# Integrating ict in mathematics teaching education essay



The purpose of this study is to study the barriers preventing the integration and adoption of information and communication technology in teaching mathematics in Bhubaneswar, India. The data were collected by means of questionnaires from secondary school mathematics teachers. Major barriers were identified: lack of time in the school schedule for projects involving ICT, insufficient teacher training opportunities for ICT projects, inadequate technical support for these projects, lack of knowledge about ways to integrate ICT to enhance the curriculum, difficulty in integrating and using different ICT tools in a single lesson and unavailability of resources at home for the students to access the necessary educational materials. To overcome some of these barriers, this paper proposes an e-portal which is a collection of mathematical tools, a question bank and other resources in digital form that can be used for teaching and learning mathematics. Based on these findings, I propose the use of several strategies that should enhance successful ICT integration.

# INTRODUCTION

Information and Communication Technology (ICT) has changed our daily activities in many ways. One of the goals for integrating ICTs in education is to enhance teaching and learning practices thereby improving quality of education (Higgins, 2003). However, in most developing countries like India, the potential of ICT to support pedagogy is yet to be fully realised. Since these changes are evident amongst younger members of our society, they are evident on primary and secondary schools' students. Considering that ICT plays an increasingly important role in society, especially if we take into account social, economic and cultural role of computers and the Internet, it

is clear that the time has come for the actual entry of ICT in the field of education. The combination of ICT and the Internet certainly opens not only many opportunities for creativity and innovation, but also for approaching the teaching material to current generation of students. Researchers argued that with the introduction of technology, it is possible to de-emphasize algorithmic skills; the resulting void may be filled by an increased emphasis on the development of mathematical concepts. Technology saves time and gives students access to powerful new ways to explore concepts at a depth that has not been possible in the past. ICT enhances efficiency of mathematical thought, enables learners to make conjectures and immediately test them in non-threatening environment (Laborde, 2001). Abramovich (1999)'s use of spreadsheets in generalizing Pythagorean Theorem demonstrates how computers may be used to learn concepts in geometry and algebra. Meanwhile researchers (Balacheff & Kaput, 1996; Kilpatrick & Davis, 1993) have discussed the impact of technological forces on learning and teaching mathematics. Internet is increasingly being used to enhance collaborative and interactive learning (Cazes, Gueudet, Hersant and Vandebrouck, 2006; Cress and Kimmerle, 2008; Resta and Rafferriere, 2007) also (Lavy andLeron, 2004). As the study and practice of facilitating learning and improving performance (Januszewski & Molenda, 2008), the field of educational technology attempts to overcome challenges by developing new approaches and frameworks. In this context, information and communication technologies (ICTs) represent a new approach for enhancing the dissemination of information and helping to meet these challenges. For a successful integration of ICT into the mathematics curriculum, it is essential

to have knowledge of the existing software that is used by mathematics https://assignbuster.com/integrating-ict-in-mathematics-teaching-educationessay/ teachers. A survey carried out by Forgasz & Prince (2002) found that 61% of the respondents (teachers) used spreadsheets, 45% used word processing and 30% used Internet browsers. In a separate study, Jones (2004) found that seven barriers existed while integrating ICT into lessons. These barriers were (i) lack of confidence among teachers during integration(21. 2% responses), (ii) lack of access to resources (20. 8%), (iii) lack of time for the integration(16. 4%), (iv) lack of effective training (15. 0%), (v) facing technical problems while the software is in use (13. 3%), (vi) lack of personal access during lesson preparation (4. 9%) and (vii) the age of the teachers (1. 8%).

# METHODOLOGY

This research deployed a survey method to investigate the barriers of integrating ICT into the teaching of mathematics. A total of 50 responses were received and they were analysed using the SPSS statistical package. A questionnaire was adapted from the Teacher Technology Survey by the American Institute for Research (AIR, 1998). The questionnaire was divided into five areas, i. e., (A) the teacher's profile, (B) how teachers use ICT, (C) the teacher's ICT experience, (D) the barriers faced by teachers and (E) the proposed solution.

# **RESULTS AND DISCUSSIONS**

# ICT applications in general

In general, a total of 74. 3% of the respondents used computers on a regular basis. Table 1 depicts the percentage of usage by teachers in the various ICT applications: word processing packages (76. 8%), spreadsheets (50. 3%),

Internet activity (67. 2%), search engines (56. 5%) and multimedia (11. 2%). These percentages show that the computer literacy rate among secondary school mathematics teachers has been high.

# **TABLE 1: Common ICT Applications by Teachers**

# Application

Daily

(%)

Weekly

(%)

# Monthly

(%)

1 or 2 times

a year (%)

Never

(%)

NA

(%)

NR

(%)

# **Computers in general**

- 22.3
- 25.2
- 26.8
- 12.5

# 6.2

- 4.2
- 2.8

# Word processing packages

- 20.4
- 26.3
- 30.1
- 13.6
- 5.8
- 1.3
- 2.5

## **Spreadsheets**

- 9.6
- 15.4
- 25.3
- 22.5
- 6.3
- 12.5
- **8.** 4

# **Any Internet activity**

- 20.8
- 22.5
- 23.9

- 28.6 1.2
- 1.3
- 1.7

# **Search engines for Internet**

- 14.4
- **19.8**
- 22.3
- 26.9
- 11.5
- 3.6
- 1.5

# Multimedia

- 2.5
- 3.6
- 5.1
- 15.8
- 40.1
- 19.5
- 13.4
- NA Not Available NR No Response

# **Uses of Internet**

The Internet was used for various purposes. 65. 5% respondents used it for browsing, 42. 3% used the e-mail facility, 5. 5% used IRC, 6. 3% used chat rooms, and 8. 6% used it in discussion forums and 4. 5% for other purposes. 6. 9% respondents did not use the Internet.

# Table 2: Use of Internet by Teachers

Activity

Browsing

e-mail

IRC

Discussion forums

Chat rooms

Others

None

Response (%)

65.5

42.3

5.5

#### 8.6

6.3

- 4. 5
- 6.9

# Professional development and training needs

A total of 40. 3% respondents indicated that they had received ICT training. 60. 2% of the respondents demonstrated that they had found the training to be generally useful while 64. 9% said that they had not received training on how to integrate ICT into mathematics teaching. According to 46. 3% of the respondents, mathematics teachers require training on how to integrate ICT into their teaching while 59. 5% of them stated that they needed a combination of various types of training..

# **Table 3: ICT Training Needs**

ICT training needs

General use

Integrate ICT into

Teaching

Use of Internet

Combination of needs

Response (%)

#### 10.1

64. 9

5.5

59. 5

# Barriers faced by teachers during integration

The six major barriers identified were lack of time in the school schedule for projects involving ICT (50. 3%), lack of knowledge about ways to integrate ICT to enhance the curriculum (49. 5%), lack of adequate technical support for ICT projects (41. 9%), inadequate teacher training opportunities for ICT projects (41. 2%), integrating and using different ICT tools in a single lesson (34. 8%) and the absence of access to the necessary technology at the homes of students (31. 0%).

# **Perception of mathematics teachers toward the proposed solution**

There is a very strong positive response to the proposed solution to develop a mathematics portal for teaching mathematics, wherein a collection of mathematical tools, a question bank and other resources in digital form that can be used for teaching and learning mathematics. 70. 2% of the respondents considered it to be very useful and helpful and 27. 3% viewed it as useful and helpful. Only 2. 5% of the respondents considered that the portal would not be very useful and helpful.

# **Table 4: Barriers Faced by Teachers**

Barriers

### % Response as

minor

major

#### Not enough or limited access to computer hardware

- 30.2
- 50. 6
- 19. 2

Availability of computer software

- 23. 8
- 54.6
- 21.6

Lack of time in school schedule for projects

involving ICT

- 11.3
- 38. 4
- 50. 3

#### Lack of adequate technical support for ICT projects

15.3

42.8

41.9

Not enough teacher training opportunities for ICT

Projects

18.7

40.1

41. 2

Lack of knowledge about ways to integrate ICT to

enhance curriculum

10.2

40. 3

49. 5

ICT integration is not a school priority

31.4

45. 2

23. 4

#### Students do not have access to the necessary

technology	at home
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22. 8

46. 2

#### 31.0

Teachers do not have access to the necessary

technology at home

24. 9

- 55.2
- 19.9

Integrating and using different ICT tools in a single

Lesson

16.5

48. 7

34.8

# **Table 5: Perceptions towards the proposed solution**

% response as

very useful and

helpful

% response as

useful and

helpful

% response as not

so useful and

helpful

% response as

not at all

Proposed solution to

develop a mathematics

portal for teaching

- 70.2
- 27.3
- 2.5

0

From this study, the following findings were found:

The most popular application packages used by mathematics teachers were word processing packages (76. 8%), spreadsheets (50. 3%), internet activity (67. 2%), and search engines (56. 5%). However, it must be noted that the packages that have not been positively considered by the respondents may not be necessarily useless. Mathematics teachers need more time to learn to use them -programmes like specific Java applets, Flash presentations, graphical applications and simulation programmes have great potential for the teaching of mathematics because they encourage explorations and higher order thinking.

It is encouraging to learn that 65. 5% of the respondents used the browser to gather information. It is timely that educators encourage mathematics teachers to use the Internet for online demonstrations like using Java applets on mathematics that are only available online.

A large proportion (64. 9%) did not have any training on how to integrate ICT into mathematics teaching. Such training should be an integral part of professional training. Moreover, 46. 3% of the respondents requested to have training on how to integrate ICT into teaching.

Some major barriers hindering the implementation of ICT in mathematics teaching were found to be lack of time in school schedule for projects involving ICT, insufficient teacher training opportunities for ICT projects, inadequate technical support for these projects, lack of knowledge about ways to integrate ICT to enhance the curriculum, difficulty in integrating and

using different ICT tools in a single lesson and unavailability of resources at https://assignbuster.com/integrating-ict-in-mathematics-teaching-educationessay/ home for the students to access the necessary educational materials. Therefore, funding for new ICT resources should be increased in order to provide adequate ICT equipment and resources. It is also recommended that the contents of the subject be reduced so as to integrate ICT. teachers consider that inadequate time is a factor against teaching and learning effectiveness

Therefore to encourage more teachers to integrate ICT into mathematics lessons, the devised programme must be user friendly. The e-portal proposed for this purpose is geared towards fulfilling such needs. This eportal will be a collection of mathematical tools, a question bank and other resources in digital form that can be used for teaching and learning mathematics.

# CONCLUSION

To create an environment of effective ICT integration, hence improving the quality of education for the youth in the province teacher education programs must focus on eliminating barriers. Based on the findings and discussions presented here, the several recommendations are suggested for practitioners.

Technology plans for implementing ICT should be prepared and implemented.

Training in ICTs for teacher educators should be improved in both quantity and quality.

Every classroom should have at least one computer with Internet access and an LCD projector.

Course content should be redesigned to acquire more benefit from ICT.

More ICT-related courses for prospective teachers should be offered.

Teacher educators and prospective teachers should be aware of the benefits of ICTs

An e-portal, collection of mathematical tools, a question bank and other resources in digital form that can be used for teaching and learning mathematics should be constructed.