Neomancer: An Exercise in Interdisciplinary Academic Game Development

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ABSTRACT

Academic interest in game development and game studies has grown steadily in recent years, with many institutions now offering courses or programs in this area. To provide a truly rich and realistic experience to students, some form of interdisciplinary or collaborative work is clearly needed as part of their education. Successful games draw upon a diverse set of talents and backgrounds from their creators, and so an interdisciplinary exposure is crucial to students studying games and game development.

This paper presents the experiences from precisely this sort of academic exercise—an interdisciplinary game development project called Neomancer. This project has involved nearly 50 participants from the University of Western Ontario and Seneca College of Applied Arts and Technology, working together for the past several months. This paper discusses the background and history of the Neomancer project, and presents some of the lessons learned to date from this collaborative venture.

Keywords

Interdisciplinary game studies, academic game development

INTRODUCTION

In recent years, there has been a growing interest in game development and game studies in academia. Many colleges and universities around the world now offer courses or programs in various aspects of this exciting new field of study, and this number is growing each year. For example, as of April 2005, Gamasutra had over 300 schools registered in its database of schools offering courses or programs in various aspects of games and game development [2].

Because of its nature, the study of games and game development draws upon numerous traditional disciplines, including computer science, art and design, music, psychology, and media studies, to name but a few. Consequently, to provide the best overall experience to students in academic courses and programs, there is a real need for interdisciplinary and collaborative work in this area [1].

This was discovered and experienced first-hand in game development efforts at the University of Western Ontario and, separately, at Seneca College. At Western, courses were computing and software oriented; consequently games developed were technically sound, but were typically devoid of aesthetics. At Seneca, on the other hand, courses focused on the artistic aspects of game development; consequently games developed were visually stunning, but lacked the underlying software and technical elements to make the games whole. Neither institution was able to complete a large scale game project on its own.

This situation motivated a partnership between the game development initiatives at Western and Seneca, leveraging our respective talents and expertise to pull together a game of commercial scale and quality. The goal was to provide a realistic game development experience to students in their respective disciplines, introducing them to the diversity and magnitude of such an undertaking. The vehicle for reaching this goal was Neomancer.

This paper presents the experiences of the Neomancer project, and some of the insights gained through this interdisciplinary academic endeavor. We begin with a general overview of the Neomancer project, discussing both the background of the project, and a brief overview of the Neomancer game. Next, we discuss the results, experiences, and lessons learned from this project over the past several months. Finally, we conclude this paper with a summary, and a discussion of future directions for the project and other possible interdisciplinary academic ventures.

THE NEOMANCER PROJECT

Neomancer [3] is an action/adventure/role-playing-game conceived by Stephen Danton of Horseplay Studios, and a graduate of Western's program. It has an extensive feature set, and is approximately the same size as a commercial title in the same genre. For a software base, it makes use of Epic's Unreal engine [4].

About the Project

The Neomancer project is a massive collaborative effort, with three groups in three cities working together. Danton, in Seattle, is the project's lead designer. Katchabaw, in London at Western, leads the programmer team, composed of 15 software project students, 4 undergraduate

thesis students, and other support personnel. Elliott, in Toronto at Seneca, leads the art and design team, composed of 15 students and several support personnel. Elliott has partnered with Seneca's Independent Music Program to have 5 additional students deliver music and sound for the project. In total, there are nearly 50 individuals engaged in various aspects of the project. A partial organization chart for the Neomancer project is shown in Figure 1.
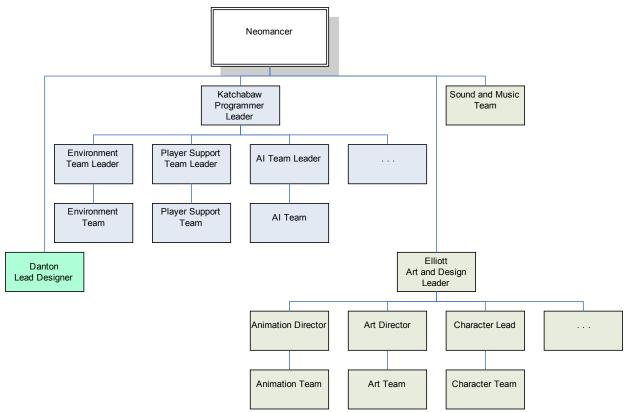

Figure 1: A partial organization chart for the Neomancer project.

Western's role in Neomancer is to provide the technical and software elements. Larger programming tasks have been assigned to three software project groups, focusing on artificial intelligence, player support, and interfacing and the game world. Smaller tasks with a significant research component have been assigned to thesis students, including relationship and reputation modeling, dialogue, quest generation, and adaptive artificial intelligence. Meanwhile, at Seneca, focus is on the artistic side of the project. This includes the modeling of game assets, environments, and characters, as well as texturing, motion capture, and animation.   Seneca also handles various aspects of game and level design, and furnishes all music and sound assets for the game.

The Neomancer project commenced in the fall of 2004, although much of its design had been finalized earlier. It is intended that the entire project will take 2-3 years for completion due the sheer magnitude of the project, and the amount of content required. The first major milestone was a playable game demo due in late December, 2004. The second major milestone of the project was slated for completion in April, 2005, as students completed current project work. A discussion of the Neomancer game, and its current status, is presented in the next section.

About the Game

A high-level mission statement of Neomancer can be found in [3]:

> "Neomancer is an action-adventure role-playing-game, set in the tropical fantasy world of Azure. Gameplay is rooted in the single player experience, which acts as a gateway to three specific gaming modes: multiplayer competition, cooperative adventuring and a rich open-ended story. All three modes work together seamlessly; presenting the player with the best of first-person shooter action, party based adventuring and, immersive single-player story telling."

In particular, Neomancer is set in the archipelago of Kintorr. There is a variety of terrain in Kintorr, including jungles, mountainous regions, deserts, wastelands, and cities influenced by various architectural styles. A map of Kintorr can be found in Figure 2, while screenshots can be found in Figures 3 and 4. There are multiple playable exotic races within Neomancer, each with its own distinct appearance, style, and abilities. The world is populated by collections of various non-player characters and monsters, as well as several different modes of transportation (beasts and vehicles), weapons, usable items, magical artifacts, treasures, and so on.

Figure 2: Overhead map view of Kintorr, the main setting of Neomancer.

The variety of content required for the fantasy world within Neomancer provides a challenge for the students at Seneca, but also provides them the freedom to express their creativity in developing their work without being shackled by preconceptions or predefined limitations. This content also requires significant code support from the students at Western, as every in-game object must have code behind it. Furthermore, students at Western must provide code to support gameplay within Kintorr according to the various modes of play described above. In the end, a

tremendous amount of work is required by all team members to develop Neomancer.

Figure 3: Screen shot of Neomancer.

Figure 4: Another screen shot of Neomancer.

As mentioned earlier, Neomancer has been developed using Epic's Unreal engine [4]. To date, significant progress has been made in building the world and key playable races. Progress has also been made in developing artificial intelligence for the game, as well as player movement, combat, and magic systems, weather and time-of-day systems, the questing system, the dialogue system, and a reaction system for modeling relationships between characters, objects, and groups in the game world [5]. Integration of these components still remains to be done, however. All in all, the first two major milestones have been met successfully.

RESULTS, EXPERIENCES, AND LESSONS LEARNED

Although we have only reached the second major milestone of the project, and have nearly two years before its scheduled completion, we have already obtained interesting insight into the development of a large scale game such as Neomancer in an academic setting. In this section, we detail the results, experiences, and lessons learned to date as a result of this project:

- *An interdisciplinary team is required for a successful game development project.* Simply put, we would not have all of the required skills in our respective disciplines to pull together Neomancer without collaborating. This is especially true in academic environments where one typically specializes in a particular discipline of study. An interdisciplinary team more closely reflects reality in major game development studios [1], and provides a more enriching experience to participating students.

- *Constant leadership and guidance is critical to the success of the project.* While some students are able to work well independently given an assigned task, others require more constant supervision to keep them on track and making progress in the right direction. In such cases, we observed that the absence of guidance from a project leader, even for as little as a week, could result in a decrease in progress and productivity, and a loss of direction. Consequently, regular contact with project leaders for guidance and supervision is definitely a requirement in student game projects. This reflects the findings in [7], where weekly meetings to check in with everyone on game development teams were found to be quite helpful.

- *Communication is also a key success factor.* This is what one would expect in a large distributed game project. It is worth mentioning here because of the large number of people involved and the distance between them. Even with regular conversations among the principles of the project, it was still easy to lose track of what each group was working on. Face-to-face contact was found to be the best form of communication, but was not always possible with the development team split in multiple cities. A message board and mailing list established for the project appeared underutilized by students, again resulting in a disconnection between participants of the project. Communication and team building are critical components to the success of a game project [7], and require further work in the future for Neomancer.

- *Workloads and expectations must be adjusted to an academic environment.* Students are still learning and do not have the same expertise or productivity level as someone working in industry. Furthermore, students potentially carry a heavy workload of other

courses and cannot be considered as working full time on the project. For example, at Western, courses are supposed to produce an average workload of 10 hours a week, including the courses used to support Neomancer. When one considers that the majority of game developers work in excess of 46 hours per week (up to 65 to 80 hours a week or more during crunch time) [6], it is clear that even with a team size of nearly 50 participants, we have a much smaller effective team size, when all factors are considered.

While the students may be talented, capable, and enthusiastic, they simply cannot be treated as if Neomancer is their full time job. In fact, one must remember that many of the students on the projects already have jobs of some kind to financially support their education, and so spare time could be quite limited.

- *Everyone must have the same vision for the project.* Without having the same vision, direction and focus can be lost in a project the size of Neomancer. This applies to gameplay, artistic style, software architecture, and many other aspects of the game. In the case of Neomancer, this vision came primarily from Danton, the lead designer for the project. While the vision was strong and communicated well, challenges were faced because Danton was geographically distant from everyone else on the project. Again, this highlights solid communication as a key to this kind of project.

- *Students want creative input and control over their parts of the project.* Not only does this bring fresh perspectives and insight to the game, but it enriches student experience as well. This again applies to gameplay, artistic style, software architecture, and so on, which to a certain extent is in conflict with the previous point to provide a single consistent vision to the project. Consequently, there must be one person in the project that finalizes and makes absolute decisions on such matters, such as the lead designer.

  To facilitate student control over various parts of the project, and to provide a more realistic experience, student groups were organized with team leaders wherever possible (for example, art director, character lead, and so on). This led to interesting challenges and issues with students now having to take direction, criticism, and orders from their peers. In the end, this approach worked reasonably well though, and will be repeated in the future.

- *Clear and stable requirements can pose a problem in a large scale, distributed academic game project.* A game's design and requirements can change frequently throughout a long-term game project [1], and we found this to be the case with Neomancer. This is only natural since it is not known at the beginning of a project what elements will result in the best overall game, and changes and adjustments are necessary to achieve that goal. However, in most cases, students are used to having clear and static requirements for course and project work, which often does not match the reality of a large scale game project. For example, at Western, the programming teams reported positive overall experiences on the Neomancer project, but found this one issue to be a particular source of frustration as it did not match the traditional waterfall

development model to which they were accustomed.

Consequently, efforts are required on two fronts. First, requirements should be as clear and as stable as soon as possible in an academic game project, with any changes effectively communicated to the development teams. Second, students must be introduced to prototyping and evolutionary methods for development that more closely match the reality of game development. Allowing (or forcing) students to use a development model that does not fit the situation is not good for the project or the students, as we observed above.

- *Solid and accessible reference materials are important to academic game projects.* Once again, since students do not necessarily have the benefit of years of industry experience, they have to rely on other sources for assistance and information in their projects. During this stage of the project, unfortunately, there were virtually no print sources of reference materials for the Unreal environment, and students had to rely upon various Internet materials of differing levels of quality and completeness to assist them in their work. We were incredibly fortunate to have several highly skilled technical support people at Seneca; otherwise we could have experienced serious difficulties with the project. Better sources of student reference materials for this kind of project are clearly needed, however. Such resources are required for widespread support of large-scale, commercial-grade projects with commercial-grade tools in academia.

- *If a project milestone or deliverable is important, grades should be tied to it in an academic setting.* Otherwise, when time is tight, the milestone or deliverable may be sacrificed in favour of coursework items that do carry weight in overall student grades. This is a natural student response observed during their crunch times with work from other courses.

This implies that project work be tied to dedicated and specialized courses, in which there is a measure of control over the grading of work. This can pose a challenge when introducing this sort of program to a curriculum without these supports in place, but it can lead to a more successful project ultimately.

CONCLUDING REMARKS

Neomancer is an on-going project, with nearly two years of hard work until completion. To date, it has been an interesting and educational experience for everyone involved. Upon completion, we will have extensive insight into interdisciplinary game development, game development in an academic setting, and the development of a large game project. To date, student response has been quite favorable. Informal surveys of students have indicated that the project has been worth while, and that they have learned a great deal about game development in the process.

In the immediate future, we plan to integrate the student work from the past several months to produce a new demo with more gameplay accessible. In the long term, plans are to complete Neomancer on schedule, naturally. Current estimates that we are well on track to meet this goal. Based on our experiences from the past several months, as discussed in this paper, we will adjust

our methods accordingly, to further ensure that this venture in interdisciplinary game development in academia is a success.

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