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Fluid structures and behavior in inculcating creative reasoning

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Abstract: This paper proposes a descriptive framework for object-oriented comparison and contrast of strategies that aims at inculcating fluid (flexible and constantly evolving) cognitive structures and cognitive behavior (strategies) within adaptable contextual schematic frameworks. The ultimate aim behind this fluidity is to create cognitive flexibility and consequently inculcate systemic and creative reasoning. An example within the strategic marketing domain is provided. Subsequently, implications to technology-mediated instructional design conclude.

Keywords: Fluid structures, strategies, scaffolding, creative reasoning, strategic marketing

1. Introduction

Creativity is often typified by an innate ability to perceive beyond the immediate or the evident, discern between relevant and irrelevant, self-regulate plans and strategies and most importantly, develop novel and *useful* ideas. Consequently, it is crucial to help our students to think creatively and become more productive and innovative members of society.

However, most scaffolds have been very structured. Structure may be restrictive to expert designers. Furthermore, it may train novices to think in a specific way simulating the system designer's way of thinking. Consequently, the novice student may find difficulty in developing his/her own voice (method for reasoning, evaluating and refining).

This paper proposes that it is crucial to structural context as basic scaffolding at the initial learning stages. However, once the initial concepts have been grasped, freedom in reasoning, evaluating and refining should be allowed in order to cater to different ways of learning [1].

In this paper, structured scaffolds to creative design processes are developed based on contextual schema and object-orientation in concepts. The context-based schema enables associations of concepts to the overall context and goal(s). Application of object-oriented programming concepts to context-based schema enables easier instantiations of contexts within which strategies can be transferred (adopted/adapted) based on reflection outcomes and within which learning paths can be dynamically adopted or adapted.

The outline of this paper is as follows: Reasons for a fluid exploration phase are first identified. This is followed by an example of strategies for the theme strategic marketing. Implications to technology-mediated instructional design for creative education conclude.

2. Related work

Let us take a look at designers' creative processes. [2]'s study on designers indicates that almost all respondents apply a wide range of design methods. Some of these methods are scenarios, storyboards, use cases, software prototyping and subsequently the testing of these on focus groups, interviews and field studies through questionnaires. Almost no one

used predictive modeling methods such as Goals, Operations, Methods and Selection (GOMS). Instead, a few used software engineering methods (8 percent), experiments (10 percent), contextual design (10 percent) or guidelines (5 percent). Moreover, 85 percent of the respondents said that they depended mainly on their own knowledge such as about affordance to interpret the data that they gather and to find a solution. They are against being constrained by prescriptive theoretical guidelines.

Since non-prescriptive exploration is encouraged, how can we ensure that exploration will lead to fruitful outcomes? The answer lies with goal-based design [3] within goal-based scenarios (GBS). Goal-based scenarios contextualize exploration, discovery and reflection processes. Furthermore, variations in mission structure can easily lead to variations in themes; resulting in rapid lesson development as well as systematic application and transfer of learning from one scenario to the other. Variations in scenarios simulating cognitive flexibility [4] will benefit the inculcation of thinking from multiple dimensions, as students will have to create meaning from the diverse content and formulate associations among concepts and strategies.

3. Contextual schema and object-oriented adaptation of strategies within similar contexts

The theme strategic marketing is used as an example. If a Malaysian company specializing in the manufacture and sale of its brand of cars wants to break into a new market in Indonesia, it can learn from prior successful examples and use the critical success factors (distinctive selling features) from these prior successful examples to formulate its contextual parameters.

Let us assume that the learning objectives are first, to be able to identify goals and sub-goals; second, to be able to link information to the goal/context; and third, to be able to reason using different perspectives. The following example shows strategies to address the three skills that require more attention in the Malaysian context and subsequently, how these strategies can be adapted to the Indonesian market.

3.1 Malaysian context

Goal: To increase sales of the car to be sold

Strategy: Road shows may be boring (less interactive) if only the car and the specifications of the car are displayed at popular spots in the country. Since the objective (sub-goal) of road shows is to inform potential buyers regarding these aspects, the marketer needs to identify the interests of main stakeholders and stakeholders influencing the main stakeholder and cater to these interests.

Hence, to achieve the goal of informing, the marketer can create an interactive web portal for the company which provides more information on the company, the brand's cars, specifications for each and allow potential buyers to change the color of the car that they like and even allow them to calculate using a financial planning calculator customized to their needs at the company's website.

In addition, helping students to think from multiple perspectives through simulation of the different interests of different stakeholders is expected to generate more interest and further action by these potential buyers. As such, marketers can target stakeholders who influence the main stakeholders, e.g. the spouse and/or the children. Spouses are more likely to be interested in the aesthetics, reviews of the specific type of car being considered and the

type of upholstery. Children on the other hand, may be interested in where they can put their games and fast food in the car.

Associating the interactive portal with the goal, objective and the different interests of different stakeholders is likely to highlight the benefits of having an interactive portal in terms of increased interest by potential buyers and influencing stakeholders, contributing towards the design of future car production. Another benefit is reduction in cost due to focus of resources on the interactive portal and less on road shows and demo.

3.2 Non-Malaysian contexts

In the given scenario above, the goals are expected to be similar in any context. Students need to generate their own alternatives to increase sales. Next, they need to consider the interests of different stakeholders. Both Malaysia and Indonesia are quite similar in cultures. Nevertheless, there will be slight differences in what the main stakeholder, spouses and children would be interested in. Adaptations of marketing strategies from the Malaysian context would therefore come into picture. Similar principles apply to adaptations of strategic marketing strategies from other countries. For example, children may not only be interested in compartments to put their stuff but also consider car TVs as a matter of style and necessity. Selecting suitable strategies (and accompanying reasoning) will hopefully lead to richer transformations of strategies to suit local contexts, richer learning paths and richer learning experiences.

4. Implications to instructional design for creative education and conclusion

The commonly accepted generic model for instructional systems design and instructional design is ADDIE: analysis, design, development, implementation and evaluation [5]. In terms of design, students can take on different stakeholder roles and compare the strategies that each stakeholder would use – similar to a debate where debaters will have to present their points and their counterparts rebut. Only now, each group of students will have to consider both stakeholder roles. Having contextual schema to provide the various possible scenarios and object-orientation of strategies to enable easy cross-reference, adoption and adaptation across stakeholder roles is conjectured to increase the likelihood of students developing cognitive flexibility and systemic thinking which will inculcate creative thinking skills.

With these concerns in mind, technology-mediated instructional design for creative education needs to enable visualization of information and the knowledge space to enable identification of interrelationships among concepts and how these relationships can contribute towards the achievement of goal and sub-goals.

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