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**THE MARRIAGE OF FREIRE AND
BLOOM: AN ASSESSMENT
PROTOTYPE FOR PEDAGOGY OF
THE OPPRESSED AND HIGHER
ORDER THINKING**

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The Marriage of Freire and Bloom: An Assessment Prototype for Pedagogy of the Oppressed and Higher Order Thinking

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Abstract

The proposal delineates the problem of CAA and Bloom's taxonomy, summarising the pedagogical issues addressed by Freire and Bloom, and their relationships. The methods of data collection are explained concisely. The paper explicates several design elements of a system prototype, namely the *Learning HOTwatch v.1.0* based on the selected responses. The analysis and discussion makes its design meeting criteria such as reflection and substantive self-actualisation for high order level thinking. The preliminary architecture designed for the prototype is depicted and the similarity computation of case-based reasoning is suggested to use for the assessment computation. This proposal will be extended to provide further details in the short paper to be submitted.

1.0 Introduction

There are various Computer-Assisted Assessment (CAA) applications in the market aimed to compliment the assessment process and to provide help for educators. The potential focuses are for the convenience of educators as well as the immediate feedback to the students. However, this results in a continuing problem: Does the question produced by such CAA application assess the learners at a higher order level?

Educationalists have been long aware of Bloom taxonomy (1956) which consists of six stages of cognitive thinking level. Bloom et al. (1956) found that most of the assessment questions require learners to think only at the lower level, which is information comprehension and memorising. Regardless the advancement of the innovation and intelligent in CAA, Higher Order Thinking (HOT) by Bloom et al. (1956) is, above all, a problematic reality in CAA. However, higher order thinking is a person's private experience, to which no

one else has direct access. The exam questions or assessment system may play a role in stimulating the higher order thinking skills for learner.

Thirty five years before Bloom, Paulo Freire with his famous publication *Pedagogy of the Oppressed* (Freire, 1980) critiques that the educator is the depositor who makes deposits whereas the students are the depository and they meekly receive, memorise and repeat (Connolly, 1980). The communication is a kind of monologue by the educator, people are taught to accept what is handed down to them by educator. Their understanding of particular knowledge is constrained to what they are told and then they just repeat what they are told during the exams. In such culture, learner are shaped to be silent and in ignorance (Bee, 1980). The learners are not given the opportunity to assess what has been assessed.

Conversely, Freire asserts that the aim of good pedagogy is to enable people to increase their understanding of their own objective conditions. Such understanding will inevitably lead the learner to assess the world as they climb out of the oppression in which they have been constrained (Barnard, 1980). He also captured the education qualities of what is to be human, and so education as a practice of freedom will remain pivotal for the realisation of the individual (Glass, 2001). Thus the learning process and angle is much wider and profound. Dialogue, reflection and communication to encompass this praxis are required (Connolly, 1980), and the role of the educator is to create such praxis, from theory to practical and also from lectures to reflections.

This perception is inevitably aligned with Bloom's Taxonomy (Bloom et al, 1956). The thinking level on knowledge, comprehension and application are more towards the conventional depository instruction method and lower thinking level whereas analysis, synthesis and evaluation are readily aligned to dialogue, reflection and assessment of the knowledge.

Likewise, Freire writes,

'...acquiring literacy does not involve memorising sentences, words and syllables - lifeless object unconnected to an existential universe - but rather an attitude of creation and re-creation, a self transformation producing a stance of intervention in one's context.' (Bee, 1980, p.42)

Hence, the aim of this paper is to study Bloom's and Freire's pedagogical praxis and to design an assessment prototype to embed such pedagogical issues into learning process.

2.0 Research Method

There have been CAA applications research and design which are based on Bloom's taxonomy (King & Duke-Williams, 2001; Sitthiworachart & Joy, 2004; Paterson, 2002; Joy, Muzykantskii, Rawles, & Evans, 2002). Their research mainly focuses on how to assist educators in embedding HOT in question

design using CAA and to provide a set of exam questions with better HOT elements.

This research is an attempt to blend the educational theories from Bloom and Freire and it focuses on assisting the learners in an active and initiative manner.

This study incorporated the case studies with qualitative-quantitative interactive continuum methodology (Newman & Benz, 1998) due to its integrative and co-existent strengths of both qualitative and quantitative strategies. First, the arguments by Freire and Bloom are studied. In order to obtain the praxis in higher education institutions, three universities were visited and observed (one more to be visited in March 2007). Academic staffs and students from varying disciplines were interviewed and surveyed. The qualitative as well as quantitative data has been collected from their teaching and learning experiences.

The principal criterion in the selection of exemplary higher educational institutions was less “which HEI represent the totality but rather, “which group of HEI can gain better understanding for the research questions?” and ““which group of HEI reflect strong, both positive and constructive examples of the research interest?”. Given these criterions, a diverse group of HEIs and faculties were needed. For instance the traditional old universities and the new universities upgraded from polytechnic institutes, and the contrasting nature of disciplines related to technology such as Faculty of Computer Science and Faculty of Education; or the Faculty of Information and Communication technology and the Faculty of Humanities and Social Sciences are proposed for the criterion stated above.

To maximize the findings in a case study, a range of formal and informal data collection instruments are incorporated as listed below:

- Online and offline survey
- Recorded Face-to-face interviews
- Cases’ sites visits with direct observation
- Offline/ Online documentation, website, systems and data observations

The responses have been analysed and then act as an input to the design of a prototype which applies Freire’s and Bloom’s perception, namely, Learning HOTwatch v1.0.

3.0 Discussion, Analysis and Preliminary Design Issues

The assessment of a learner on Bloom’s taxonomy is not only reflected in examinations, it can be assessed from the reflection of course work, tutorial, lecture, examination and the whole learning process. There are contrasting views offered from academics discussed next:

Interviewee 1: Course work is the weak option in assessment because students can copy and whatever, and at the end of the day, the final exam is the true reflection. And it's always being driven like that...as long you have the assessment then you have the confidence that you actually truly assess the individual knowledge.

Interviewee 3: ...we are so much exam-oriented...because of this, teachers going into the class, what they think are, I want to cover the syllabus...I want to finish it and I want to give them exam and I want to drill my students until I got the model answers. Even during exam you must try to use that exactly word...to that extends for certain subjects...teachers maybe thinking assessment is always like we are teaching the students, and then we are assessing them, we give them test and exam at the end of the semester or the end of the term or at the end of the year... assessment actually can be done continuously...to assess our students in the process of teaching and learning and not assess them towards the end of the semester.

In the conventional assessment method, the final examination is inevitably the way of imposing learners into HOTS level. Freire further argues that pedagogy of the oppressed involves reflection and communication (Connolly, 1980). Such reflection process is a private experience and the process of learning is independent, no one else can assist and is not necessarily carrying out only through conventional examination. This precisely stated by the following interviewee:

Interviewee 7: It's not easy to teach the students the learning skills, the learning to learn by themselves. It depends a lot's on the students' ability to reflect on what happens.... to pick up the skill you have to do a lot's of reflection on your own.

Thus, the key element of the Learning HOTSwatch prototype is to provide the learner a continuous room for reflection by themselves and such assessment is not constraint to final examination but possibly the lecture, the course work and etc in the entire learning process. It provides a clear framework for learners to assess their own learning outcomes in Bloom's taxonomy boundary. With this framework in place, learners and educators are guided objectively and are able to assess the teaching and learning on an innovative manner. The insight gained by both learners and educators through this prototype may exceed what is generally available through traditional CAA-HOTS assessment methods.

To demonstrate the learning reflection, general and simple externalization is substantive. The medium of externalization is not constraint to exam or lecture. It can be in any way:

Interviewee 2: From my experience, I realised that when students express themselves, they are actually expressing what they have internalised. If I am giving a class, it doesn't matter what method I use, be a lecture or hands on or whatever method I use, what I do is normally...I force them to express themselves; it can be in any way. It can be in drama, it can be in song, it can be in poem, or just power point presentation, posters, modeling whatever..... They have to express themselves so that I can see what they have internalised. If they are not given a chance to express, to externalise what they have internalised, I would not know whether they have learnt. That's my technique, I make them externalise what they have internalised.

The Learning HOTwatch prototype aimed to achieve this by designing “Learning externalisation” facility for the learners to externalise what have been learnt. From the educators’ perspective, the role is changed from depositor and depository to facilitator and reflector. This prototype is not a system for setting up higher order thinking exam questions. It is a simple and general assessment tool to develop the learners’ contemplation. The learners may not have possibility to assess what have been assessed in a traditional CAA. It would be helpful if there is a system which allows the learner to express and to reflect their assessment of learning in higher order thinking rather than merely assessing their thinking skills. This complies the view from one interviewee:

Interviewee 8: I want something like when people use your system, they will follow certain educational method and they will realise at last this is the learning process. In the class, when we ask students to google something and they will stuck when there are few thousand results return. There are some students who will choose the right website but some students will select the inappropriate site. Why is that so? Can we have one system to help those students who can't make a good choice to improve and know how to make a good decision? So, this system is educating the students to learn and not just information delivery.

Paul (1993) suggests a model for the national assessment of higher order thinking to the United States Department of Education, Office of Educational Research and Improvement of the National Centre for Education Statistics. He claims that in addition to the assessment of learners’ skills in Bloom taxonomy, the model should be able to improve the instruction and enable educators to see what kinds of skills are basic for the future.

In such context, the Learning HOTwatch prototype is designed to concentrate on the ability leading to the improvement of instruction in a long run. At the same time it can be employed with maximum flexibility, in a wide variety of subjects and educational levels.

A preliminary model for the Learning HOTwatch prototype is depicted as the following:

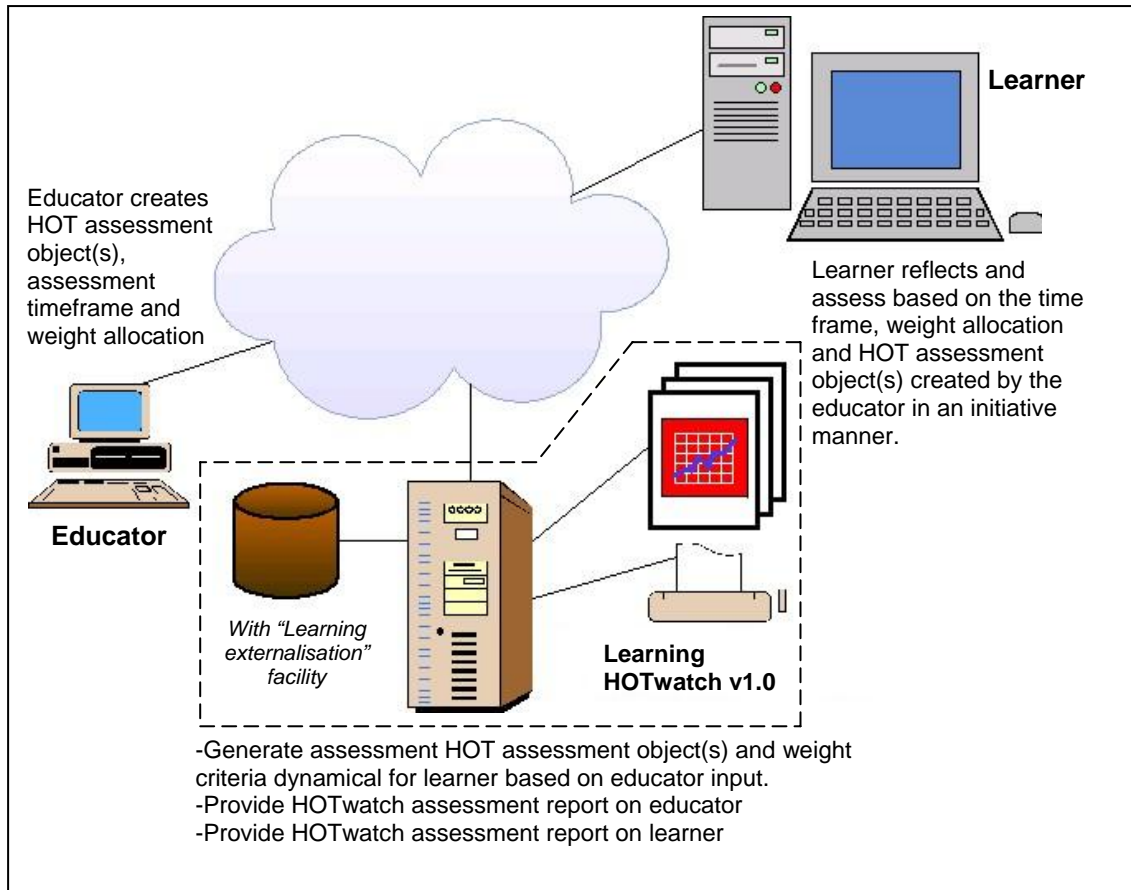


Figure 1.0: The Preliminary Design for Learning HOTwatch v1.0

The algorithm of learning HOTwatch makes use of case-based reasoning, one of the expert system reasoning techniques to compute the result and report. Case-based reasoning is an attempt to apply the Analogical Reasoning to a practical problem (Leake, 1996). It is a methodology to model human reasoning without using rules for problem solving but matching algorithm. In summary, the Learning HOTwatch prototype itself corresponds to an if-then-else rule and it can be formulated into a complex computation model which is introduced in the Equation 1.0 and 2.0.

$$SIM(A, B) = [sim_1(a_1, b_1), sim_2(a_2, b_2), \dots, sim_i(a_i, b_i)] * w$$

where w = weighting i = assessment no.; a = educator's assessment b = learner's assessment

Equation 1.0: Learning HOTwatch Similarity

$$SIM(A, B) = 1 / f \sum_{i=1}^f sim_i(a_i, b_i) * W_i$$

where f = full weighting, w = weighting; i = assessment no

Equation 2.0: Learning HOTwatch Similarity Computation Summary

4.0 Conclusion

Freire insists that liberating pedagogy consists of reflection, critical dialogues and the acts of cognition, not the transfer of information from the depositor (the teacher) whereas Bloom taxonomy suggests the higher order thinking level that consists of analysis, synthesis and evaluation, which are readily aligned to the dialogue and reflection of the teaching and learning process

Overall, such teaching cannot be imposed from the top but instead should be carried out in a reflection process, shared investigation and in a problem-raising situation between educator and learners (Bee, 1980). The learner shall act as a subject and always possess critical thinking and maintain the dialogue with the educator, instead of being a submissive object in the learning process. Thus, this research is to design an assessment prototype, named, the Learning HOTwatch v1.0 which based on the pedagogical issues raised by Freire and Bloom, as well as the experiences from the academics. It will provide a bottom-up assessment via the process of articulation and reflection of higher order cognition by combining the considerations of two pedagogical approaches.

This proposal is a work in progress research in which the design and application flow of the Learning HOTwatch prototype will be illustrated in the short paper to be submitted later. Generally, review and discussion through sharing of ideas in web-based mediated environments has been implemented to facilitate forms of higher order reasoning (Wegerif, 1997; Crooks, 1994). In addition to this, the analysis and design of the Learning HOTwatch prototype aim to help educators distinguish more closely what they teach and by implication what they are assessing.

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