

## Exploring NetMeeting Characteristics for Online Teaching and Learning Mathematics

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**Abstract.** Teaching and learning process have shifted to online since the advancement of technology few decades ago. Educators need to understand the purpose and types of technology before they can effectively incorporate it into their teaching and learning. The paper explores the characteristics of NetMeeting freeware in teaching and learning mathematics online. Open ended questionnaire and in-depth interview protocol were utilized for gathering the information. The respondents were students who enrolled mathematics courses conducted using NetMeeting software online in two of the learning institutions in Malaysia. Data from the study and literature review were coded and a set of NetMeeting characteristics for online teaching and learning mathematics was elicited.

**Keywords:** Netmeeting, Characteristics, Online Teaching and Learning

### 1. Introduction

The advancement of technology has enhanced the teaching and learning process over the last 20 years. Since then, thousands of new educational software have been developed and used widely [1]. Among the technologies available for classrooms learning include simple tool-based learning, handheld computers and personal digital assistant (PDA) [2]. As different technologies contribute to different purposes [3], an understanding of the purpose and types of technology is crucial before one can effectively incorporate it into the teaching and learning process.

The use of technology in teaching and learning such as tutors for learning basic skills and knowledge, tools to apply to different goals in learning process, resources to develop creativity, developing higher order thinking and research skills [4, 5], developing analysis and scientific taught [6], reinforce collaborative learning [7, 8, 9], encourage active engagement, group study, linking to real world contexts, interaction and feedback [6].

Educators have no choice but to shift from their traditional lectures to technology based teaching as learning institutions are now equipped with technology based teaching and learning tools such as Liquid Crystal Display (LCD), computers lab, and WiFi connections [10] making available a vast amount of information within a mouse click. Educators can use communication software such as Windows Messenger, Skype, Yahoo Messenger and NetMeeting in teaching and learning as these software can be downloaded for free [10]. Among these freeware, NetMeeting is already installed in the Window 95, 98, 2000 and XP operating system [10] and is very convenient to download [11]. For Window Vista, this freeware is very easy to download too. In Window 7, NetMeeting is replaced by Microsoft SharedView.

NetMeeting is a product of Microsoft Window software for audio and video conferencing. Its features including view presentation, share files and chat through Internet synchronously [11, 12, 13]. It has been applied in many fields such as remote training, collaborative design, augmenting existing software application, virtual team support, accessibility, user support and situations that required travel costs and time saving (p1476) [14]. Other applications includes professional development programming [11], data and

video conferencing [15], distance tutoring [10], collaboration learning [12], collaboration tools on a manufacturing setting, real time teaching to support distance education [16], computer aided peer review of writing [17], collaborative work [14, 18] and internal communication within an organization [19]. Even though NetMeeting was applied in many studies, study on the characteristics of NetMeeting yet need to be explored.

## 2. Purpose of the Study

The study explored the characteristics of NetMeeting for Online teaching and learning mathematics. Hence with the understanding of the characteristics, educators will pre-determine whether the freeware can effectively enhance their teaching and learning in all areas.

## 3. Methodology

The study utilized mixed method approach to elucidate the characteristics of NetMeeting for online learning. The multiple-case study and the survey were used to gather information. The open-ended questionnaire and an in-depth interview protocol were adapted from Keeney [20] where he believes this is the best way to elicit ideas from respondents since different respondents will express their opinion in different way. Respondents in the study were students who had attended mathematics course via online using NetMeeting software in two of the higher learning institutions in Malaysia from year 2009 to 2011. The open-ended questionnaire was given to these students at the end of their semester. Prior to the collection of questionnaires distributed, more information was gathered through structured questionnaire posted to some of the respondents to stimulate their thinking on teaching and learning mathematics using NetMeeting. In-depth interview were conducted through random sampling from the pool of population in the study. All data gathered were then coded and converted to common form.

## 4. Results and Discussion

The open-ended questions from 110 respondents and 36 in-depth interviews were collected. The analysis on these data studied were categories into seven characteristics of NetMeeting as a tool for online teaching and learning mathematics. The characteristics are Learner's impact, Economy, Interaction platform, Digital warehouse, Educator's aid, Technical support and User friendly. Each characteristic was them divided into several factors that captured the respondents' feedback.

Table 1: Characteristics of NetMeeting for Online Teaching and Learning Mathematics

No	Characteristics	Factor
1	Learner's impact	a) Interest <ul style="list-style-type: none"> <li>• Learning process is more interesting.</li> <li>• Boost interest to study.</li> <li>• Teaching method is more interesting and exciting.</li> <li>• Mathematics becomes more exciting.</li> <li>• More interesting and attractive learning method.</li> </ul> b) Motivation <ul style="list-style-type: none"> <li>• Students were motivated to learn.</li> <li>• Motivate students to attend mathematics class.</li> <li>• Students were self motivated to explore more on the subject matter.</li> </ul> c) Fun learning <ul style="list-style-type: none"> <li>• Learning becomes more fun.</li> <li>• Enjoyable mode of learning.</li> </ul> d) Attract attention <ul style="list-style-type: none"> <li>• Students are more attentive in class.</li> <li>• Students pay more attention in class.</li> </ul> e) Flexibility <ul style="list-style-type: none"> <li>• Enable work to be presented in many formats.</li> </ul>

		<ul style="list-style-type: none"> <li>• Able to write while discuss.</li> <li>• Able to revise the class discussions note at anytime.</li> <li>• Able to retrieve discussions softcopy at anytime.</li> <li>• Add on or delete any part of the discussion at anytime.</li> <li>• Able to cut and paste any materials from other resources.</li> <li>• Editing and reorganizing teaching materials at anytime.</li> <li>• Not constraint by study location.</li> </ul> <p>f) Accessibility</p> <ul style="list-style-type: none"> <li>• Possible access to more information.</li> <li>• Easier access to resources.</li> </ul> <p>g) Expedite learning</p> <ul style="list-style-type: none"> <li>• Students were able to master concept and idea fast.</li> <li>• Learn faster.</li> <li>• Improve imaginary skill.</li> <li>• Improve understanding.</li> <li>• Better understanding in concept.</li> </ul> <p>h) Effective learning</p> <ul style="list-style-type: none"> <li>• Concept can be explained in different ways so that easily understood.</li> <li>• Able to understand more.</li> <li>• Easier to understand difficult concepts.</li> <li>• Easier to focus in learning.</li> <li>• More efficient in learning.</li> </ul> <p>i) Improve visualization</p> <ul style="list-style-type: none"> <li>• Lecturers can give her experiences and the concepts clearer.</li> <li>• Improve visual quality.</li> <li>• Graph can be plotted easily.</li> <li>• Zoom feature improve visualization.</li> </ul> <p>j) Negative influence</p> <ul style="list-style-type: none"> <li>• Tendency to surf Internet on other matters.</li> <li>• Distracted by other features.</li> <li>• Tendency to do other work during lectures due to computer facilities.</li> </ul>
2	Efficiency	<p>a) Time Saving</p> <ul style="list-style-type: none"> <li>• Save time during the teaching and learning process.</li> <li>• No need to erase the whiteboard.</li> <li>• Don't have to jot down discussions note.</li> </ul> <p>b) Cost Saving</p> <ul style="list-style-type: none"> <li>• Does not pollute environment compared to use whiteboard marker.</li> <li>• Save cost for buying stationary for traditional whiteboard.</li> <li>• Save energy.</li> </ul>
3	Interaction platform	<ul style="list-style-type: none"> <li>• Discussions among students can be done at anytime.</li> <li>• Discussions with lecturers were not confined to lecture time only.</li> <li>• Supported by Chat tool.</li> </ul>
4	Digital warehouse	<ul style="list-style-type: none"> <li>• Able to keep all the discussions in softcopy.</li> <li>• Able to keep sharing files.</li> <li>• Able to save all softcopy.</li> </ul>
5	Educator's aid	<ul style="list-style-type: none"> <li>• Easy for the lecturer to write on the whiteboard in NetMeeting than using whiteboard in front of the class.</li> <li>• Lecturer can go to the previous pages when necessary.</li> <li>• No need to write the same note for the same course.</li> <li>• Able to copy and paste notes and diagrams from other applications.</li> </ul>

		<ul style="list-style-type: none"> <li>• Able to use the discussions softcopy for revision or further discussions in the next meeting with students.</li> </ul>
6	Technical support	<ul style="list-style-type: none"> <li>• Technical team needed to maintain the online system.</li> <li>• Technical team required to support all technical problems.</li> </ul>
7	User friendly	<ul style="list-style-type: none"> <li>• Easy to install.</li> <li>• Built in tools are users friendly.</li> <li>• Overall user friendly software.</li> </ul>

The analysis conducted focused on the characteristics of NetMeeting. Respondents agreed that NetMeeting gave them positive impact in the teaching and learning process. The respondents believed that NetMeeting could make the class activities more interactive and interesting. Hence learning processes were enjoyable. Time could be saved as the lecturer did not have to erase what have been written on the white board when conducting lecturers as in the traditional way. Discussions were more flexible in terms of presentation and logistic. Respondents expressed that their discussions could easily be saved as softcopy and could be retrieved when conducting further lectures later on. The retrieved files could be done by anyone who was registered with the course conducted, at anyplace and anytime of their convenience. All it required was the support system, NetMeeting software and the computers. They acknowledged that certain concepts were explained better as the graphic and presentation could be enhanced using NetMeeting as a tool in the teaching and learning processes. Being computer savvy, some respondents found that the lectures conducted using NetMeeting were more engaging and hence they were motivated to look for more information.

However, the respondents have some reservation towards the use of the tool as they feared possible technical problems. Hence the technical support team to overcome the Internet connectivity at the venue was the concern expressed by the participants on the possibility of using NetMeeting to enhance the teaching and learning process. Table 1 shows NetMeeting's characteristics from the study.

The result of the study also supported some characteristics mentioned in literature such as attract attention [16], user friendly, efficient delivery tool, motivate students to study [10, 11, 13, 16], time saving and cost saving [11, 12], flexible in meeting location, allowed different format of teaching materials, flexibility in using whiteboard, save and print the necessary materials for further review and documentation [12], share application, files and discuss through audio and video capabilities [12, 17, 11], interaction [18], facilitating collaboration [12, 19], communicate with students from different geographic area, socioeconomic backgrounds and diverse ethnic [10]. Technical aspect drawn attention to researchers as this is the main constraint of using NetMeeting in teaching and learning mathematics. This constraint also pointed out by Legutko [10].

## 5. Conclusions

This paper extends the scope of NetMeeting study by providing its characteristics that support online teaching and learning. The empirical study was guided by the literature in this field to obtain a more complete set of characteristics in applying NetMeeting for online teaching and learning mathematics. The characteristics will be augmented through a reliable and validated instrument to evaluate the courses conducted using NetMeeting software.

This study is important as it further explored online learning software that contributes to build a framework in this field. Hence extending the literature further. It provides some insight and offer educators another platform for online teaching and learning.

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