

Vicarious Learning

John R. Lee

University of Edinburgh, UK

INTRODUCTION

In computer-based learning, we often find ourselves addressing our technology to an unexpectedly complex Web of issues in learning and instruction. Understanding what is going on may require us to take a step back and look at some more fundamental theoretical issues. This is the position we find ourselves in with the application of “vicarious learning”. On the face of it, this is the simple concept of accumulating a collection of records of learning experiences, which other learners can also use to learn from. Such a concept is apparently similar to observational learning, or to various notions of re-usable learning knowledge-bases. However, the specific suggestion we address here is that vicarious learning is a distinct idea that may have its own implications, particularly for distance learners and others whose access to normal learning dialogue is limited. In this article, then, we begin with a discussion of the general concept of vicarious learning, and its close relationship to the role of dialogue in learning. We use this understanding to motivate the application of vicarious learning in computer-based learning systems, and argue, against specific objections, that these systems show benefits that will be especially relevant for the groups mentioned above.

VICARIOUS LEARNING: ORIGINS AND SCOPE OF THE CONCEPT

The idea of learning vicariously—through the experiences of others—was originally discussed by Albert Bandura (1965, 1971, 1986). Bandura was interested especially in the way that behaviours may be learned from the observation of other individuals, for example, in the case of aggression being possibly learned from watching aggressive behaviour on television. There is some process whereby people will model observed behaviour. Bandura noted that modeling behaviour is enhanced if the observer sees that behaviour being reinforced by some kind of reward. More specifically,

the observer needs to perceive the behaviour as having attracted a reward: If the connection is not perceived, then modeling is not enhanced. On the other hand, modeling can be reinforced where behaviour is thought to have been rewarded even though in fact it was not. Vicarious learning accordingly arises in situations where a learning experience is witnessed and reacted to as a learning experience by another learner. Vicarious learning is thus to be distinguished from the observational learning of some behaviour merely by exposure to the performance of that behaviour, especially expert performance (as found, e.g., in Beishuizen, Booij, & de Visser, 1997). The principle itself is general enough to apply also to nonhuman learning agents (Crabbe & Dyer, 1999) and organisational learning (MacIntosh-Murray, 2001).

Bandura was concerned mainly with fairly general issues of social learning, especially affective learning. However, a similar modeling phenomenon arises in many other learning situations. Tulley and Lucas (1991) describe a museum context in which people’s ability to reassemble a dismantled lock mechanism was more influenced by their having observed others doing it than by any other discernible factor. Consider also a typical tutorial setting: a shy student in a medium-sized tutorial group. The student does not like asking questions, and it is very easy for him or her to keep quiet without anyone noticing. But there are some more voluble members of the group, and every so often one of them raises a question that relates directly to a problem this student has been puzzling over. As the question is discussed, the shy student follows the argument closely, gradually comes to recognise that he or she has misunderstood one of the main points from an earlier lecture, and now realises how to solve his or her own related problem. Though not participating in the discussion, the shy student has directly benefited from simply observing another student’s learning experience and is able to relate it to his or her own situation. This is a clear example of vicarious learning where the focus of the learning episode is some cognitive skill or understanding.

In many areas of education, vicarious learning is almost institutionalised through notions like the *master class*. In music and design, well-known teachers work with individual students in front of an audience of others to the benefit of all. Less obviously, perhaps, a related process can be mediated by technology. The Answer Garden (Ackerman & Malone, 1990) and Answer Web (Slater, 1993) are computer-based learning systems based on networks of questions that have been asked by learners and answered by experts, allowing future learners simply to access these exchanges and thus to learn vicariously.

VICARIOUS LEARNING AND “TERTIARY COURSEWARE”

A focus on vicarious learning very naturally soon becomes a focus on the role of dialogue in learning. The learning process needs to be articulated and externalised if it is to be available to other learners, and this happens most straightforwardly in dialogue. Terry Mayes, who first applied the term vicarious learning in the context of computer-based systems, has developed a general model of learning based on a cycle through three stages (Mayes, 1995; Mayes & Neilson, 1996). In the first stage, material is absorbed and conceptualised; in the second, it is actively worked on and reconstructed, for example, in problem-solving tasks. In the third stage, problems are addressed that have arisen in the second stage, and this typically involves dialogue with experts or peers, which reveals gaps or inadequacies in knowledge or understanding that may propel a return to the first stage. Mayes proposed that different kinds of courseware could be developed to support these stages. Primary courseware would be essentially expository material, secondary courseware would be environments offering some kind of activity, while tertiary courseware would gradually emerge as an accretion of question-answer and dialogue materials arising dynamically from the continued use of the first two types. Tertiary courseware would thus be a direct application of the principles of vicarious learning. A series of studies, including the evaluation of a prototype system incorporating tertiary courseware features, produced encouraging evidence that this can be a valuable technique (Lee, McKendree, Dineen, & Mayes, 1999). Aspects of these and other studies are discussed below.

A wider implication of the application of tertiary courseware derives from the general importance of dialogue in learning, which can also be seen, e.g., in the need to acquire the language of a discipline, especially in professional contexts: to “talk the talk.” Laurillard (1993) suggests this is distinctive of higher education. The communities of practice discussed by Wenger (1998) are often very much characterised by their uses of language, and induction (or exclusion) with respect to them is related especially to language use. Schön (1985) argues that learning arises particularly from dialogue with expert practitioners who are able to induct the learner into the forms of discourse characteristic of a profession. Again it seems that important aspects of such language use are often in effect gained vicariously in group contexts, and so might be accessible through tertiary courseware. The distance learner, who is cut off from normal classroom interaction, is seen as a particularly obvious candidate to benefit greatly from the availability of these kinds of materials.

A GENERAL OBJECTION TO VICARIOUS LEARNING

The theory of vicarious learning needs from the outset to confront strong constructivist intuitions that learning is fundamentally an outcome of activity and participation. Construction is, of course, catered to in the second of the three stages just outlined earlier, but many would propose that participation is also critical at the third stage. On the face of it, observing others’ learning is a hopelessly passive state, that can only be of relatively little benefit. Similarly, theorists of dialogue have often insisted that participation is essential for understanding. Schober and Clark (1989) describe a study in which “overhearers” hear recordings of dialogues between pairs where one participant is describing arrangements of tangram figures to the other, whose task, repeated over six trials, is to copy them. The participants cannot see each other, but can talk as much as they like. Some overhearers (“early”) hear all six trials, others (“late”) only the last three; their task is also to copy the tangram arrangements. In this task, there was a clear tendency for the participants to use less words over a number of trials, as they were able to refine the ways they referred to the figures; but at the same time, they became more accurate (perfect after Trial 4). Schober and Clark argue that collaboration is an essential part

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