

**Online Adaptive Math Programs**

**by**

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## **Chapter 1 Introduction**

Introduction paragraph

### **Problem**

Online adaptive math programs continue to gain popularity. It is not clear whether or not teachers are prepared to effectively evaluate and implement these programs. Additionally, as more emphasis is placed on problem solving and being able to explain and justify answers, it is not clear whether or not online adaptive math programs are effective at developing those skills.

### **Research Questions**

1. What are the current perceptions of and experiences with online adaptive programs by preservice teachers?
2. Do preservice teachers know how to evaluate, identify and effectively implement online adaptive math programs?
3. Following the completion of training modules, are preservice teachers able to evaluate and identify effective online adaptive programs?
4. Following the completion of training modules, are preservice teachers able to create an implementation plan that effectively utilizes online adaptive math programs?
5. Following the completion of training modules, do preservice teachers feel prepared to implement online adaptive math program in the classroom?

### **Definitions**

**Online adaptive math program**

**Adaptive math program**

**Intelligent tutoring system**

**Blended learning**

**Synchronous learning**

**Asynchronous learning**

**Mastery learning**

**Self-paced learning**

**Procedural fluency**

## **Chapter 2 Literature Review**

Introduction paragraph

**What are some of the current educational practices in using online adaptive math programs?**

**Blended learning**

**Synchronous learning**

**Asynchronous learning**

**Conclusion**

**What is the current state of online adaptive math programs in math education?**

**Optional remedial resource**

**Optional extension activities for high-achievers**

**Required content for all students**

**Required for special needs students**

**Conclusion**

**What is the rationale for using online adaptive math programs?**

**Differentiated instruction**

**Mastery learning**

**Data-driven assessment**

**Anytime, anywhere learning**

**Self-paced learning**

**Conclusion**

**What are the benefits/barriers related to online adaptive math programs?**

## **Benefits**

**Allows teachers to meet the needs of all students**

**Improves procedural fluency**

**Requires students to master skills before progressing**

**Enables students to work at their own pace**

**Keeps students in their zone of proximal development by adapting to their**

**ability level**

## **Conclusion**

## **Barriers**

**Access to technology for all students**

**Students may not have opportunities to develop problem solving skills**

**Students may not have opportunities to explain and justify their answers**

**Teachers may not be trained on how to properly utilize the programs**

**Analyzing all of the data can be time consuming**

## **Conclusion**

**What are the characteristics of an effective online adaptive math program?**

**Usability for students and teachers**

**Gamification elements to motivate students**

**Requires mastery learning**

**Teachers have ability to easily track progress and assign tasks**

## **Conclusion**

## **Implications**

## **Overall Conclusion**

Online adaptive math programs continue to gain popularity because they have been shown to increase student performance. As access to technology in schools and at home continues to become more prevalent, it is important for preservice teachers to be able to evaluate online adaptive math programs and implement them in their classrooms effectively. A training module could help prepare them to do this.

## **Chapter 3 Methodology**

Introduction paragraph

### **Research Questions**

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2. Do preservice teachers know how to evaluate, identify and effectively implement online adaptive math programs?
3. Following the completion of training modules, are preservice teachers able to evaluate and identify effective online adaptive programs?
4. Following the completion of training modules, are preservice teachers able to create an implementation plan that effectively utilizes online adaptive math programs?
5. Following the completion of training modules, do preservice teachers feel prepared to implement online adaptive math program in their classroom?

### **Context**

Small, public university located in South Dakota; 3,100 students; Known in the region for programs in information technology and teacher education; Teacher education programs place heavy emphasis on developing technology integration skills.

### **Participants**

25-50 undergraduate students majoring in K-12 education; majority of participants are female majoring in elementary education; majority of participants 19-26 years of age; majority of participants are juniors and seniors nearing the end of their undergraduate program.

**Participant Selection Criteria.** Students that are enrolled in ELED 330 K-8 Math Methods and SEED 302 6-12 Math Methods.

### **Materials**

Online module created in Desire2Learn to train preservice teachers to identify and evaluate online adaptive math programs. As a part of the online module, learners will complete a project involving creating an implementation plan for online adaptive math programs in the classroom. See Appendix for Module documentation of Instructional Goals, Instructional Analysis, Learner and Context Analysis, Performance Objectives, Assessment Instruments, Instructional Strategy, and Instructional Materials and the Formative Evaluation Report.

### **Instrumentation**

Introduction paragraph

#### **Survey of Preservice Teacher Experiences and Perceptions**

Addresses research question (RQ) 1 and 2

#### **Pre-Module Participant Interview**

Addresses RQ 1 and 2

#### **Pretest/Posttest of Participant Knowledge of Online Adaptive Math Programs**

Addresses RQ 2 and 3

#### **Implementation Project**

Participants will complete a project to demonstrate their ability to implement online adaptive math programs in the classroom. A rubric will be used to evaluate the project deliverables. Addresses RQ 4.

#### **Post-Module Participant Survey**



Addresses RQ 5

### **Post-Module Participant Interview**

Addresses RQ 5

### **Procedures**

Students enrolled in ELED 330 and SEED 302 will be introduced to the module during class. They will begin by completing the Survey of Preservice Teacher Experiences and Perceptions online. Following completion of the survey, the Pre-Module Participant Interview will be conducted with each student. Once interviews have been conducted, students will complete the Pretest of Participant Knowledge of Online Adaptive Math Programs.

Students will complete the online module. As a part of the module students will complete the Implementation Project. Students will submit project deliverables and rubrics will be used to evaluate submissions.

Upon completion of the module, students will complete the Posttest of Participant Knowledge of Online Adaptive Math Programs, Post-Module Participant Survey, and Post-Module Participant Interview.

### **Research Design**

Introduction paragraph

#### **Data Collection**

**Data collection before module.** Survey of Preservice Teacher Experiences and Perceptions, Pre-Module Participant Interview, and Pretest of Participant Knowledge of Online Adaptive Math Programs.

**Data collection during module.** Deliverables from Implementation Project.

**Data collection after module.** Posttest of Participant Knowledge of Online Adaptive Math Programs, Post-Module Participant Survey, and Post-Module Participant Interview.

**Data Analysis**

Mixed-methods - comparison of pretest and posttest mean scores; comparison of pre- and post-module attitudes from surveys and interviews, analysis of mean scores based on scoring rubrics for Implementation Project.

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Appendix A

Instructional Design Documentation

Appendix B

Formative Evaluation Reports

Appendix C

Survey of Preservice Teacher Experiences and Perceptions

Appendix D

Pre-Module Participant Interview

Appendix E

Pretest/Posttest of Participant Knowledge of Online Adaptive Math Programs

Appendix F

Implementation Project

Appendix G

Post-Module Participant Survey

Appendix H

Post-Module Participant Interview

Appendix I

IRB Approval Documentation