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Abstract

This paper outlines and discusses some of the pedagogical foundations of an innovative "learning architecture" which combines the power of goal-based learning, role playing, the capabilities of the World Wide Web and the traditional method of lectures and tutorials. What it demonstrates is the way this learning architecture is used to achieve pedagogical goals in Political Science using the example of a World Politics course and the potential it has for other social science courses.

Introduction

This paper outlines and discusses some of the pedagogical foundations of an innovative "learning architecture" which combines the power of goal-based learning, role playing, the capabilities of the World Wide Web and the traditional method of lectures and tutorials. What it outlines is the continuing effort of a multidisciplinary team at the University of Melbourne in designing a learning architecture to facilitate learning and teaching in political science and beyond - especially for study domains that involve learning about the organizational and communicative life in and between societies.

Simulations using the capabilities of the Internet for teaching political science were first organized by Dr. Andrew Vincent in the Political Science Department at the University of Melbourne in 1991 and have continued to be used and developed ever since at both Melbourne and Macquarie Universities. The major innovation in the last few years has been in moving towards web-based simulations rather than ones based on platform specific e-mail system. (Vincent and Shepherd, 1998; Linser and Naidu, 1999.)

What this paper aims to demonstrate is the way this learning architecture is used to

achieve pedagogical goals in Political Science using the example of a World Politics course and the potential it has for other social science courses.

Learning architecture

The four essential ingredients of this learning and teaching architecture are:

- . • Goal-based learning;
 - . • Role Play-based learning;
 - . • Web-based communication and collaboration, and
 - . • Lectures and Tutorials
- First, goal-based learning, a form of learning by doing, is a very powerful learning strategy widely acknowledged as a strong motivator of learning. At the core of this strategy is the assumption that knowledge is predicated on the skills by which it is acquired. Thus, the goal for learning something motivates learning the necessary skills. In other words goals drive the learning process. On the basis of these assumptions, Roger Schank has developed what he calls Goal-Based Scenario (GBS). Typically, a GBS includes a mission, a cover story, a focus and an operations component (Schank and Cleary, 1995).

The second critical ingredient of this learning architecture is play - both in the sense of playing a role and playing with possibilities and alternative worlds. The strategy of learning through playing is significant, not the least because 'having fun' in the process of learning is an extremely useful motivator. More importantly, it gives students a personal stake in the proceedings and hence a reflexive learning process is initiated by these proceedings.

The third critical ingredient of this learning architecture is the World Wide Web. It provides a virtual space for communication, information and collaboration among students, and between the students and educational facilitators in synchronous and asynchronous modes. The Web also enables access to "just-in-time" learning by making available to students resources (such as current news from electronic newspapers and web-sites etc.) from all over the world as well as access to facilitators or mentors (control) as and when they need them.

Finally, the fourth critical ingredient is the traditional teaching method of face-to-face lectures and tutorials. Many experienced on-line educators (Blain Price, 1998; Hedberg and Harper, 1998; Brown, 1998; Durham, 1998) have emphasized the importance of including face to face interaction in teaching with the aid of Computer Mediated Communication and online teaching. The importance of incorporating these techniques into the learning architecture is not only for their utility in the presentation of facts, cases and theories. They also provide communicative events that stimulate reflection about actions undertaken and strategies pursued by comparing real world events with the simulated ones.

Discussion

According to Schank

GBSs are always constructed around skills and processes. Facts and cases have no place in a

GBS's pedagogical goals: while they may be helpful to a student, they must not be taken as an end in and of themselves. Rather, they are taught as supporting material while the student is engaged in trying out the skills around which the GBS is built.

(Schank and Cleary, 1995)

For the purpose of teaching political science at a University level this is clearly too limited as a pedagogical goal. In order to effectively use a GBS in the teaching and learning of facts, issues, skills, processes and cases, as well as relations and theories, we must first think through our pedagogical goals and then evaluate how the potential of a GBS might be used to achieve these learning and teaching goals.

In political science the pedagogical goals are not only in developing skills, but also in learning about processes, issues, facts and cases. More importantly it is about learning how to analyze these in the context of theories and continuous events. Without doubt part of the aim of the pedagogical goal is to turn out political scientists with appropriate skills. But understanding cases, an 'ambiguous' skill according to Schank, normative and empirical evaluation of facts and issues, and understanding different approaches, make a significant part of the pedagogical goals in learning political science. These are the 'skills' which the discipline aims to impart.

Perhaps the architecture of Goal-based learning (or Goal-based Scenarios as Schank calls it) is better suited to facilitate the learning of particular skills. However, when combined with Role Play-based learning, the use of interactive web technology and traditional methods of lectures and tutorials a more complex learning architecture can be designed which achieves the more 'ambiguous' goals from which Shank shies away.

More specifically the integration of a GBS into a more flexible learning architecture means that what Schank calls 'missions' (our role-profiles) and 'cover story' (what we call initial and context scenario) need not remain given or fixed. Rather, given the role interactive capacity of this learning architecture, the 'cover story' can be responsive to the actions taken by the roles. Role interaction produces effects which feedback into the 'cover story' and thus demand attention from the roles players to respond. In effect this means a continuously fluctuating and changing scenario context - a 'dynamic scenario'. In a similar manner the 'missions', or the objectives and strategy embedded in a role profile may, and often do, shift and change in priority given the changing scenario environment.

The effect on the learning process of transforming the scenario context into a dynamic scenario are firstly that it emphasizes the learning activities of the student rather than the teaching activity of the educator; secondly it makes transparent the relations between policy objectives and strategy on the one hand, and pragmatic evaluations on the other; and thirdly it demonstrates that the importance of knowing cases, events and facts is in how they are generated and used.

To be successful however, roles need to know precisely what they need to do. It is possible, as in Schank's GBS to provide students with a 'mission' and a 'cover story' which together provide the scenario context. But at least at the University level, this

would miss a learning opportunity. By allowing students to choose a role and then research, write and submit a role-profile a number of pedagogical aims are achieved. Firstly students learn the facts and issues, as well as objectives and strategy associated with their role. Secondly, in gathering material for the role-profile students exercise their research and evaluation skills. And thirdly, because they have researched the objectives and strategy of their role, they can, during the course of the simulation, better evaluate the strengths and weaknesses of these objectives and strategy

In the web-based simulation for the "*World Politics in Transition*" course in the Political Science Department at the University of Melbourne, students are also asked to include in their role-profiles an outline of the theory, or theories, that seem best suited to explain the actions of their role. Thus during the course of the simulations and after they've completed the simulation, they are better placed to evaluate the explanatory power of these theories in light of their 'simulated' experiences.

Role Profiles serve another pedagogical function. Once students have written and submitted their role-profiles, these are put on the web for all participants to read. Thus, they can evaluate the potential for setting up alliance, or assess the needs, policies, desires, fears, weaknesses and expectations of other roles which they can use to further their own objectives.

Playing out these roles in teams has the added advantage of having someone to aid the reflective process by bouncing ideas of one another. It also helps students in managing the workload and reduces the amount of time needed to perform particular tasks. Common goals, teamwork and division of labour are particularly important experiences given the complex structure of modern organizational environments.

The use of the web as a communicative environment and as an addition to the face to face environment provides the advantage of personal anonymity. This frees students to suggest and implement imaginative ideas, proposals and adventurous modalities for action that in a face to face environment would be more constrained. The web also allows the flow of real world information and simulation events to be compared, evaluated and used as an integral part of the learning process.

The web site designed for this purpose also includes a mail system that is independent of the normal Internet e-mail. This has both a security function, in that it does not allow outsiders to enter the messaging system and an integrative function, in that it provides a single environment for all operations and activity to be carried out on the same web page.

What follows is a more detailed discussion of how this learning architecture achieves the pedagogical aims for which it was designed. Here we will describe the *World Politics in Transition Simulation* by using the flow chart provided in Figure 1 that details the dynamic and reflexive capability of this learning architecture.

Pedagogical goals and tasks

Figure 1. presents the information flow of our dynamic learning architecture that combines the four ingredients discussed above in terms of the pedagogical goals on the one hand (design view from above) and the particular tasks undertaken by the students (student view from below).

The simulation carried out in a *World Politics in Transition* course in the Political Science Department at the University of Melbourne in 1998 and 1999 aimed to educate students on the various approaches to understanding world politics. In a broad sense, this can be divided into three main pedagogical objectives, acquisition of knowledge, understanding and skills.

Students were expected to achieve a level of competence with regards to the knowledge of facts, cases and events in the international political system so that together with understanding the processes that engender these, the relations between them and the way theories organize these into explanatory schemes, they can analyze the transition which the international system is undergoing and evaluate appropriate strategies for meeting the challenges that this transition engenders.

Prior to 1997 this course relied on the traditional approach of lectures, tutorials and individual research by students. The new course incorporating a Web-based simulation based on the above learning architecture provides a virtual space for students to examine the political processes and theories that are still introduced in the lectures.

Knowledge of political facts, issues, cases and events is learned using this architecture in a number of ways that reinforce one another. Firstly they are encountered in the lectures and tutorials. Secondly the students in researching and writing their role profiles actively gather them from the web and library. Moreover what they gather becomes facts and issues for the other roles. Thirdly they are encountered in the initial context scenario written by the educational facilitator which uses real world events, cases and issues together with a number of 'fictional' perturbations that serve to focus student attention on potential directions which the international system may take. Fourthly, they create facts using the messaging system, by participating in forums and by publicizing them through the media roles. Fifthly students may bring new facts or issues from real world events through the Web links in the Resource center.

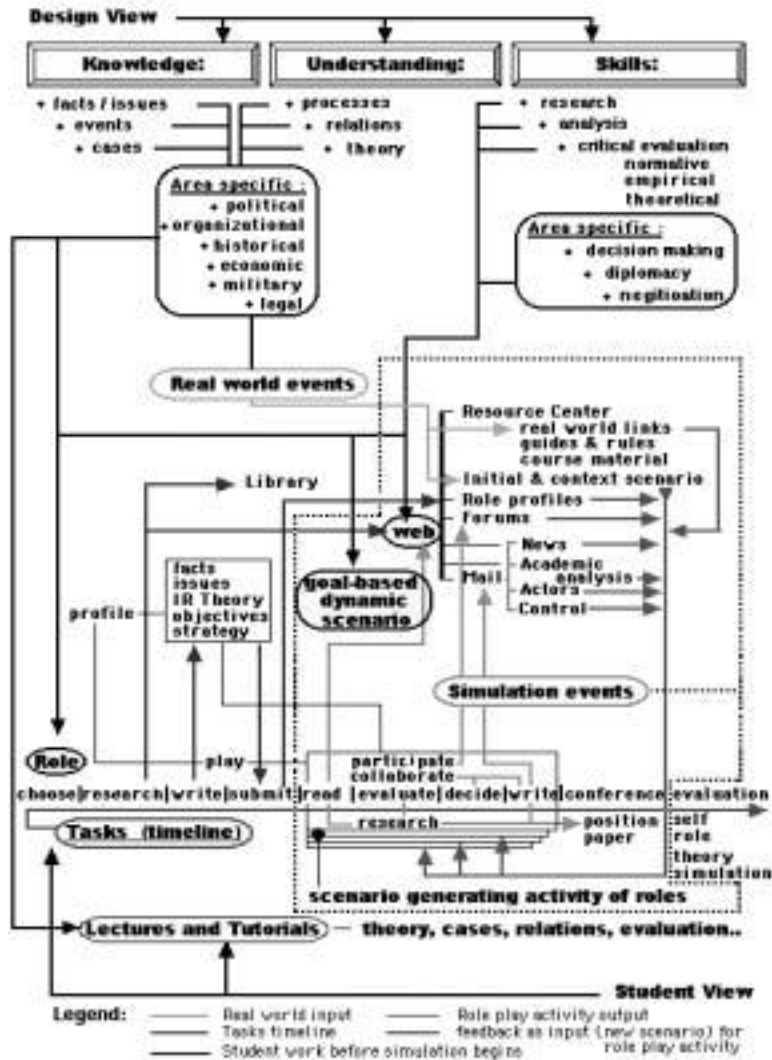


Figure 1: Details of a Dynamic Learning Architecture

The knowledge base required in World politics is thus learned through activity that creates, uses, manipulates, organizes and deploys facts, issues, cases and events in the course of attempting to reach particular objectives.

Understanding of political processes, relations and International Relations theory is also achieved in a number of related ways. It is achieved in the process of evaluating the relations between the actions taken by one's own role and the responses to it from other roles.

Theory is specifically embedded in the role profile so that role players can continuously evaluate the explanatory power of the theory in relation to their actions and the actions of other roles. Students thus become aware of the strengths and weaknesses of particular explanatory schemes because in pursuing their objectives and strategy they are often confronted with discrepancies between their theoretical assumptions and the pragmatic

responses they must make. Theory is also addressed throughout the simulation by one of the roles - the International Institute of Strategic Studies - which continuously publishes analysis of the simulation events in terms of different theories studied in the course.

What the Goal Based Dynamic Scenario enables is the comparative examination of the role's own objectives and actions and the degree to which these accord with the assumptions and propositions of theory.

The pedagogical goal of understanding political processes and relations, like the understanding of theory, is achieved in a number of ways. In both the role profile and the playing of the role, students are involved in a pragmatic process of evaluation and re-valuation of the political, military, economic and other relations between their role and others - reflecting relations in the Real World. They learn about these relations by establishing them themselves through the mail system and in the forums. They find out about the limits of these relations, about the desirability and level of different relations with others in the context of evaluating the effects of these relations on pursuing their own political goals. Thus they might upgrade or downgrade, take for granted, sever old or establish new relations. Finally the conference towards the end of the simulation requires the students to organize it themselves. In other words, by developing and setting their own agenda, the effect and volatility of certain political issues on the relations between roles becomes apparent as the priorities of each role become transparent in negotiating the agenda and organization of the conference.

Understanding the processes by which these relations are established, maintained or dissolved, is thus learned in actively creating, re-evaluating and maintaining them and in evaluating their effects on the player's own political objectives within the simulation.

The pedagogical goal of learning both general and particular skills required by the discipline is achieved by the various tasks that students have to complete. The dynamic and reflexive nature of the Goal Based Dynamic Scenario (GBDS) means that students are required to repeat certain tasks a number of times. Thus, they acquire the skills by practicing them and get better at them each time they have to complete them. Decision-making, diplomacy and negotiating skills, for example, are continuously practiced throughout the simulation in approaching other roles and attempting to sway them in such a way as to reach the particular political objectives required by their role profile.

Of specific pedagogical significance is the scenario generating activity of roles when roles are played as teams rather than individually. This adds a collaborative learning dimension to the Role-play ingredient of this reflexive learning architecture whose effects have additional pedagogical benefits (Vincent and Shepherd, 1998; Linser and Naidu, 1999.) Thus both the profile generating tasks and the tasks that constitute the playing of the role initiate an additional internal dynamic to roles. In collaborating in playing a role, students learn to do collaborative research, writing, evaluation and most importantly decision making - all extremely valuable skills in today's world.

For learning generally and in particular learning about the organizational and communicative life in and between societies, or in our case World politics, this has useful consequences. Social and political life are constituted by collaboration and conflict. The dynamics of collaborative Role-play add another important experiential layer from which student learns about the dynamics of world politics.

What the above demonstrates is that integration of the four critical ingredients - Goal based Learning, Role Play, the web and traditional teaching methods - into a unified learning architectural space enables a course to achieve the general pedagogical goals (knowledge, understanding and skills) as well as the more particular ones required by the discipline. And it does so by providing a space for interaction that is dynamic, flexible, reflexive, fun for the students and most importantly which is responsive to the 'ambiguous' pedagogical aims of acquiring knowledge, understanding and skills required in political science.

Formative outcomes

The move from the traditional lectures, seminars, tutorials, paper-based exams, essay writing and reliance on printed books and articles, to communication and collaboration via the Internet and Web has significantly transformed the learning and teaching processes in this course in a number of ways. Firstly, it has brought students to the center of the learning process rather than putting them in passive and receptive role. Secondly, it has transformed the way students and teachers carry out research by emphasizing communication and collaboration rather than individual activity. Thirdly it has allowed for flexibility in the delivery of material in terms of the number of participants, the timing and spatial location of the teaching and learning process. And fourthly, it has taught everyone new skills and competencies, not only about teaching and learning but communication and collaboration.

By using such an integrated and dynamic learning architecture, students were able to contextualize and analyze world events on the basis of an experience that enabled them to manipulate facts and events and experiment with alternative objectives and strategies to handle these. It brought into their personal experience what would otherwise have remained distant and impersonal.

To view the Web site of the World Politics in Transition Course:

<http://polsim.politics.unimelb.edu.au/wpt>

To view the Simulation site:

Click from the Web site on [World Politics in Transition Simulation] and Login:

username: "guest" password: "demonstration"

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References

- Blaine A. Price (1998) "From global scalable distance teaching to high Bandwidth classroom resources in local schools", *'Flexible Learning' Proceedings of the Apple University Consortium Conference at the University of Melbourne 27-30 September 1998*
- Brown, M. (1998) "New Teacher for a New Age: The Myths and realities of the Global Classroom", *'Flexible Learning' Proceedings of the Apple University Consortium Conference at the University of Melbourne 27-30 September 1998*,
- Durham, M. (1998) "Working at Virtual Records - a simulated workplace", *Proceedings of the AUC 1998 Conference, 'Flexible Learning' Proceedings of the Apple University Consortium Conference at the University of Melbourne 27-30 September 1998*
- Hedberg, J. and Harper, B. (1998) "Supporting flexible thinking with interactive multimedia", *'Flexible Learning' Proceedings of the Apple University Consortium Conference at the University of Melbourne 27-30 September 1998*
- Linser, R. and Naidu, S. (1999) "Web-based Simulations As Teaching And Learning Media In Political Science" *AusWeb99.Conference Proceedings*, <<http://ausweb.scu.edu.au/aw99/papers/naidu/>>
- Vincent, A. and Shepherd, J. (1998). "Experiences in Teaching Middle East Politics via Internet-based Role-Play Simulations". <<http://www-jime.open.ac.uk/>>*Journal of Interactive Media in Education*, 98 (11) <www-jime.open.ac.uk/98/11>
- Schank, R. C. & Cleary, C., (1995). *Engines for Education*. Lawrence Erlbaum Associates, Publishers, Hillsdale, New Jersey. <http://www.ils.nwu.edu/~e_for_e/> Engines for Education ("hyper-book") Roger Schank, Director of ILS, and Chip Cleary, The Institute for the Learning Sciences. Northwestern University; <http://www.ils.nwu.edu/>

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