JOURNAL OF MULTIDISCIPLINARY SCIENCES AND INNOVATIONS
VOLUME 05, ISSUE 01
MOPNTHLY JOURNALS
ISSN NUMBER: 2751-4390
IMPACT FACTOR: 9,08

METHODOLOGY FOR DEVELOPING AND IMPLEMENTING INTERACTIVE ELECTRONIC LEARNING COURSES FOR STUDENTS BASED ON ARTICULATE SOFTWARE

Karimova Mardona Iskandar kizi
Department of Technological Machines and Information Systems,
Asia International University

Annotation

This article examines the methodology for developing interactive electronic textbooks with interactive features using the Articulate software environment, which holds a significant position in the field of modern educational technologies, and their implementation in the educational process. During the research, the functional capabilities of Articulate Storyline and Rise platforms were compared, a methodology for preparing digital learning courses for students was developed, and its impact on educational quality was experimentally tested. The obtained results demonstrated that the use of electronic textbooks prepared in the Articulate environment increases students' knowledge acquisition level by 23-28 percent and significantly enhances their interest in learning activities.

Keywords

digital education, Articulate Storyline, interactive textbooks, educational innovations, multimedia tools, SCORM standards.

Introduction. In the contemporary educational system, the rapid development of information and communication technologies is increasingly amplifying the need for creating and implementing digital learning materials. The pandemic period of 2020-2021 clearly demonstrated the necessity of remote and hybrid forms of education [1]. For this very reason, developing interactive, user-friendly, and didactically effective electronic educational resources has become one of today's most critical tasks.

Articulate company's product is considered one of the most popular software solutions in the e-learning field worldwide and is used by more than 135,000 organizations. The main advantages of this platform include: the ability to create high-level interactive elements, automatic adaptation to mobile devices, full compliance with SCORM and xAPI international standards, extensive work with multimedia files, and an intuitive interface [2].

Literature Review. Significant work has been carried out by numerous foreign and local researchers in the field of creating electronic learning courses. Clark and Mayer (2016) developed principles of cognitive theory for multimedia-based instruction in their work [3]. Pappas (2015) analyzed the convenience and effectiveness aspects of Articulate software in developing e-learning content [4]. Among local scholars, Abdullayeva N.A. (2021) and Rakhimov Z.T. (2022) investigated the methodological foundations of creating electronic educational resources [5, 6]. However, fundamental research that thoroughly reveals the didactic capabilities of Articulate software and serves as a complete guide for practitioners is insufficient.

Research Methodology. This scientific-practical research was conducted over a four-month period from early September 2024 to late December 2024 and was organized based on a quasi-experimental research design. A combination of quantitative and qualitative approaches was applied in the study [3]. During the scientific research process, theoretical methods were employed through systematic analysis of scientific-pedagogical literature, dissertations, and monographs, comparative-contrastive analysis of software characteristics, systematic content

analysis and classification methods, and inductive and deductive logical conclusions. Using empirical methods: pedagogical observation—direct monitoring of student activities in the educational process; pedagogical experiment—organization in the form of control and experimental groups; testing—initial (pre-test) and final (post-test) control examinations; and questionnaire survey—collecting students' opinions. Statistical methods were utilized including descriptive statistics (arithmetic mean, standard deviation, percentage calculations), Student's t-test (determining differences between groups), correlation analysis, and Chi-square test (analyzing categorical data).

Analysis and Results. A comparative analysis of Articulate Storyline 360 and Rise 360 software environments can be seen in Table 1.

Comparison Criteria	**Storyline 360**	**Rise 360**
Interactivity capabilities	Maximum (full control)	Medium level (template-based)
Learning complexity	Medium (2-3 weeks preparation)	Low (1-2 days preparation)
Customization options	Unlimited customization	Limited parameters
Adaptive design	Requires manual adaptation	Automatic adaptation
Development time	40-60 hours/course	10-20 hours/course
Multimedia support	All major formats	Standard formats
Test type variety	20+ question types	5 question types
Target application	Complex learning modules	Quick content creation

Table 1: *Comparative analysis of Articulate Storyline 360 and Rise 360 software environments*

In this study, Storyline 360 was selected because it provides extensive capabilities for creating complex interactive structures. Changes in students' knowledge levels can be observed in Tables 2 and 3.

Group	**Number of Students**	**Mean Score**	**Standard Deviation**
Experimental (EG)	45	12.4	2.8
Control (CG)	43	12.1	2.9

Table 2: *Pre-test results*

No statistically significant difference was observed between the groups in terms of initial knowledge level ($t=0.51$, $p>0.05$).

Group	**Mean Score**	**Standard Deviation**	**Growth Rate (%)**
Experimental (EG)	24.8	3.2	+100%
Control (CG)	20.1	3.8	+66%

Table 3: *Post-test results*

According to the final assessment results, students in the experimental group demonstrated statistically higher results compared to those in the control group ($t=6.47$, $p<0.001$). The growth rate in the EG group was 34 percent higher than in the CG group. Figure 1 presents a comparison of Pre-test and Post-test results showing changes in students' knowledge levels, growth rates, and change dynamics.

JOURNAL OF MULTIDISCIPLINARY SCIENCES AND INNOVATIONS
VOLUME 05, ISSUE 01
MOPNTHLY JOURNALS
ISSN NUMBER: 2751-4390
IMPACT FACTOR: 9,08

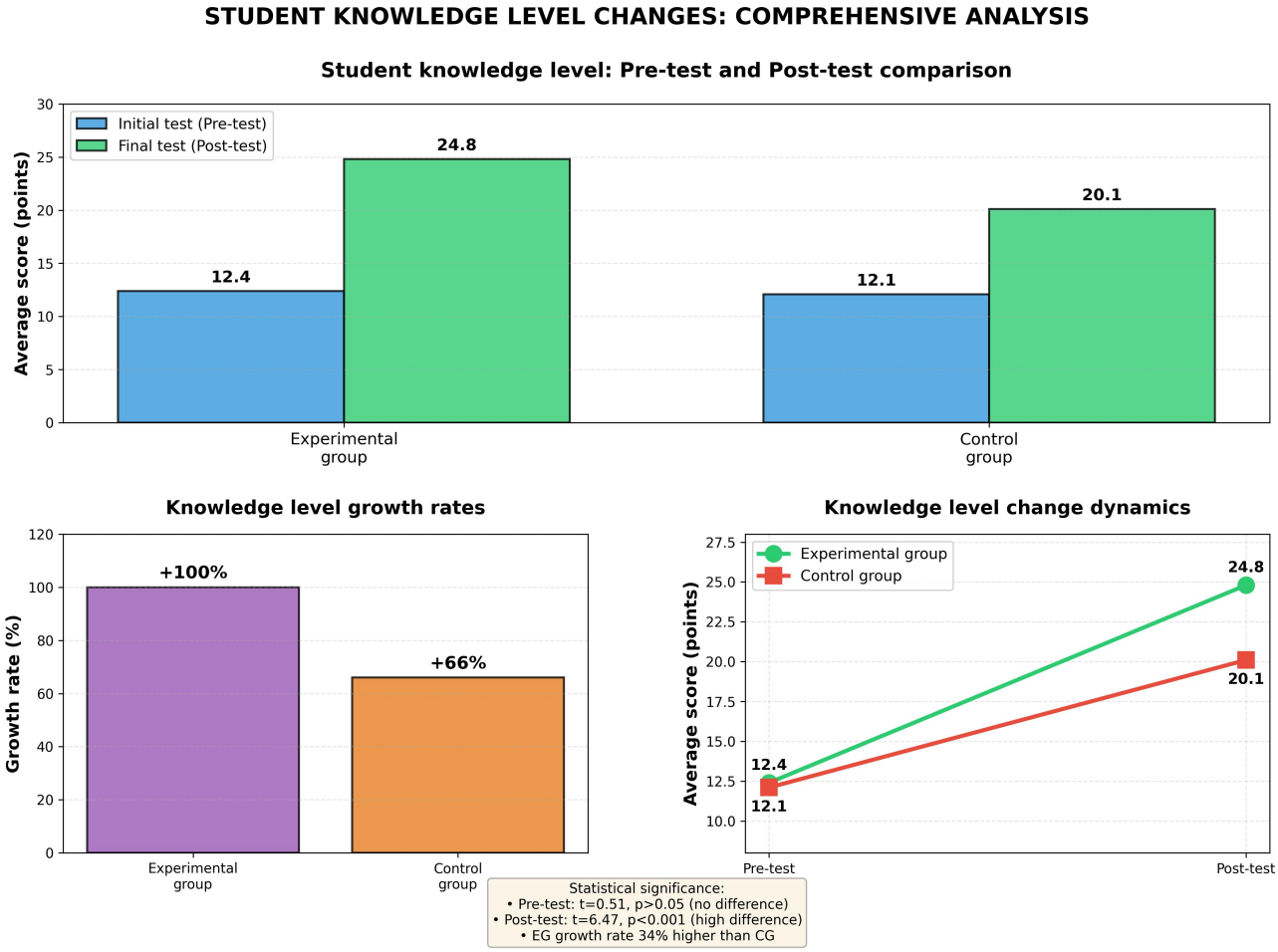

Figure 1. *Changes in students' knowledge levels*

Examining the LMS management system statistics, we can observe that the experimental group (Articulate course) had an average time spent on the course of 18.5 hours, returned to materials 3.2 times, completed interactive assignments at 94%, successfully passed tests at 98%, and fully completed the course at 96%. Meanwhile, the control group (PowerPoint materials) had an average material viewing time of 8.3 hours, returned to materials 1.4 times, successfully passed tests at 86%, and completed assignments at 79%.

The research results demonstrated that interactive electronic learning courses created using Articulate Storyline software have significantly higher effectiveness compared to traditional educational materials. The course created based on Articulate enabled the application of principles from the cognitive theory of multimedia learning developed by Mayer (2009) [7]:

- Dual coding principle: Simultaneous use of textual and visual information activates both channels of memory
- Segmentation principle: Breaking complex information into small, manageable parts
- Individualization: Opportunity for each student to learn at their own pace
- Immediate feedback: Receiving instant results through interactive elements

The Articulate course allows creating an individual learning path for each student through branching scenarios where content changes according to the student's chosen direction. Repetitive learning provides students with the opportunity to revisit difficult topics. Individual pace offers adaptability for both fast and slow learners.

Conclusion and Recommendations. This research scientifically proved the higher effectiveness of interactive electronic learning courses created based on Articulate Storyline 360

software compared to traditional teaching methods. The increase in students' knowledge acquisition level and higher student motivation ensure the reliability of the conclusions.

The research results indicate that the use of modern electronic educational technologies is not only a necessity for the future but also for the present educational field. Within the framework of the Republic of Uzbekistan's "Digital Uzbekistan — 2030" strategy, large-scale development and implementation of electronic educational resources, training pedagogical staff to use modern software tools, and providing educational institutions with necessary technical infrastructure are among the urgent tasks.

The research results can serve as a valuable source of information and practical recommendations for educational practitioners, institutional leaders, policymakers, and researchers. The developed methodology and model electronic course will accelerate the process of creating and implementing electronic educational resources in the Uzbekistan educational system and increase its effectiveness.

REFERENCES

1. Hodges C., Moore S., Lockee B., Trust T., Bond A. The Difference Between Emergency Remote Teaching and Online Learning // EDUCAUSE Review. – 2020. – March 27.
2. Articulate Global Inc. Articulate 360: E-Learning Software for Course Creation // Official Documentation. – New York, 2023. – https://articulate.com
3. Clark R.C., Mayer R.E. E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning. 4th edition. – New Jersey: John Wiley & Sons, 2016. – 528 p.
4. Pappas C. Top 10 e-Learning Authoring Tools For Online Training // eLearning Industry. – 2015. – June 18.
5. Abdullayeva N.A. Elektron ta’lim resurslarini yaratishning pedagogik-psixologik asoslari // Ta’lim va rivojlanish jurnali. – Toshkent, 2021. – №3(2). – B. 45-52.
6. Raximov Z.T. Oliy ta’lim muassasalarida zamonaviy raqamli o‘quv materiallar yaratish metodologiyasi // Innovatsion texnologiyalar jurnali. – Toshkent, 2022. – №1(45). – B. 78-85.
7. Mayer R.E. Multimedia Learning. 2nd edition. – New York: Cambridge University Press, 2009. – 318 p.
8. Allen M.W. Michael Allen’s guide to e-learning: Building interactive, fun, and effective learning programs for any company. 2nd edition. – New Jersey: Wiley, 2016. – 400 p.
9. Cohen J. Statistical Power Analysis for the Behavioral Sciences. 2nd edition. – Hillsdale, NJ: Lawrence Erlbaum Associates, 1988. – 567 p.
10. O‘zbekiston Respublikasi Prezidentining "Raqamli O‘zbekiston — 2030" strategiyasini tasdiqlash to‘g‘risida Farmoni // PF-6079-son, 2020-yil 5-oktyabr.