in one part of the concept map and concepts in another makes it challenging to use conceptual maps as a teaching method.	3.49	0.811	Medium
6	6	There is difficulty in making students repeat concept map construction steps when moving on to other subjects	3.40	.842	Medium
		Difficulties in constructing conceptual maps with student participation.	3.54	0.738	Medium

Table 7. Means and standard deviations for each item related to difficulties in using conceptual maps, in descending order according to means.

Rate	No.	Item	Mean	Standard deviation	Level
1	2	There is difficulty in choosing an appropriate method for displaying conceptual maps to students	3.96	0.870	High
2	6	A lack of good knowledge about constructing and executing conceptual maps exists.	3.80	1.01	High
3	4	It is difficult to use technology such as computers and projectors to construct a concept map and display it to students.	3.78	1.01	High
4	5	The absence of background or training in conceptual maps is a great difficulty and determinant that prevents the use of conceptual maps.	3.63	0.97	Medium
5	1	There is difficulty in creating a teaching situation that is amiable to conceptual maps.	3.62	0.84	Medium
6	8	Students viewing conceptual maps as a waste of time or a recess for fun makes it challenging to use them.	3.61	1.02	Medium
7	3	Considering student characteristics during the display and discussion of conceptual maps makes it difficult to repeat.	3.56	1.05	Medium
8	7	Geography material is too great, preventing the use of conceptual maps.	3.54	0.99	Medium
9	9	The large number of students in the classroom limits the effective use of conceptual maps.	3.52	1.01	Medium
10	10	Chaos amongst students while using conceptual maps makes it difficult to achieve the purpose of using conceptual maps.	3.22	0.91	Medium
		Difficulties in using conceptual maps.	3.60	0.58	Medium

Table 8. Mean and standard deviation for each item related to general difficulties related to conceptual maps being a teaching method in descending order according to mean.

Rate	No.	Item	Mean	Standard deviation	Level
1	1	A difficulty arises from the teachers' inability to discard the traditional verbal method in teaching due to the unique nature of the geography subject.	3.92	1.16	High
2	7	Routine complications administrative laws impose in schools relative to equipment and teaching aids are regarded as difficulty in adopting conceptual maps as a teaching aid from one time to another.	3.86	1.25	High
3	6	Teachers' crowded period schedules and multiple additional tasks make them refrain from investing their time and effort in preparing conceptual maps and using them.	3.76	1.34	High
4	2	Scarcity in schools of those specialising in teaching aids and technology in general and those specialised in conceptual maps in particular whom teachers may consult makes it difficult to use conceptual maps as teaching aids from one time to another.	3.57	1.09	Medium
5	4	In the classroom design of current classrooms, their equipment is unsuitable for the effective use of teaching aids, and conceptual maps sometimes require projectors, computers, and equipment other than a blackboard to display and explain conceptual maps.	3.41	1.14	Medium
6	5	The nature of period schedules and study plans required from teachers by school administration makes it difficult to adopt conceptual maps as teaching aids from time to time.			Medium
7	3	The rare availability of books and periodicals in school libraries for reference to increase awareness and understanding of conceptual maps and their use is considered a difficulty in sometimes using conceptual maps as a teaching aid.	3.38	1.06	Medium
		General difficulties related to conceptual maps being a teaching method.	3.61	0.65	Medium

Table 9. Results of a 2-way ANOVA analysis of the degrees of difficulty faced by geography teachers in using conceptual maps of all stages regarding gender, years of experience, and interaction between them.

Source of variance	Total Squares	Degrees of freedom	Mean of square summation	The calculated value of F	Statistical significance
Gender	1.284	1	1.284	1.047	0.352
Years of experience	0.799	2	0.399	0.652	0.522
Type * experience	2.908	3	0.727	1.186	0.316
Error	255.688	197	0.613		
Total	261.977	203			

* Statistically significant at the level of significance $\alpha \leq 0.05$

General difficulties related to conceptual maps as a teaching method

(Table 8) shows the mean and standard deviation for items related to general difficulties using conceptual maps as a teaching method. The means for these items ranged from 3.38 to 3.92, indicating moderate to high difficulty in this area.

- Item 1, which states, "Difficulty arises from the teachers' inability to discard the traditional verbal method in teaching due to the special nature of the geography subject," received the highest rating with a mean of 3.92, suggesting that the teachers saw this as a significant challenge.
- Item 3, which states, "Rare availability of books and periodicals in school libraries for reference to increase awareness and understanding of conceptual maps and their use is considered a difficulty in sometimes using conceptual maps as a teaching aid," received the lowest rating with a mean of 2.38 and a standard deviation of 1.06. This indicates that while it was identified as a difficulty, it was less of a concern than other factors.

The overall mean for general difficulties related to conceptual maps as a teaching method was 2.61, with a standard deviation of 0.65. This reflects moderate difficulty in this area, with a relatively consistent distribution of responses among the study participants.

Results for Question Two

Are there statistically significant differences in the mean scores of the difficulties faced by geography teachers in using conceptual maps for all stages according to gender, years of experience, and the interaction between them?

To address this question, statistical analyses such as the Independent Samples T-Test (for gender differences) and ANOVA (for differences based on years of experience) would likely be performed to assess whether there are significant differences in the difficulties faced by geography teachers according to these variables. These analyses will help determine if gender, years of experience, or their interaction have a significant impact on the difficulties experienced by teachers in using conceptual maps. The specific findings would be detailed based on the statistical results obtained from these tests.

The 2-way ANOVA analysis was implemented; the results are shown in Table 9.

Table 9: Results of a 2-way ANOVA analysis of the degrees of difficulty faced by geography teachers in using conceptual maps of all stages regarding gender,

years of experience, and interaction between them.

(Table 9) shows that no statistically significant differences at the level of significance ($\alpha=0.05$) existed among the difficulties faced by geography teachers in using conceptual maps in all stages regarding gender, years of experience, and the interaction between them. Where the calculated value of "F" was respectively (1.047, 0.652, 1.186) at a level of significance of (0.352, 0.522, 0.316).

Discussion

1. Discussion of Results Question one: "What are the difficulties faced by geography teachers in using conceptual maps, for all stages, from the point of view of the teachers themselves in education districts throughout Irbid Governorate?"

Reviewing and discussing these results showed that in relation to difficulties in constructing conceptual maps, they were practised at a medium level and overall slanted towards a high level, meaning it was close to a high level of practice. The results clearly illustrated the following difficulties: in constructing conceptual maps and adopting them as a teaching method; in extracting concepts required to be put in the concept map upon reading the subject; conceptual maps being used in set formats and not constructed with student participation due to the difficulty faced in constructing them. This is primarily because they are not practised continuously and are regarded as secondary and dispensable, which is a result of the Ministry of Education offering teaching aids and methods as being optional while guiding teachers towards following the most effective method in achieving quality educational outputs.

To answer the question on difficulties in constructing conceptual maps with student participation, the level of practice was like the first question. This was attributable to difficulties in constructing conceptual maps with students participating because the geography teacher/herself is experiencing the same difficulties in practising concept map construction, which will reflect on the students and thus pass on the problem from teacher to students. This will hurt the learning process at a critical time for the region and the Arab world when there is a serious need for students to understand the geography and geo-political events and concepts in the region. In so doing, they can arrive at logical explanations concerning current events, enabling them to visualize the region, culturally and otherwise.

Results concerning discovering the difficulty level in using conceptual maps

were medium and like the above-mentioned results. Choosing how to display conceptual maps to students is challenging due to a lack of knowledge in construction and execution mechanisms. Difficulties in this area are compounded by using technology tools such as computers and projectors during concept map construction and its display. Teachers lack training and background in conceptual maps, significantly limiting their use. This is attributable to the teachers' undergraduate education, where interest in using conceptual maps was low, resulting in teachers attaching slight importance to such maps and, thus, their use as teaching aids. Additionally, it was concluded that some university policies did not encourage using conceptual maps, resulting in a low level of interest among teachers.

Regarding general difficulties faced in the use of conceptual maps as teaching aids, results showed a medium level of practice similar to that of the comprising elements addressed and discussed because the educational ethos is essentially social and compounded, and this results in teachers' lacking a deep understanding of constructing and using conceptual maps. This was attributable to general difficulties in concept maps used as a teaching aid due to teachers' inability to move away from traditional textual instruction. The above-mentioned difficulties and limitations are compounded due to the extensive content of the geography curricula and complications imposed by administrative guidelines related to equipment and teaching aids. Teachers' demanding schedules, whether the number of classes or additional tasks, must be considered when considering their difficulty in constructing and using conceptual maps. Teachers are not given the encouragement or time to exert the additional effort to prepare and use conceptual maps.

2. Discussion of Results Question Two: "Are there statistically significant differences in the mean scores of the difficulties faced by geography teachers in using conceptual maps for all stages according to gender, years of experience, and the interaction between them?"

This researcher views the agreement of the study sample participants according to gender and the number of years of experience as evidence that all are facing these difficulties.

Recommendations

- Create a teaching aid assessment policy for aids used in the classroom regardless of educational material. Then, give training courses focusing on the use of appropriate teaching aids, conceptual maps, and others.
- Review of university geography degree study plans in Jordanian universities introducing multiple courses to construct and simulate classroom reality so that the teacher can handle classroom situations. This may be accomplished by reducing the university or Arts college's compulsory and optional courses and exchanging them for subjects that focus on conceptual maps for geography. Conceptual maps may also be introduced in different specialisations at Jordanian universities while also increasing specialised subjects so that the teacher can perform successfully in the classroom, resulting in students with high-quality educational output.
- Reduction of the number of classes geography teachers are assigned while providing them with training in conceptual maps to allow for applying these maps in school classrooms. The Ministry of Education should be encouraged to employ more teachers to reduce teachers' current challenging schedules.
- Similar studies focusing on teaching aids in science subjects should be conducted from a teacher's perspective.
- A study with the same title as this current study should be performed in another district or Ministry of Education directorate.

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