Can Web-Based Tools Measure Logical Thinking Skills among University Students

Aminuddin Hassan
Department of Foundations of Education
Faculty of Educational Studies
University Putra Malaysia
43400 UPM Serdang, Selangor
aminuddin@upm.edu.my

Abdullah Mat Rashid
Department Of Science and Technical Education
Faculty of Educational Studies
University Putra Malaysia
43400 UPM Serdang, Selangor

Abstract

Web-based has a considerable influence in the methodology of the study. The use of web-based requires the internet connection. In general, technology is booming now and all people require internet to do any work. This paper is to examine whether the web-based tool can explore the level of logical thinking skills among university students. In the current curriculum of schools and universities, there is a lack of the inculcation of logical thinking skills. This paper begins by explaining the definition of logical thinking. Then, this paper describes the logical thinking from the perspective of philosophy. In addition, logical thinking also described from the viewpoint of Islam from this paper. This paper also discusses web-based, the advantages of using web-based and how to use web-based to in measuring students' logical thinking skills.

Keywords: Logical thinking, thinking styles, web-based tools

Introduction

Currently, universities in Malaysia are stressing on producing more graduates who can be competitive in the job market. The main issue of the current graduates is that they lack soft skills which are personal attributes, interpersonal skills, problem-solving and decision-making skills (Shakir, 2009) to be more competitive. Many universities in Malaysia are therefore implementing the integration of soft skills in the curriculum in their courses. Logic plays a big part here as it aids the students in developing critical thinking and

problem-solving skills which are part of the soft skills (Ministry of Higher Education, 2006). To improve the quality of graduates and human capital in Malaysia, higher learning institutions must not underestimate the importance of logic within students.

E-logic is a method that alludes to how the capacity of logical thinking and one's thinking can be measured on the web. Another approach in the instruction, which component is likewise on the web, is the e-learning frameworks (of which when the rationale is beaten through it, e-logic assessment can be led effectively) give a promising arrangement right now on a trading channel. Enhanced advancements could mean speedier and less demanding access to data yet do not essentially guarantee great quality. E-learning has experienced concentrated advancement presently consequence of the late expansion of web innovation. These situations encourage the conveyance of generous parts of training through the utilization of apparatuses and materials that are available specifically to the learners' home or office, and whenever. Likewise, the progressions in innovation, which are utilized to upgrade the intelligence and media substance of the web and the expanding nature of conveyance stages, make a perfect situation for the extension of e-learning frameworks (Alkhatabi et al., 2011). As indicated by Ramayah et al. (2010), the framework quality, data quality, and administration quality are determinants of behavioral expectation and give observationally defended establishment for the gatherings concerned to create procedures for empowering the reception of e-learning. By understanding the determinants of behavioral expectation of utilizing the e-learning framework, suitable moves can be made to build the acknowledgment of e-learning and accordingly likewise e-rationale in advanced education in Malaysia.

The use of Internet to aid research practice has become more popular in the recent years. In fact, some believe that internet surveying and electronic data collection may revolutionize many disciplines by allowing for easier data collection, larger samples, and therefore more representative data.

Definition of Logical Thinking

Logical thinking can be classified as an argument that makes sense. Logical thinking is a way of thinking to find the answer to any problem or question. It often used in planning things to think with the brain in making reasoning.

Logical thinking is the way a person sees something and effort to identify what is wrong and what is right according to his logic. Logical thinking is also a process that tries to find information, knowledge, data and facts about the truth of a matter. In other words, the reason given logical means to strengthen the truth of a situation that made sense.

Most thought the right of logic was proven wrong when viewed from the standpoint of natural reality and real life. The logic of a problem in terms of purely human reason and logic based on the actual nature of reality. The logic that purely from the mind is called mathematical logic while logic based on the nature of reality is actually also called the logic of natural or logic nature.

In the book Edward de Bono, Thinking Course, stating that logic is a way to get information out of the situation. Information to be generated is a true and sensible. From this understanding, it can be concluded that the thinking logic is a thought process to find information, knowledge, data and facts about the true of a matter.

Logical Thinking in Philosophy

In human life, it filled with decision-making process. In making this decision, humans are more to the right and correct decision. Here, we will discuss the concept of the logical standpoint of logic scholars of Western philosophy. To master logical thinking, the basic concept in logic needs to be known and understood first. There are six basic concepts of logical thinking. Among them is the concept of assumption, premises concept, the concept of a general statement, the concept of a special statement, the concept of qualification and concept of refute.

The assumption is a decision or opinion made by someone who is regarded as true, although it certainly not to be true. Assumptions are beginning to seek facts or park a basis for directing brains to think of a way. Next, the basic concept is the premises. The premise is the beginning or principle in matches discusses the matter. The premise is important in speech at the beginning because often the starting point in the argument. The premise is something that has always existed in the mind of the person in the form of a title or subject matter when you start talking about things. The premise is also known as 'phrase statement' which sometimes supported and sometimes rejected. It depends on the strength of the evidence and the relevance of the particular situation.

General statements usually are open to the conclusion that may be accurate or inaccurate. A general statement that often used is not strong and accurate. Therefore, general statement not recommended.

The special statement refers to efforts to give the facts and explain what has been said. This particular statement can avoid the dispute and that statement is open. This is because the particular statement is accurate and specific. In making a special statement, the precision is needed in order not to miss important facts. The result of the particular statement listeners or readers feels comfortable with complete details and they do not feel doubt.

The next concept is the concept of qualification. The concept of the qualification refers to the use of the phrase or word that can contain a statement from becoming too common. Use the phrase like 'most', 'in certain circumstances', 'in most circumstances', and words such as 'often', 'many' is often used to save the general statement of dispute. In summary, a statement to refute is limiting the meaning of other statements.

The concept of refute is the argument that could destroy the foundation of logic or premises of another person. The purpose of this is to refute a statement received by giving the notice to replace the facts. It was accepted in logic as proof has been made. However, this is not permanent refute because it will be replaced by another statement.

Logical thinking in Islam

In Islam, Allah never restricts people to think even God encourages people to think. Thinking is a prayer. However, the thought of Islam must be based al-Quran and al-Hadith. There are many verses in the Quran that calling people to think, reflect, observe and see the signs of Allah's greatness as follow:

> *'Thus we describe some signs for a people who understand'*
>
> *'Take ye, O men like distant gaze'*
>
> *'That thing so it becomes like for those who are farsighted'*
>
> *'That will remember is the people who have attention in'*
>
> *'Religion is the human mind, and who is lacking, it is no religion for him'*

In general, Islamic thought has some specific genre. There are four major streams of flow derived solely revelation, flows derived from revelation and reason, flows derived from reason and revelation and flows derived from reason alone.

Flow-based solely revelation is holding the Prophet and apostles and disciples at the time of the first generation of Muslims by the Quran and the Sunnah of the Prophet Muhammad SAW. Flow-based revelation and reason would join after the death of Prophet Muhammad SAW. Various sects were formed when the flow is accepting the influence of foreign civilization.

Flow is derived from reason and revelation comes from the Greek civilization. The flow-based on logic and like to twist the truth that contained in the Quran. The flow reason alone is not primarily derived from Islamic thought because there is no difference with western logical thinking conscious mind and based on natural law and love creator.

In al-Quran and al-Hadith, Islamic faith is able to evoke a number of characteristics of thinking which is right and just to his (Abdul al-Majid, 1997). This globally can be clearly seen from the point of uniformly of a solution, whether theoretical or practical problems of life in all its aspects. An essential element in Islamic thinking is perfection vision, unity and harmony, nature, critical and objective. If these five principles were applied, it would be a way of thinking based approach to Islam.

The Basic Principle of Logic

There are three basic principles in logic; the principles of identity, middle principle and the principle of contradiction.

In logical thinking, the principle of identity states that an object is always the same with its own, (A=A). In summary, if a statement is true, then it is true. Next is the middle principle. In this principle, a statement can be either equal to B, A=B or A is not equal to B, A≠B. It is the nature of the definition of third exclusion principle (principle of the excluded third/

Principium tertiliexclusi). In this principle, a statement is whether true or false. Lastly is the principle of contradiction. This principle is a statement that cannot be true or false simultaneously. According to the law of statement, two principles conflict at the same time cannot be true. When two proposition entirely different in nature and amount, the contact of contradiction will occur. This statement is the statement that has been given by Aristotle. It does not take truth for both propositions if you are true, others not correct, and then one of these statements must be true.

Web-Based

Web-based applications are using web technologies or any browser. This web-based application can be used anywhere as long as there have an internet connection. Web-based does not require users to install things on the computer, what they just need is only to open a web browser. Examples are as Google Word Processor, meebo.com, Google spreadsheets and flash games

A web-based application refers to any program that is accessed over a network connection using HTTP, rather than existing within a device's memory. Web-based applications often run inside a web browser. However, web-based application also may be client-based, where a small part of the program is download to a user's desktop, but processing is done over the internet on an external server. Web-based applications are also known as Web apps.

Benefit of web-based survey

The web-based tool is one of the best ways to carry out the study for the present. There are several advantages of using a web-based as an instrument when making an assessment.

The web-based software does not need to install and it only requires the internet. Therefore, it is inappropriate. The time required to answering the questions are more quickly than traditional methods were used. By using this way, we do not have to wait for paper questionnaires to come back to you. The response rate is almost instant. In addition, by using a web-based it is cheaper. It can save the cost of your research. The response can be processed automatically from the respondents and the results are accessible at any time.

Using a web-based as a way to gather information is more appropriate way and more accurate. There is smaller margin of error because the participants enter their responses directly into the system. If using the traditional method, the researcher should tell the respondent in depth and common mistakes make by people frequently.

In addition, the use of web-based is very simple. It is conveniently used to the respondent and to the researcher. One study found 90% of people that have access to the internet prefer to answer the questionnaire online. With the online survey, the respondent can choose the right time to answer the questionnaire. The main advantage of using online survey is time saving. Necessary data can either be quickly and easily transferred to the special statistic software.

In conclusion, the use of online surveys can be time-saving, inexpensive and can result quickly. The use of this online survey could be one of the convenient ways.

How to measured logical thinking using web-based

The assessment of developmental reasoning is becoming a necessary part of teaching. The results can be used to modify in teaching strategies and help teachers to better understand students' intellectual development.

Clinical interviews are often used to assess students' cognitive development. However, there are time-consuming and required trained interviewers. To avoid these problems, many classroom tests of cognitive development have been developed.

Logic is found to have a consistent impact on certain aspects of critical thinking (Annis & Annis, 1979), and it can also be monitored and determined. It can also be measured using many available tools. However, none of the tools that exist now meets the demand of globalization. Similar to the approach of E-learning, which revolutionized learning on the online level (Trombley & Lee, 2002) and E-commerce, which enables business and transactions to be conducted online, the development of E-logic is to bring the evaluation of logical thinking skills online to reach more users. E-logic is an approach that refers to how the ability of logical thinking and one's reasoning can be measured online. Improved technologies could mean faster and easier access to information but do not necessarily ensure good quality. E-learning has undergone intensive development as an inevitable result of the recent proliferation of internet technology. These environments facilitate the delivery of substantial parts of education through the use of tools and materials that are accessible directly to the learners' home or office, and at any time. In addition, the advancements in technology, which are used to enhance the interactivity and media content of the web and the increasing quality of delivery platforms, create an ideal environment for the expansion of e-learning systems (Alkhatabi et al., 2011).

In another development, based on student achievement and human-computer interaction in logics, affective variables are important research issues to fully understand the relationship between information systems development and e-logic. E-logic is the central dimension of e-logic system adoption, which is one of the most important aspects of e-logic student excellent management. According to logical systems and human-computer interaction insights, affective variables, such as perceived enjoyment and system anxiety, are parts of the target perspectives. Perceived enjoyment, the extent to which the activity of using a computer system is perceived to be personally enjoyable on its own right aside from the instrumental value of technology, increase thinking intentions. System anxiety, the apprehension or fear of the results when an individual is faced with the possibility of using, negatively affects system adoption. Thus, these positive (enjoyment) and negative (anxiety) effects on e-logic would be important empirical finding. Furthermore, web design and web quality are also suggested as important antecedents to online logic measurement.

Test of Logical Thinking

In the year 1980s, Tobin and Capie had constructed the Test of Logical Thinking (TOLT) to measure formal reasoning. The test consists of 10 questions to measure the ability of formal reasoning. Two questions will represent each mode of reasoning such as proportional reasoning, controlling variable, probability reasoning, correlational reasoning, and combinatorial reasoning. For the first eight questions, students were asked to choose the correct answer along with the reason to answer that question. Both answer and reasons must be correct to get marks. The last two questions are comprised of combinatorial reasoning and required students to think about some of the possibilities inherent in the question. Score marks for the TOLT test are between0 until 10. For each correct answer and reason, students will receive 1 point and for every wrong answer and reason, students will receive 0 points. The TOLT has been used on several occasions to correlate the performance of science and engineering students in secondary and postsecondary school with their ability to used logical thinking. In general, performance in science and engineering is correlated with TOLT scores.

Group Assessment of Logical Thinking

The Group Assessment of Logical Thinking is developed by Roadrangka, Yeany and Padilla (1982). GALT is a paper-and-pencil test. GALT is constructed to measure logical reasoning abilities. The test includes 21 items and measures six logical processes. These processes are conservation, proportional reasoning, controlling variable, probabilistic reasoning, correlation reasoning and combinatorial reasoning.

In the test, respondents are asked to answer each question and to write down their answer. Past studies found that the test in the GALT is appropriate for students in grades 6 and above. The time allotted to complete the test is 45 minutes (Korkmaz, 2002).In the process of scoring, one point is given for each correct satisfactory answers and reasons for the first 18 items, and one point is given for each correct answered for the other questions.

Conclusion

In all, this concept paper is important as logical thinking among students relates with their qualities in terms of thinking style, inspiration, as well as critical and creative thinking, which is in accordance with what Sezen and Bülbül (2011) recommended. Logical thinking adds to scholastic achievement (Bayram et al, 2009) and the capacity to take care of issues better (Çığˇrık and Ergül, 2010). The capacity of logical thinking creates the more insightful and expert graduates pick up the capacity to face issues and understand them easily and innovatively. Having the capacity to think critically has turn out to be progressively imperative because of the way that in the time of data, students, representative, and managers on need to settle on more choices (Renaud and Murray, 2008).

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