Instructional Scaffolding: 
The Computerized Classroom

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ABSTRACT

This article addresses the use of embedded scaffolding to enhance web-based learning in an online course which covers an introduction to multiple programming languages, utilizing selected resources and strategies as scaffolding techniques. This programming languages class is taught at the junior level in the Information Systems discipline as an online elective class, in a public institution located in a large, urban setting. Low to high knowledge learners are guided in the development of programs and implementation of systems through the use of four different programming languages. Learners with various experience levels were surveyed to determine if they thought these reinforcing scaffolding techniques were effectively used to provide all students with their own success producing pathway through the course. While finding out which scaffolding sections actually added to student success may not be absolutely necessary in designing a successful course, embedding hypermedia fostering a systematic improvement of learning options requires the constant “redesign” and encompasses web-based scaffolding processes as a very real advantage.

Keywords: Embedded, Fragility, Hypermedia, Icon Seeding, Online Learning, Programming Course, Scaffolding, User-Centered Design, Web-Based Learning

INTRODUCTION

Scaffolding computer mediated conversations are best started in the computer classroom as behaviors can be modeled. We all participate in computer mediated conversations. Our Facebook page, our I-Phone, our learning management systems, such as Blackboard, allow for these computer mediated communication moments (CMC). In the case of Blackboard, the CMC is available for a semester; on Facebook, or a computer mailbox, there is no time limit as long as one keeps the same email address or one’s computer does not crash and lose addresses or one is not written off a colleague’s or friend’s Facebook page as “Unfriended.” However, an online computer language programming course is less forgiving since the student has a very limited timeframe in which to master the complexity of the assignments. This makes the situation and course perfect for the implementation of scaffolding techniques since if one path leads to an intellectual dead end, the student has another route to explore.

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We are talking about the scaffolding of a computer mediated conversation using a wealth of techniques: a professor scaffold option wherein the professor serves as a resource, a student instructor scaffold option in which a upper level student provides additional services as needed, a team scaffolding option in which the student can learn mastery from advanced fellow teammates, a student expert scaffolding system, and online tools such as Wimba for online collaboration.

Scaffolding, at best, uses inductive logic, as it completes the learning circle. The learning sources of good strategic scaffolding are placed in and around the classroom in accordance with statistical information about the particular course’s dangers. Is the student likely to panic and never return to a frightening classroom? Does the student have the necessary talents, tools and texts to succeed in the course or is the student unable to acquire the necessities for some reason? Is there a section of the course where the student has failed before and the approach of that material brings memories and expectations of failure? Is there at least one major, acceptable learning source or pathway in the classroom? Is there are least one acceptable learning source on-line? Is there a skill which the teacher assumes the student has, such as photo-shopping or, are there just graphs placed within the texts, which escape the student every time he or she attempts the course? This last question can be used to illustrate just how useful scaffolding can be. Put into strategically made teams, sometimes the student can learn this skill from an advanced fellow student, even if the teacher never notices the student’s learning deficit. With a student instructor in the classroom, the same process can continue. With a tutoring lab available this can also occur. With Google on the computer, the student with good Boolean logic will be able to ask for a tutorial on the

Discovering, at the beginning of a course, which student is most likely to select which learning path or even which part of the learning scaffolding to make thickest because of the expectation of greater usage would be as useful as it would be fascinating and desirable, if unlikely, difficult, and time consuming. The wonderful thing about scaffolding is that it can succeed without such analytics and the operationalizing of those analytics. The bad thing about this sort of scaffolding is that it “eaters” to prejudices. If a person does not want to go to the female Lebanese professor, he or she has options that do not challenge what ought to be challenged; they are open to avoid a scholar from Beirut. The lack of gendering of the on-line classroom, like its lack of ethnicity, is objectifying. More significantly, if the professor is willing to go through the time consuming process of analytics on who or what the student is learning from in the on-line classroom, tremendous amounts of important data can be harvested and the course can be improved using that data. (Figure 1)

We have always believed, perhaps from vested interests and our early professor-centric classroom, that the professor learning path was the choice of the ambitious, enabled student and that the peer-path was the path of the student who fails this better path or for whatever reason is unable to use this path. Or, it could be because that student allows himself or herself to learn from an authority or authorized representative of the university or adult world, sometimes even refusing to allow an authoritative adult the opportunity to serve as a mentor and successful teacher. Thus we long presupposed that the student who is willing to fail in extreme defiance has an alternative to educational suicide if that student sees that there are peer paths to some competencies that do not directly set off the Oedipal experience or require subservience to a professor.

We are not saying that these learners can expect as good an outcome as the student who is able to select the best path to the competency regardless of his past experience with professors, student assistants or computer aided information systems. However, we are saying that this student gives himself alternatives to deep failure while the students who takes all elevators up may experience a “learning surge” that lifts them to another deck on the learning ship, a deck that, while attained by a few in the
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