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The Impact of the Interaction between the Adaptive Content Organizing Approach and Learning Style on Developing Educational Technology Students' Skills of Designing and Producing Digital Learning Resources.

A Ph.D in Education With a major in Education Technology

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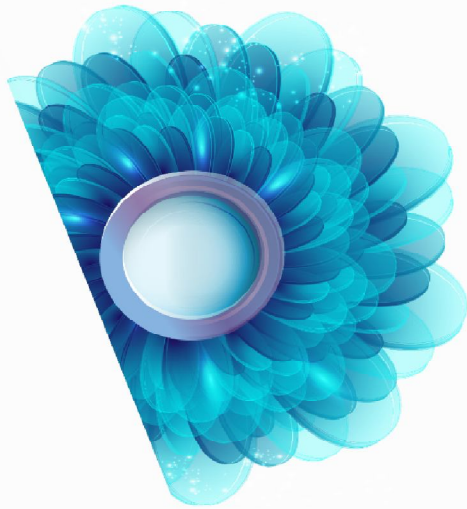
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Summary



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Introduction:

Digital learning resources and their classifications are one of the most important competencies that the educational technology specialist needs to possess the skills to choose and use if the pre-designed learning resources are available or he can design and produce new sources and electronic media in case they are unavailable.

Adaptive learning environments are one of the best and most important learning environments to help the learner produce and use educational resources as needed. Each learner can get an individual learning different from his/her peers known as adaptive learning for learners according to learning styles. The adaptive content is considered one of the most important characteristics of adaptation as learning and content are presented to learners to be suitable for them. Adaptive electronic content requires a high level of organization to be with a clear structure and meaningful to learners. It is necessary to choose the appropriate organization method in order to help learners form a holistic image and to recognize the cognitive and professional aspects.

Study Problem:

The current study problem lies in the deficiency in designing and producing digital learning resources (comics and infographic) in educational technology students. To solve this problem, the current study tries to answer the following main question:

What is the impact of the interaction between organizing the adaptive content and the learning style on developing the skills of designing and producing digital learning resources by educational technology students?

The previous question branches out into the following sub-questions that the study tries to answer:

1. What is the impact of adaptive content organization method on developing the skills of designing and producing digital learning resources by educational technology students?
2. What is the impact of learning style on developing the skills of designing and producing digital learning resources by educational technology students?
3. What is the impact of the interaction between adaptive content organization method and learning style on developing the skills of designing and producing digital learning resources by educational technology students?
4. What is the effectiveness of an electronic learning environment on the interaction between adaptive content organization method and learning style on developing the skills of designing and producing digital learning resources by educational technology students?

Study Aims:

1. Measuring the impact of adaptive content organization method on developing the skills of designing and producing digital learning resources by educational technology students.
2. Measuring the impact of adaptive content according to the learning style on developing the skills of designing and producing digital learning resources by educational technology students.
3. Measuring the impact of interaction between the adaptive content organization method and the learning style on developing the skills of designing and producing digital learning resources by educational technology students.

Study Importance:

1. Introducing a new model for organizing the adaptive content in adaptive learning environments.
2. Coping up with the new trends calling for adaptive learning and putting into consideration the learners' styles to acquire the most important skills that are related to their professional competencies and job requirements in the job field.
3. Integrating the current study results with the results of previous studies and researches as the responsible persons should use the adaptive learning technologies through the web as one of the effective educational aids in different academic stages.

Study limitations:

The current study is limited to the following:

- Third year students in Educational Technology Department –Faculty of Specific Education- Fayoum University-2018/2019.
- Adaptive content organizing approach (psychological approach-systematic approach).
- Adopting three learning styles of Vermunt classification of learning styles (meaning-oriented learning, application-oriented learning, and retrieval-oriented learning).
- Skills of designing and producing digital learning styles, i.e. comics and infographic.

Study Method:

The current study follows the analytic descriptive method that is related to literary studies and previous studies that have handled the adaptive content generally, the organizing approach particularly, learning styles and preferences, and their impact on learning processes.

The research follows the quasi-experimental method with regard to the educational environment, building up adaptive content according to the learning styles, comparing between the experimental groups, measuring the impact of interaction between the adaptive content organizing approach and the learning style on developing the skills of designing and producing digital learning resources by educational technology students.

Quasi-Experimental Design:

The study sample consists of educational technology students –Faculty of Specific Education- Fayoum University- Third year. The researcher distributes them randomly into six experimental groups as following:

Table (3): The Experimental Design after Learning Implementation and Adaptive Procedures.

Experimental Groups		Pre-Testing	Experimental Treatments	Post-Testing	<u>Study Hypotheses:</u> First: Study Hypotheses regarding the Post-Application of the Achievement Test of the Cognitive Aspect of Designing and Producing Skills of Digital
Psychological Approach*Retrieval Style	Systematic Approach* Retrieval Style	√	Electronic Learning Environment based on the Interaction between Adaptive Content Organizing Approach and Learning Style	√	
Psychological Approach*Meaning Style	Systematic Approach* Meaning Style				
Psychological Approach*Applying Style	Systematic Approach*Applying Style				

Learning Resources:

1. There are no statistically significant differences between the mean scores of the experimental groups regarding the adaptive content organizing approach in the post application of the achievement test in the cognitive aspect of designing and producing skills of digital learning resources by the educational technology students and it is divided into :
 - a) There is no statistically significant difference between the mean scores of the two experimental groups according to the adaptive content organizing approach in the post application of the achievement test in the cognitive aspect of designing and producing skills of infographic of the educational technology students.
 - b) There is no statistically significant difference between the mean scores of the two experimental groups according to the adaptive content organizing approach in the post application of the achievement test in the cognitive aspect of designing and producing skills of comics of the educational technology students.
2. There are no statistically significant differences between the mean scores of the experimental groups regarding the learning style in the post application of the achievement test in the cognitive aspect of designing and producing skills of digital learning resources of the educational technology students and it is divided into :
 - a) There is no statistically significant difference between the mean scores of the two experimental groups according to learning style in the post application of the achievement test in the cognitive aspect of designing and producing skills of infographic of the educational technology students.
 - b) There is no statistically significant difference between the mean scores of the two experimental groups according to learning style in the post application of the achievement test in the cognitive aspect of designing and producing skills of comics of the educational technology students.
3. There is no impact of interaction between adaptive content organizing approach and the learning style in the post application of the achievement test in the cognitive aspect of designing and producing skills of the educational technology students.
 - a) There is no impact of the interaction between adaptive content organizing approach and the learning style in the post application of the achievement test in the cognitive aspect of designing and producing skills of infographic of the educational technology students.
 - b) There is no impact of the interaction between adaptive content organizing approach and the learning style in the post application of the achievement test in the cognitive aspect of designing and producing skills of comics of the educational technology students.
4. There is no statistically significant difference between the mean scores of the six experimental groups according to the adaptive content organization approach and learning style between the pre-post administrations of the achievement test in the cognitive aspect of designing and producing skills of digital learning resources of the educational technology students and it is divided into :
 - a) There is no statistically significant difference between the mean scores of the six experimental groups according the adaptive content organizing approach and the learning style between the pre-post administrations of the achievement test in the cognitive aspect of designing and producing skills of infographic of the educational technology students.
 - b) There is no statistically significant difference between the mean scores of the six experimental groups according the adaptive content organizing approach and the learning style between the pre-post administrations of the achievement test in the cognitive aspect of designing and producing skills of comics of the educational technology students.

Second: Study Hypotheses regarding the Post-Administration of the Evaluation Cards of Scaled Performance Levels of Designing and Producing Skills of Digital Learning Resources:

1. There is no statistically significant difference between the mean scores of the two experimental groups regarding the adaptive content organizing approach in the post administration of the evaluation cards of performance levels of designing and producing skills of digital learning resources of the educational technology students and it is divided into :
 - a) There is no statistically significant difference between the mean scores of the two experimental groups according to the adaptive content organizing approach in the post administration of the evaluation cards of performance levels of designing and producing skills of infographic of the educational technology students.
 - b) There is no statistically significant difference between the mean scores of the two experimental groups according to the adaptive content organizing approach in the post administration of the evaluation cards of performance levels of designing and producing skills of comics of the educational technology students.
2. There is no statistically significant difference between the mean scores of the experimental groups regarding the learning style in the post administration of the evaluation cards of performance levels of designing and producing skills of digital learning resources of the educational technology students and it is divided into :
 - a) There is no statistically significant difference between the mean scores of the experimental groups according to the learning style in the post administration of the evaluation cards of performance levels of designing and producing skills of infographic of the educational technology students.
 - b) There is no statistically significant difference between the mean scores of the two experimental groups according to the learning style in the post administration of the evaluation cards of performance levels of designing and producing skills of comics of the educational technology students.
3. There is no impact of the interaction between adaptive content organizing approach and the learning style in the post administration of the evaluation cards of performance levels of designing and producing skills of digital learning resources the educational technology students and it is divided into:
 - a) There is no impact of the interaction between adaptive content organizing approach and the learning style in the post administration of the evaluation cards of performance levels of designing and producing skills of infographic of the educational technology students.
 - b) There is no impact of the interaction between adaptive content organizing approach and the learning style in the post administration of the evaluation cards of performance levels of designing and producing skills of comics of the educational technology students.
4. There is no statistically significant difference between the mean scores of the six experimental groups according to the adaptive content organization approach and learning style between the pre-post administrations of evaluation cards of performance levels of designing and producing skills of digital learning resources of the educational technology students and it is divided into :
 - a) There is no statistically significant difference between the mean scores of the six experimental groups according the adaptive content organizing approach and the learning

style between the pre-post administrations of evaluation cards of performance levels of designing and producing skills of infographic of the educational technology students.

- b) There is no statistically significant difference between the mean scores of the six experimental groups according the adaptive content organizing approach and the learning style between the pre-post administrations of the evaluation cards of performance levels of designing and producing skills of comics of the educational technology students.

Third: Study Hypotheses regarding the Post-Administration of Measuring the Learning Environment Effectiveness:

1. There is no effectiveness of the electronic learning environment based on the interaction between the adaptive content organizing approach and the learning style in developing cognitive aspect of designing and producing skills of digital learning resources of the educational technology students.
2. There is no effectiveness of the electronic learning environment based on the interaction between the adaptive content organizing approach and the learning style in developing the skills of designing and producing digital learning resources by educational technology students.

Study Variables:

First: Independent Variables:

Adaptive content organizing approach and it is divided into systematic approach and psychological organizing approach.

Second: Categorical Variables:

The learning style of the learners (study sample) and it is divided into retrieval- oriented style, applying-oriented style, and meaning-oriented style.

Third: Dependent Variables:

Designing and producing digital learning resources and the researcher adopts the following: designing and producing comics and designing and producing infographic.

Study Tools:

First: Experimental Treatment Tools:

- An electronic learning environment based on the interaction between the adaptive content organizing approach and the learning style. (Designed by the researcher).

Second: Measurement Tools for Testing the Study Hypotheses:

- An achievement test for measuring the cognitive aspect of designing and producing digital learning resources (prepared by the researcher).
- The evaluation cards of scaled performance levels of designing and producing skills of digital learning resources (prepared by the researcher).

Third: Tools for Choosing the Sample and Testing its Equivalence:

- A test for identifying the learning styles of the educational technology students "the study sample"(Adopted by the researcher).

Fourth: Tools for Collecting Data:

- A checklist of the skills for designing and producing digital learning resources (prepared by the researcher).
- An educational and technical criteria's checklist for designing and producing an electronic learning environment based on the interaction between adaptive content organizing approach and learning style (prepared by the researcher).

- An eligibility evaluation card for the electronic learning environment based on the interaction between adaptive content organizing approach and learning style (prepared by the researcher).

Study Procedures:

First: An Analytic Study of the Theoretical Framework:

Reviewing and analyzing literature and previous studies related to the current study and its aspects represented in: (adaptive learning systems, adaptive contents and its organization approaches, and learners' learning styles), building up an adaptive content for designing and producing learning resources, defining the characteristics of the electronic learning environment based on the adaptive content to the learning style.

Second: An Experimental Developmental Study:

The study has passed through a number of procedural designing steps to design the experimental treatments, study tools, their experimentation, and collecting results and interpretation through making use of Mohammed Ibrahim Desoky's Model (2015) for designing electronic learning environments.

Study Results:

- There is a statistically significant difference between the mean scores of the two experimental groups regarding the adaptive content organizing approach in the post administration of the achievement test in cognitive aspect of designing and producing skills of digital learning resources of the educational technology students .
- There is a statistically significant difference between the mean scores of the two experimental groups regarding the adaptive content organizing approach in the post administration of the evaluation cards of performance levels of designing and producing skills of digital learning resources of the educational technology students .
- There is no statistically significant difference between the mean scores of the experimental groups regarding the learning style in the post administration of the achievement test in the cognitive aspect of designing and producing skills of digital learning resources of the educational technology students .
- There is no statistically significant difference between the mean scores of the experimental groups regarding the learning style in the post administration of the evaluation cards of performance levels of designing and producing skills of digital learning resources of the educational technology students .
- There is an impact of the interaction between adaptive content organizing approach and the learning style in the post administration of the achievement test in the cognitive aspect of designing and producing skills of the educational technology students in favor of the interaction between the systematic organizing approach and the meaning oriented learning style and the psychological organizing approach and both the retrieval oriented learning style and applying oriented learning style.
- There is an impact of the interaction between adaptive content organizing approach and the learning style in the post administration of the evaluation cards of performance levels of designing and producing skills of digital learning resources the educational technology students in favor of the interaction between the systematic organizing approach and the meaning-oriented learning style and the psychological organizing approach and both the retrieval-oriented learning style and applying- oriented learning style.

- There is a statistically significant difference between the mean scores of the six experimental groups according to the adaptive content organization approach and learning style between the pre-post administrations of the achievement test in the cognitive aspect of designing and producing skills of digital learning resources of the educational technology students in favor of the post one.
- There is a statistically significant difference between the mean scores of the six experimental groups according to the adaptive content organization approach and learning style between the pre-post administrations of evaluation cards of scaled performance levels of designing and producing skills of digital learning resources of the educational technology students in favor of the post one.
- There is an effectiveness of the electronic learning environment based on the interaction between the adaptive content organizing approach and the learning style in developing cognitive aspect of designing and producing skills of digital learning resources of the educational technology students in favor of the interaction between systematic organizing approach and the meaning-oriented learning style and the psychological organizing approach and both the retrieval-oriented learning style and applying-oriented learning style.
- There is an effectiveness of the electronic learning environment based on the interaction between the adaptive content organizing approach and the learning style in developing designing and producing skills of digital learning resources of the educational technology students in favor of the interaction between systematic organizing approach and the meaning-oriented learning style and the psychological organizing approach and both the retrieval-oriented learning style and applying-oriented learning style.

Study Recommendations:

- Applying the basics and criteria adopted by the current research in the adaptive electronic learning environment.
- Adopting the suggested design of the adaptive content to be applied according to other classifications of learning styles and patterns.
- Making use of the suggested strategy of the adaptive content in different curricula.
- Applying the adaptive models suggested by the study for designing and building up new electronic learning environments.
- Paying attention to the content organization approaches in all academic courses not only a narration of the content.
- Integrating the skills of designing and producing adaptive learning environment in the academic courses for Educational Technology Departments according to the most updated technologies.
- Putting into consideration the learners' characteristics, their learning styles, and preferences during designing learning and according to the individual learners' needs.
- Adopting the Vermunt classification of learning styles while designing adaptive learning environments for university students as it is designed especially for this age and requirements and it covers all learning aspects and dimensions.

Suggested Researches:

- Studying the impact of different interaction patterns within the adaptive learning environment on the development of achievement and related skills.

- Studying the effect of different media used in the presentation of adaptive content according to learning styles.
- Building up adaptive strategies for electronic learning environments according to other classifications of learning patterns.
- Using artificial intelligence technology in designing and building up adaptive learning systems.
- Studying other adaptive content organizing approaches and measuring their effectiveness.
- Studying the impact of using adaptation on new educational technologies such as virtual reality, augmented reality, gamification, etc.
- Studying the impact of adaptation in electronic learning environments on the continuity of learning and using it in new learning situations.
- The current study is limited to studying the impact of adaptive content according to learning patterns, so it is possible to study the impact of other adapting elements of learning systems such as assessment adaptation, adaptation of support, or adaptation of the user interface.
- The current study is limited to developing the skills of designing and producing digital learning resources (infographics, comics), so future researches can therefore tackle the development of other skills either producing different new learning resources or developing different thinking skills.