Associative Relevance based Instructional Strategy upgrades eLearning

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Abstract

Research on instructional strategies for optimal performance has been one of the intensive studies in the area of eLearning. An enhanced instructional strategy is a necessity for significant transfer of learning and in turn, to enrich human mind with knowledge. In this study, we investigated to collect samples as data from participants who joined in this research. The collected data were tested to prove our hypothesis that cognitively engendered associative relevance based instructional strategy had extensively improved eLearning. The analyzed data and inferential evidences established our hypothesis that associative relevance based instructional strategy upgraded eLearning.

Keywords: *Associative relevance, Cognition, eLearning, Instructional Strategy*

1. Introduction and background

In the field of eLearning, the instructional strategies have been of great interest to the practitioners, teachers, scholars, professionals, and researchers and a number of serious probes have been going on for the advancement of instructional strategy designs and implementations. The applicability of the eLearning instructional strategies is widely addressed challenge in eLearning researches. As the instructional strategy gets marginal improvement, there is possibility of manifold enhancement in transfer of learning and consecutive knowledge expansion [1-6].

Subsequently, in a number of research literatures, to address the problem in eLearning for the instructional strategy design and implementation, the discussion and consideration for the cognitive aspect in eLearning has been extensively discussed in detail. Further, the cognitive aspect in eLearning has become frequently adapted fundamental idea within the eLearning instructional strategies. The deployment of the cognitive aspect in eLearning unwraps diverse applicability of the instructional strategies that are necessary constituents of eLearning field. Accordingly, it becomes obvious that the study of cognitive impact in eLearning is going to lead us towards a path of success. Hence, we study the influential underlying factors of human cognition in eLearning process. Undoubtedly, by improving the influential underlying factors in eLearning materials, we may strengthen the process of learning as well [6-15].

As per human cognition, a human mind and memory engage in the transfer of learning profoundly. In fact, the complete duration of learning processes during eLearning rest on the harmonization of underlying mechanism of persistent cognitive processes involving the mind and memory. In addition to these, the learning processes involve a number of transitional sub-processes during various phases of the main processing. Within these transitional sub-processes, there exists an indispensable and obligatory process, i.e. the process of viewing the objects and assigning relative identities. The human viewing process initiates a series of cognitive functions, including visual attention, perception, analogical thoughts, cognitive reasoning, and metacognition. These are constrained to exist until the end of viewing of objects [6-17].

In the transfer of learning of eLearning materials, a human looks at the learning materials as objects and underlying cognitive processes bring about exertions for effective retrieval of knowledge or information that are exhibited. Further, human mind is operating for memory management and enduring storage of the human mind. Cognitively, the process of storage gets involved in after formation of relevant association within the contexts, as it makes relatively better memory accretion and repossession. The instructional strategies for transfer of learning are the ways of human thinking, perceiving knowledge, and processing information for understanding. Human thinking and reasoning are some of the primary activities that acquire the most basic of motor skills. A number of proposed human learning models include the memory as a fundamental component. Models based on associative memories significantly influence our understanding of about learning involving mind and memory [6-17].

Associative relevance is evolutionary and cohesive notion which is emanated from thoughts of analogy. Associative relevance can be sensed along and after the happening of the analogy phenomena. Like analogy, associative relevance is significant in cognitive processes and is key mechanism in concluding creativity which is also a part of the subject, like eLearning. Associative relevance is basically related similarity in which the same relations or likeness hold between different domains or systems. The main focus of our research is on the associated thoughts and processes placed in eLearning materials. In the eLearning materials, the correlated and coexisted objects have considerable relevance by which people understand one state or pattern in terms of another [17-23].

We employ instructional strategy based on associative relevance for eLearning materials. In this approach, we intend to transfer the associative contexts of eLearning material to the learners. The contexts are connected via associative chaining. Hence, the memory of learner's mind could in turn, associate and organize the memory of brain.

By adapting an instructional strategy of learning in accordance with human cognitive phenomena that exist during the learning process, we can improve the learning process. At the same time, the mind can perceive and withstand gigantic amount of knowledge and retain it in memory for longer duration. The eLearning based on associative relevance is proposed instructional strategy that can assist and enhance learning process.

2. Present study

We examine the eLearning materials from cognitive perspective, including the underlying mechanism of associative relevance, during viewing of eLearning materials. For the purpose, we follow along and finish the steps of planning experimental setup, statistical data analysis, and data visualization for interpretation, which are the key steps during the entire study.

Initially, participating students view traditional eLearning materials that are shown in the classrooms as traditional learning process. The data related to this eLearning material based on traditional instructional strategy are collected from questionnaires of participants as feedback.

Thereafter, the participants are requested to view eLearning materials based on associative relevance that are cognitively created based on associative relevance notion. The data related to this eLearning material based on associative relevance are collected as well in terms of questionnaires as feedback. Finally, we analyze all collected data for interpretation statistically. The interpretation is carried out with the help of statistically existing parameters for such study.

The main objective of this study is to prove the instructional strategy based on associative relevance is improved, imperative, and well-intentioned for learning process than traditional instructional strategy.

The study of cognitive impact of eLearning consists of a number of steps to be performed. These steps are represented as shown in the adjacent flow chart diagram (figure 1). This is a comparative study of two data (the data from traditional instructional learning strategy and the data from associative relevance learning strategy) analytically.

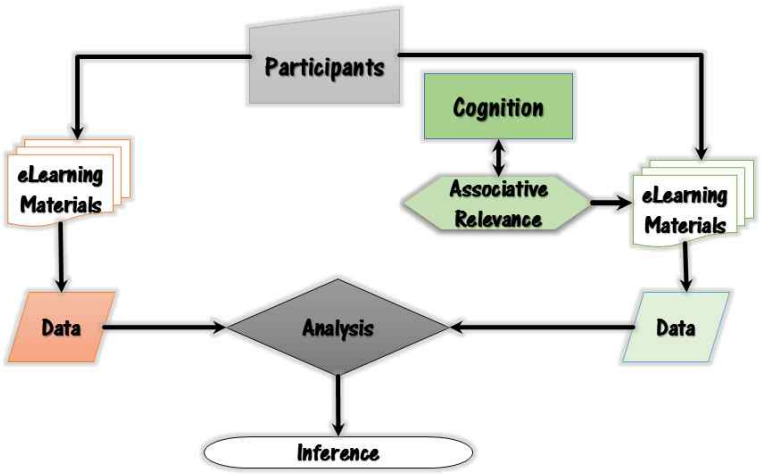

Figure 1. Flow chart of research study

3. Method

We selected 140 participants from a number of classes randomly, aging from 21 years to 30 years. These Subjects, the participants were assigned to view two sets of ordinary slides as shown below in figure 2.

In simplistic manner, the first set of slides (in first row) consists of three slides related to the topic of 'Data vs. Information' and the second set of slides (in second row) consists of three slides related to the topic of 'Coding Standards'. These traditional slides, related to computer science course, are displayed during active viewing of the participants.

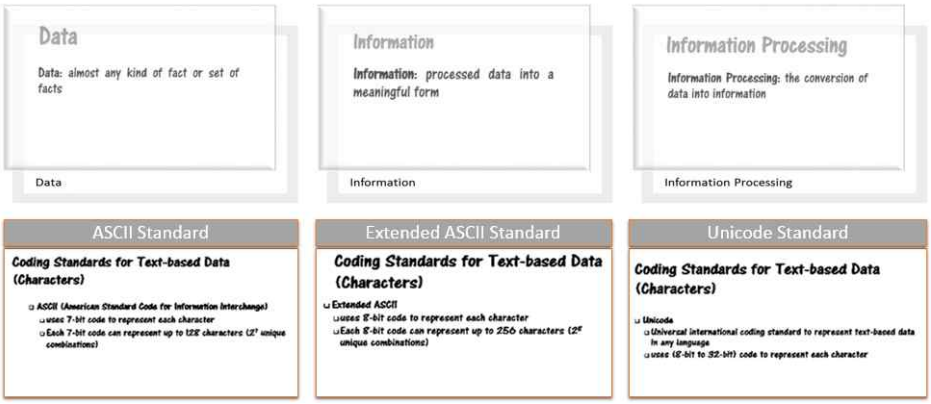

Figure 2. Selected Learning Slides for research study

4. Analysis

There were two phases of analysis for our study. At first, we studied the two sets of slides as 'Analysis 1' and 'Analysis 2' along with respective slides based on associative relevance for our experimentations. For all the cases, we recorded the feedbacks of participants in term of questionnaires. Thereafter, we performed detailed data analysis that led to the interpretations and conclusion.

4.1. Analysis 1: Study of first set of slides for 'Data vs. Information'

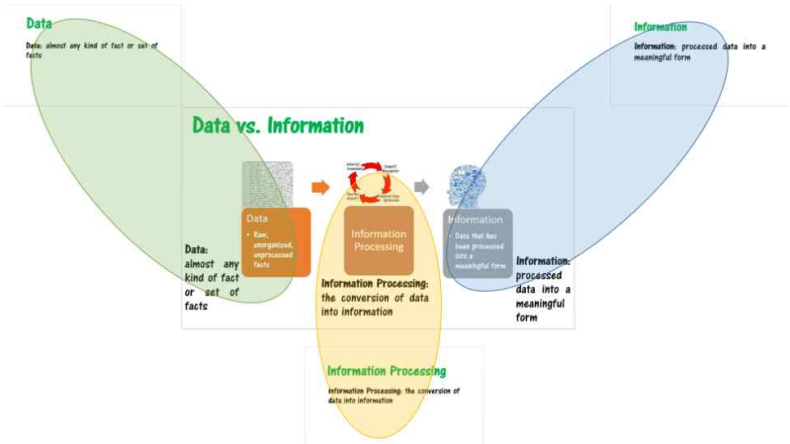

Figure 3. A set of slides and their associative relevance in restructured slide

In this experimental analysis for the set of slides related to 'Data vs. Information' (figure 3), at first, we presented to the participants the first set of three slides sequentially. We instructed them with traditional strategy. In this traditional learning strategy, keeping single subtopic for single slide

had been considered as the easiest and the most efficient way of learning. Therefore, the participants regarded the individual three slides and concluded their feedback.

Afterward, the participants were shown the amended slide (the central slide in figure) based on associative relevance consideration, i.e., keeping the associated subtopics in relevant manner in single slide along with relative illustration. This slide considered all the aspects of existing association among the subtopics and put in relevant mode to perceive learning adapted by human minds. We concerned about the human mind and memory during this transfer of learning and did effort to put in elements of cognitive perspective. We collected the data as feedback of participants' responses in the survey.

4.2. Analysis 2: Study of second set of slides for 'Coding Standards'

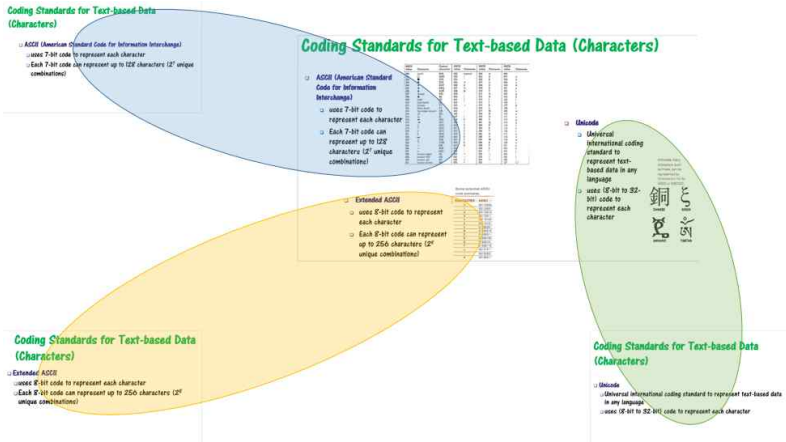

Figure 4. A set of slides and their associative relevance in restructured slide

In this analysis of slides for 'Coding Standards' (in figure 4), at first, we conducted experimentation and recorded the observation as data from participants who regarded for the individual three slides. These slides were based on the traditional learning strategy that stated that for the easiest and optimized mode of learning, there should be separate slide for separate topic.

Afterward, we continued experimentation for the amended slide (the central slide in the figure) based on associative relevance consideration. This associative relevance notion came in from cognitive perspective and the notion of associative relevance was denoted along with pictorial representations as well. We did our special effort to embed within this slide the underlying mechanism of cognition. Taking as an advantage of associative relevance contexts presented in the slide, we tried to relate the mind to memory that could receive or retrieve information accordingly. We expected that the associated intents in terms of existing contexts in the slide might enhance the capability of learning more efficiently. However, the participants viewed the slide and gave us feedbacks that were gathered as data for further analysis.

5. Statistical data analysis

Based on gathered data from the participants as feedbacks, we plot a graph (shown in figure 5) for data distribution for both learning strategies. The data distribution graph shows both general and associative relevance learning strategies along with participants' learning capabilities in fractions.

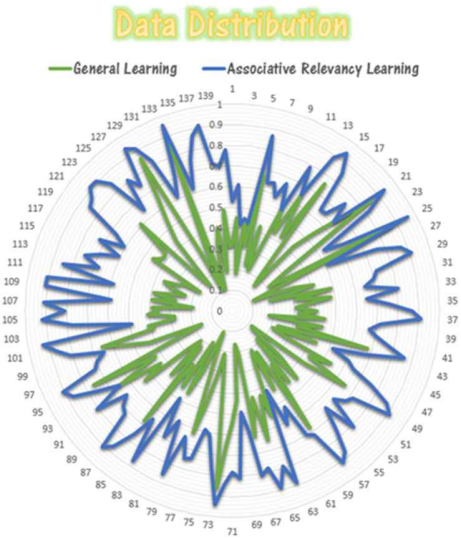

Figure 5. Data distribution of both learning strategies for learning capabilities (in fractions)

Further, we analyze the data for our hypothesis. We begin with the t-test statistical hypothetical procedure. The assumptions for this t-test are in accordance with our data, i.e. our existing data consist of all the requirements that are the prerequisites of the t-test. In our experimentations, the matching participants on the general learning strategy variable that correlates positively with the dependent variable belonging to associative relevance learning strategy or observing the same participants under both scenarios, i.e. the general experiments and associative relevance based controlled experimentations [24-27].

We suppose our initial, i.e. the null hypothesis that there is no mean difference between the data obtained from associative relevance learning strategy and the data from general learning strategy. This means we assume that both learning strategies are equivalent and they have same levels of intuition for the learners. Additionally, this hypothesis accomplishes that the associative relevance based learning strategy is no better strategy than the general learning strategy as well.

In addition to these, our alternative hypothesis states that there is significant mean difference between the two samples or datasets obtained from the two types of data, i.e. the data from associative relevance learning strategy and the data from general learning strategy. Further, we deduce this as associative relevance based learning strategy is better than general learning strategy.

Table 1 shows the summarized outcome of the t-test. The detailed t-test statistical analysis reveals the following for both types of learning strategies.

Table 1. The t-test for means of both learning strategies

t-Test: Paired Two Sample for Means		
	Associative Relevancy Learning	*General Learning*
Mean	0.739857143	0.389214286
Variance	0.017389908	0.032431752
Observations	140	140
Pearson Correlation	0.444857237	
Hypothesized Mean Difference	0	
df	139	
t Stat	24.49320713	
P(T<=t) one-tail	1.39729E-52	
t Critical one-tail	1.655889868	
P(T<=t) two-tail	2.79457E-52	
t Critical two-tail	1.977177724	

The test result clearly indicates that under the consideration of no hypothesized mean difference between the dataset of associative relevance based learning strategy and the dataset based on general learning strategy, there is significantly high value of statistical t (obtained t stat = 24.49320713).

In addition to this, the value of obtained t is far beyond the critical value of t for both conditions, i.e. for critical one-tail (directional critical t = 1.655889868) and for critical two-tail values (non-directional critical t = 1.977177724). This inference leads to the decision that our null assumption turns out to be false. Therefore, we come to have confidence in our alternative hypothesis.

As a result, our hypothesis that the instructional strategy based on associative relevance in e-learning materials is better than the instructional strategy based on general learning.

6. Discussion

Instructional strategies have always been considered as integral constituents of eLearning studies. One of the advantages that we come across in this research study, is easier approach to the problem in hand, i.e. the optimization of associative relevance based instructional strategy for better transfer of learning.

Although there exist a number of approaches to handle this issue, yet we sense comfortability in this approach because of direct approach for the problem with the assistance of human cognition and interaction that play a vital part in the entire scenario of transfer of learning. As the human interactions change with learning strategies, the most impacted strategy on human learning process can be considered as that one which can better deal the scenario based on the human centric system.

Further, we find the associative relevance based instructional strategy is the suitable methodology in accordance with the human learning process which has tendency to explore the knowledge in human mind and to transfer the knowledge for adaptive human minds as well.

Furthermore, the human minds have underlying mechanism of the human cognition, so the cognitive processes can align to enrich the human mind with knowledge which is transferred through instructional strategy based on associative relevance.

However, the upgradation of the eLearning through associative relevance based instructional strategy is a comprehensive resolution for the concerned problem of design and implementation of eLearning materials. Nevertheless, the resolution exclusively relies on different aspects and scenarios of the experimentations, and in turn, implementations.

Although the design aspect of eLearning materials has been fully borrowed from the consideration of cognitively generated associative relevance notion, yet the collection of datasets from samples do make difference.

On the one hand, the analytical part of the experimentations are significant and precise in our research study, on the other hand, there could be slight variation in the result depending upon the diverse perspective of the same experimentations including the participants' survey, questionnaires, experimental setups, and embedding of the associative relevance perspectives as well.

7. Conclusion

On the grounds of our statistical analysis, we infer that the associative relevance based instructional strategy in e-learning materials is more proficient, natural, and manifold in comparison to the instructional strategy based on general learning.

In addition, we conclude that the associative relevance based instructional strategy upgrades eLearning. Further, existence of associative relevance cognitively enhances the learning process for adaptive minds of learners.

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