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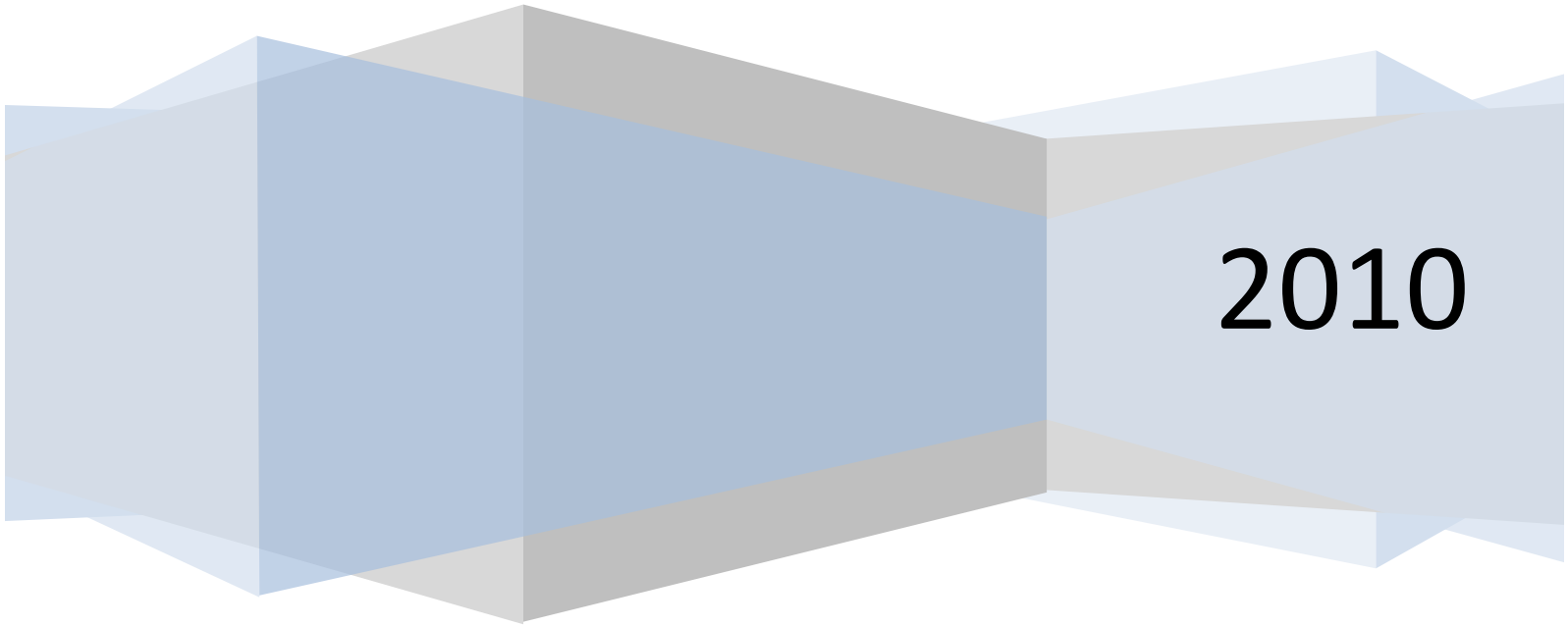
SKILI Proposal

South Korean Immersive Learning Institute

Micah Modell

Dr. Curtis Bonk



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Executive Summary

Immersion is the practice of placing a student into a context such that they are able to maintain the feeling that it surrounds them. It is a technique that is increasingly being used to facilitate learning. Traditionally it has taken the form of live action simulation or role-play and this has evolved into language classrooms where the target language is the sole language used (i.e. native English speakers studying French in French) (Genesee, 1994). Today, with the advent of networked computers, virtual worlds, 3D games and even augmented reality and alternative reality games, it is gaining in popularity. The South Korean Immersive Learning Institute (SKILI) is designed to facilitate the design, development, evaluation and continued improvement of these techniques in an environment capable of providing the necessary resources while training a generation of college students with the skills required to keep the field moving forward.

South Korean Immersive Learning Institute

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Introduction

Context

South Korea, as a society, maintains a strong commitment to Education as is evidenced by the strength of the Hagwon or private institute system, which provides additional after school instruction for children. One need not walk more than a block or two in any major city to find an English Hagwon (other subjects are common as well). South Korea also made significant early investments in networking infrastructure leading to its having been hailed as the most wired country (Frontline, 2009) and with this, online immersive computer games have become extremely popular and a strong game culture has emerged. As a result, Seoul National University is the ideal sponsor for an Institute designed to develop, apply advanced immersive techniques to education.

Immersion, or the induction of the suspension of disbelief (Dede, 2009), is a technique that is used in educational contexts to enhance learning. It takes many different forms, but characteristics include a convincing sensory experience coupled with a degree of participant control over the actions that occur. Some highly immersive implementations include: French language classrooms where only the French language is spoken (Genesee, 1994), a 3D first-person Hazmat simulation (Schollmeyer, 2006) or an augmented reality game in which participants use a GPS-enabled PDA device to interact with digital artifacts placed in the physical world (Schrier, 2006).

Implementing an immersive language classroom incurs only the minimal additional cost of translating materials into the target language, and from this the learning gains are achieved. However, language is a relatively simple case as it is pervasive in all collaborative environments while convincingly delivering other content or combinations of other content requires an investment of significant resources, including talented design resources. Such designers must be trained and the best way to do so is through immersion. It is this concept which provides the foundation for the four-year program provided by the South Korean Immersive Learning Institute.

Guiding Theory

Building these environments requires the application of creativity by a critical mind. To maintain engagement, novelty must be introduced on a regular basis, but this must be in keeping with the theme(s) of the game rather than for its own sake. Furthermore, it is only through the lens of a nimble and critical mind that the learning objectives will be thoroughly

presented in an authentic fashion. The theory underlying this Institute and providing support to the concept of Immersive Learning itself is that of creativity being not inherent but rather a perspective that is induced by the interaction of environmental pressures (yielding motivation) and resources available. The founders subscribe to a situated approach to cognition (or learning by doing) and rely upon this to guide their development.

Institute Structure

Year One: Experience

Freshmen at the Institute spend a full year running through a wide variety of games, simulations and otherwise immersive experiences. Overtly, the goal is to learn geography, calculus, chemistry, Medieval English Literature and the myriad other topics baked into the games. As they work their way through, some games will have them plumb the depths of the libraries or web resources available to solve the problems presented as negotiators in computer-animated 3D games set in a space-based future. In other scenarios, they will find themselves training for and claiming victory over challenging obstacle courses as medics attempting to rescue trapped civilians. In some cases, they will craft arguments to win the votes of their peers or compromise with rival players to maintain the safety of the cities of which they are mayor.

These activities serve not only to build up knowledge and understanding of the world and how it has arrived at its current state, but also to expose the students to a broad sampling of what it is possible to create and achieve using immersive methods. They will gain an implicit understanding of how sound, story, kinesthetics and art can interact to motivate learners and instill knowledge. Furthermore, they will be frequently evaluated with respect to their ever increasing understanding, the affect of the experiences and their improving skills in such areas as group work and leadership. Much of this evaluation will go undetected until their third year, (see “Year 3” below) as it will be part of the environment and the experience with much of the data being analyzed and fed back in to allow the virtual world (in whatever form it takes) to adapt.

Year 2: Building

As sophomores, participants will be handed the designs for a few new experiences. Throughout this year, they will learn to read and interpret the designs of others as they build new virtual worlds, physical props and perform all the research required to make sure everything is authentic.

An important aspect of this phase, beyond learning to work with all the various tools, is their first direct exposure to design. Upon first read, many details may seem extraneous or redundant and as the year progresses, students' work will be scrutinized less and less. In effect, they will be increasingly free to adhere to the design as closely or as loosely as they choose. This combination of flexibility within a rigid structure is deliberately conceived to evoke creative new solutions and improvements. However, in many cases, they are expected to find that the shortcuts they take warp and twist the game in unintended ways – they learn the importance and strength of a great design and begin to appreciate the ingredients that go into producing one.

After each game has been tested and verified functional, the Institute will have a series of new toys added to its arsenal. Introduction of some of the new experiences will begin with the following year's freshmen.

Year 3: Implementation and Evaluation

In their third year at the Immersive Learning Institute, students will serve as overlords for the various scenarios running that year. In the case of alternate reality games, they are the *Puppetmasters* that run the show, plant the clues, deliver the messages and adapt to the unanticipated actions of the freshmen. In classroom environments, they serve as the educators and when it comes to computer-based worlds or systems, they serve largely as technical support to insure that everything continues to function as expected.

The most important part of this apparent support function is the collection and analysis of game data. This may take many forms, but tools and analysis guidance will have been designed and implemented along with the experiences themselves. In some cases, the system will adapt of its own accord, but many times these juniors will have to evaluate the performance of both the worlds and the participants within those worlds. Are they learning? What are they learning? Are they retaining the knowledge? Are there any demonstrations of transfer? Do participants consistently get stuck at a certain point? Are there any bugs in the system?

It is in this phase that participants will first be exposed to learning theory and the ability to tie objectives back to sequences of interactions. Responsibilities here will necessitate the consumption and assimilation of the cognitive, learning and instructional design theories and evaluation methods incorporated into the experience(s). This will not be a formal requirement, but rather a necessity implied by the need to communicate and discuss the analyses performed on a regular basis. Furthermore, although this may happen as part of year two, it is in this year that students are encouraged to develop infrastructure components and reusable libraries of tools to further the field.

The top priority will always be on analyzing and feeding the data back into the game, but students will also continue to develop their collaborative skills as they report and discuss their findings and learn from each others' perspectives.

Year 4: Design

Having worked through all possible perspectives (first person, third person and omniscient), students who have made it this far are now ready to begin to apply their skills by formulating designs of their own. These designs must explicitly pay attention to the applicable motivational concepts as well as learning objectives, how the designed interactions would facilitate their transferrable learning, the data to be captured by the deployed system (both automated and manual) and how this data is to be analysed and used in a feedback loop to facilitate continuous improvement and maximal adaptability in both the learner and the system itself.

In this culminating year, students will focus on such concepts as debriefing, stealth or embedded assessments (Shute et al., 2008), flow (Csíkszentmihályi, 1990) and game theory. The product will be one or more comprehensive design documents complete with resource estimates based upon their second year experiences.

Admissions and Grading

In keeping with the view that creativity can be induced by provision of flexibility and resources to a properly motivated mind, the selection process for entry will take an unconventional approach to admittance. College aged students wishing to take part in the Institute's program will be required to submit to a five day intensive examination process. The content of the examination itself will be challenging and the topics will touch upon numerous areas – in this respect it may be viewed as relatively conventional in all but duration. The key characteristic to be measured however is motivation: how determined are these individuals to participate? Will they persevere under stress and pressure, breaking through the wall and coming out the other side with a viable solution? As a result, although the responses will be quantitatively measured and provided to the participants, the meaningful evaluation will come from the proctors who observe the level of engagement and spot for signs of *checking out*. Naturally, this must remain a closely guarded secret.

Further alignment with the goals of creativity, motivation and perseverance is fostered by the fact that no grade or summative evaluation is attached to graduating students beyond the products of their efforts throughout the four years. Students walk away with a portfolio that demonstrates their competence with concrete examples.

From Fiction to Fact

Although this vision sounds fantastic and outside the realm of possibility, this is not the case. It is fair to expect to admit the first students two years after making the decision to fund the project, which would require roughly $13,048,500 to prepare (see appendices). It is expected that those companies that make up the computer gaming ecosystem may provide partial funding for the endeavor in the form of sponsorship while licensing or sale of the produced games to educational organizations may present an alternative revenue stream. With a cadre of 60 students yearly, once SKILI opens its doors, it will reach the break-even point.

Costs will be kept down significantly as a result of a policy of using only Free and Open Source Software (FOSS). This will be possible because of the intensive nature of the Institute. FOSS is notorious for its steep learning curve, but our students will be enrolled based upon their perseverance and therefore it can be expected that they will learn these powerful and efficient tools in the context of immersive experience development. Additionally, due to the length of the development cycle and the development downtime up front during design ideation, all the developers can be reasonably expected to learn and understand the available FOSS options for the tasks they perform.

The timeline and associated costs follow.

Phase I

In Phase I, a multi-disciplinary development team will be hired (see Appendix A) and charged with designing and developing the environments required to support the first four years of the school's existence. The instructional designers will initially analyze and distill learning objectives from a sampling of five to ten engineering programs and five to ten liberal arts programs from Seoul National University and its competitors. The next step will be to enter into a dialogue with the designers and the rest of the team to group these functionally and logically into one or more unified environment designs. As the design is fleshed out, the implementation team (programmers, artists, sound designers, etc.) will begin building the implementation.

In parallel with this task, design and construction of a dedicated facility will begin on the outskirts of Seoul. This building's layout will emphasize collaborative group work and will be designed with maximum flexibility in mind so as to support the needs of the various games and simulations that will be developed within. Budgeted hardware purchases (see Appendix B) will be made as the need arises and with the approval of the Project Manager who will have his eye always on the timeline.

At the end of this year long phase, design and development of all necessary games will be completed.

Phase II

In this second phase, the output from Phase I will be tested for functionality and effect as well as soundness. This is a significant task and the entire development staff must be retained during this period to fix all errors found. An eye will be kept towards pedagogy, but the major focus will be on rendering technically bug-free scenarios. This focus on technical issues rather than those involved in learning results from our acceptance and embrace of instructional design as an asymptotically improving art whose results may always be criticized – it is our intention to allow our students as much to improve upon in this area as possible.

It is during this phase also that marketing and public relations efforts will begin. As the year progresses, a call for applications will be made and the test will be administered in the cities of Seoul, Busan and Daejeon as these are major population centers and cover the north, middle and south of the country respectively.

Phase III

This final stage is when the first round of students will begin the program (as described above). The ongoing costs from this point forth will remain relatively constant at roughly $1.1M per year (see Appendix for details) and members of the initial development team will be dropped in favor of trained educator-facilitators. It should also be noted that, at $30,000 per student, a class of 60 students would bring in tuition revenue of $1.8M and this more than covers expenses.

In Sum

Technology has advanced to the point where educators can do truly great things both inside and out of the classroom. Studies show that these techniques are effective both in providing motivation and in achieving learning. However, the economics indicate that the return on investment for individual efforts using existing resources and capabilities does not warrant further development. If Seoul National University builds and supports the SKILI, Korea will not only improve its own education system significantly, but it will step to the fore with respect to immersive environment development capabilities.

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Appendix A: Personnel Budget

Phase I			
Title	Salary	Count	Total
Project Manager	$70,000.00	1	$70,000.00
Instructional Designer	$60,000.00	2	$120,000.00
Administrative Assistant	$40,000.00	1	$40,000.00
Programmer (local)	$50,000.00	3	$150,000.00
Game Designer	$70,000.00	2	$140,000.00
Sound Designer	$45,000.00	1	$45,000.00
3D Artist	$45,000.00	3	$135,000.00
Set Designer	$45,000.00	1	$45,000.00
Story Designer/Screenplay Writer	$50,000.00	2	$100,000.00
Marketing	$60,000.00	2	$120,000.00
Total		18	$965,000.00
Phase II			
Title	Salary	Count	Total
Project Manager	$70,000.00	1	$70,000.00
Instructional Designer	$60,000.00	2	$120,000.00
Administrative Assistant	$40,000.00	1	$40,000.00
Programmer (local)	$50,000.00	3	$150,000.00
Game Designer	$70,000.00	2	$140,000.00
Sound Designer	$45,000.00	1	$45,000.00
3D Artist	$45,000.00	3	$135,000.00
Set Designer	$45,000.00	1	$45,000.00
Story Designer/Screenplay Writer	$50,000.00	2	$100,000.00
Marketing	$60,000.00	2	$120,000.00
Educator/Facilitator	$50,000.00	5	$250,000.00
Recruiting	$45,000.00	3	$135,000.00
Testers	$30,000.00	5	$150,000.00
Total		31	$1,500,000.00
Phase II			
Title	Salary	Count	Total
Administrative Assistant	$40,000.00	1	$40,000.00
Programmer (local)	$50,000.00	1	$50,000.00
3D Artist	$45,000.00	3	$135,000.00
Set Designer	$45,000.00	1	$45,000.00
Story Designer/Screenplay Writer	$50,000.00	2	$100,000.00
Marketing	$60,000.00	2	$120,000.00
Educator/Facilitator	$50,000.00	7	$350,000.00
Recruiting	$45,000.00	3	$135,000.00
Total		20	$975,000.00

Appendix B: Resources Budget

Phase I			
		Cost per	Count
Recruiting		$10,000.00	18
Construction		$10,000,000.00	1
Travel		$100,000.00	1
Utilities		$20,000.00	1
Hardware			
	Desktop PC	$1,000.00	19
	Laptop PC	$700.00	5
	WebServers	$2,000.00	1
	Application Servers	$2,000.00	1
	Database Servers	$2,000.00	1
	Networking Equipment	$10,000.00	1
	Miscellaneous	$5,000.00	1
Phase II			
		Cost per	Count
Recruiting		$10,000.00	13
Travel		$50,000.00	1
Utilities		$40,000.00	1
Hardware			
	Desktop PC	$500.00	1
	Laptop PC	$700.00	5
	WebServers	$2,000.00	1
	Application Servers	$2,000.00	3
	Database Servers	$2,000.00	1
	Networking Equipment	$1,000.00	1
	Miscellaneous	$5,000.00	1
Phase II			
		Cost per	Count
Travel		$50,000.00	1
Utilities		$40,000.00	1
Hardware			
	Desktop PC	$1,000.00	60
	Miscellaneous	$5,000.00	1

Appendix C: High Level Budget Estimate

Yearly Costs			
Phase I	$11,308,500.00		
Phase II	$1,740,000.00		
Phase III	$1,130,000.00	sustained	
Yearly Revenue from Tuition			
60	$30,000.00	1	$1,800,000.00
60	$30,000.00	2	$3,600,000.00
60	$30,000.00	3	$5,400,000.00
60	$30,000.00	4	$7,200,000.00