

Teaching Game Design: Problems in Educating the Next Generation of Digital Game Developers

Michael S. Prinke

Abstract—I perform an analysis of current trends in education in the field of digital game design and detail the problems involved in trying to marry academics with entertainment. We will explore the various paradoxes in trying to teach a form of entertainment in the classroom, analyzing various approaches to this problem and their respective issues.

I. INTRODUCTION

THE digital gaming business has grown to a multi-billion dollar industry that refuses to back down even in the face of broad economic problems and political criticisms. As such a mesmerizing and popular form of entertainment and such a lucrative one it's no wonder that students across the world flock towards it as a career interest. Digital games, though, are still a very young entertainment media and still a black box even to veterans who have been making games since the inception of the industry. It should come as no surprise, then, that techniques in teaching to this industry's needs are only in their infancy. What's more in so many peoples' minds games and education are polar opposites. As such a gap exists between teaching to the professional goals of aspiring students—and indeed the companies they aspire to work for—

and the academic goals of instructors, to an almost paradoxical degree.

II. GAME DESIGN AND PRODUCTION – PROFESSIONAL ISSUES AND THEIR IMPACT ON THE CLASSROOM

A. *An Outline*

To understand where these paradoxes arise we must first understand the challenges posed in the industry itself as the challenges in the classroom are very similar. We will cover the process of game development itself and outline the challenges involved, the conflicting points of view that are currently prevalent in the game industry, and how the challenges reflect on academia.

B. *The Process of Digital Game Production*

The template provided by Maic Masuch and Michael Rueger provides a good outline. The process of bringing a game from conception to production as they detail it is as follows:

- Developing the core idea
- Writing a game concept
- Producing the artwork
- Programming the game engine
- Game content production

- Playtesting
- Balancing and Bug Fixing

It should be understood that this process is outlined with reference to a single cohesive product. A finished game, regardless of its genre or scope, is expected to be designed with a series of rules in mind and with a series of elements that all contribute meaningfully to the player's experience. The conception of these core ideas should be a series of careful considerations, and the visuals, sound, and narrative are all expected to be an appropriate reflection of gameplay.

The process of creating the game content itself, meanwhile, is an intricate collaboration between highly skilled **programmers, artists, and designers**. Every object in a game world, from the smallest blade of grass to tall skyscrapers and hulking monsters must be conceived, built in a computer either in 3D or as a series of re-useable images called sprites, programmed to be functional, and tested extensively for balance and bugs. If we use the metaphor of a painting to describe this situation, though, it's as though one set of individuals drew a sketch, another set are doing the heavy brush strokes, another is doing the light ones, and each person on the team has their nose only inches away from the canvas, working on a single stroke per person. One programmer may be working only on a physics engine for the game while another may be working on a handful of artificial intelligences, for instance. Artists may become highly specialized, with whole teams devoted solely to concept art, solely to modeling, solely to preparing models for animation, or solely to texturing models; such is the technical complexity of creating in-game

content and the challenge involved with creating a single working asset for a game.

Managing this process usually falls on designers who oversee the project and have a clear vision of what it should be like when it's finished, but it's a chaotic process and no two companies handle it alike. For instance, the exact role of someone with the title of "designer" varies widely from one company to another. One company may restrict designers solely to writing, communication, and project management while another might expect designers to program or use special in-house software. This variance is an issue within other fields as well. One company may define a "technical artist" as one who understands the technical aspects of animation and prepares CG models for animators while suiting them to the technical specifications within a game engine while another may define it as one who draws preliminary artwork that modelers use as blueprints. The corporate culture is such that the term "industry standard" is a very loosely used one as there are none to truly speak of, owing to the fact that in game development, to borrow a film analogy, the developers have to rebuild the camera every time they want to make a game—and no one is sharing their cameras. The nebulousness of game industry practices coupled with the diversity of skill sets that it needs to function presents a difficult challenge for educators in that no single curriculum can prepare students for every position or every company. Instructors have to find ways to match students' abilities and interests to what exists and help them at a more personal level than one might normally see in a college course.

C. *The Perspective Effect*

This challenge is by no means a simple one to overcome as the many positions that exist in the industry reflect multiple philosophical points of view regarding game design itself. These points of view are not necessarily mutually exclusive as the advancement of one is often contingent on the advancement of the others but nevertheless both developers and students color their expectations of games and of the type of projects they want to make based on a peculiar philosophy revolving around their backgrounds, skills, and personal preferences. The three main points of view are as follows:

1) *Games as Novelty*

This point of view holds that games are first and foremost games and that at the heart of a fun game is the novelty of the game itself. This often goes hand-in-hand either with a strong emphasis on creative play, as is the case with *The Sims* and other titles by Maxis, or with an emphasis on simplicity, enjoyability, and accessibility of a game's mechanics, as is the case with puzzle games like *Tetris* and a variety of online casual games.

2) *Games as Expression*

This point of view holds that games are a new form of expressive media like film or literature and that the heart of a good game lies in the fulfillment of players' fantasies and the power of the game's storytelling. Games like *The Legend of Zelda* and *Final Fantasy* try to put players into the world of the story and involve them in a narrative directly.

3) *Games as Invention*

This point of view has been hard-coded into digital game design culture since digital games' beginnings in graduate student labs and holds that games and simulations are a way of showcasing the latest computing technology. PC-based games strongly emphasize this philosophy, taking advantage of the most powerful commercially available hardware before it's even released to the public. In this case the tools and techniques that are used to build the games are in and of themselves the object of focus.

These different interpretations of games are not opposites, but nevertheless developers and team members of all kinds find themselves emphasizing one or another, which is understandable given the diverse skillsets involved. On a corporate basis this schism in philosophies is the fundamental issue that has resulted in the breadth of practices between companies. On an individual basis every team member has their own vision of what the purpose of a project and definition of a game is and, with those things, preferences for the kinds of projects that they want to work on—the types of projects that exist in total are very broad, ranging from casual puzzle games to cinematic masterpieces. The divide presents not only challenges in preparation for work in the industry but in communication and cooperation between students; one may want to work on a cinematic game while another might not see the point, and these two people may find themselves on a team together in the classroom when they might never otherwise work together as they would likely apply to companies that better reflect their individual philosophies.

From the instructor's perspective the challenge also exists to cater to the wide variety of expectations that students enter programs with and provide a satisfying experience in their curriculum for everyone. This poses the third great challenge in that there are so wide a variety of techniques and standards to go along with these philosophies that no single program covers all of them. Teaching resources—hardware, software, and labor—raise major budgetary concerns and, especially in the case of instructors and personnel in this area of study, may be extremely scarce, limiting the variety of courses that an institution may be prepared to offer and with that subjects that it may be prepared to teach and software packages that it may be able to prepare students to use.

D. Social and Economic Issues

Finally, let us not ignore the issues faced by gaming as a whole beyond any individual production. While growing stronger as a part of modern global artistic and economic culture games are still struggling to find some sense of legitimacy in the public eye and are having a more difficult time than their predecessors for the conflicting points of view revolving around them. Digital games, though they have made great progress as an expressive media, are still closely associated with toys, both in the minds of many designers and in the minds of many consumers. Meanwhile controversial matters like game violence and addiction issues keep the legitimacy of games mired in bad press both in the news and in politics. When this legitimacy as a form of entertainment is called into question so is the legitimacy of digital games as an area of study, such that only within the last ten years have

educational institutions developed programs surrounding digital games—and only a handful are available. This, compounded with the other issues highlighted in this article and the high budgetary risks involved in exploring new properties and techniques on a significant commercial scale, has made digital gaming a very slow field to grow. The technology may be pushing ever-forward as processing cores in computers multiply, memory capacity and speed doubles, and the economic scale and power of games as a media grows with them, but the techniques have barely been explored, let alone documented, which puts educational institutions seeking to teach a new generation of game designers in a difficult place.

III. APPROACHES TO TEACHING GAME DESIGN

The four great challenges of educating game design, then, are as follows: first, instructors are challenged to prepare students of a bewildering variety of backgrounds and interests for an industry with no production standards and wild variance in job descriptions, expectations, and design philosophies. Second, instructors are challenged to work around students' expectations and present a curriculum that satisfies them. Third, they must do this within budgetary constraints. Fourth and finally, they must instruct students in a field that, like the rest of the entertainment industry, may or may not be taken seriously by either other educators or the public alike.

Several approaches have been outlined for dealing with these challenges. Ian Bogost and associates suggest that the two major forms of teaching games are “production” programs and “games studies” programs; a curriculum based on

developing practical skills versus one based primarily in social science-related research revolving around games as the main object of study. He highlights one as being more associated with trade and art schools and one as being more associated with Universities and more traditional academia. However, the most successful and well-known Universities in game design—MSU, RIT, USC, and Bogost’s own program at Georgia Tech, to name a few—hold production at least at equal weight with more theoretical issues and do put significant focus on it. We will hold, therefore, that the difference between the two major approaches lies not in the subject matter of coursework as Bogost and associates suggest but rather in the teaching methodology between **skills-oriented** and **academically-oriented** programs.

A. *The Skills-Oriented Approach*

The longer-standing approach that is more commonly adopted by trade and art schools is, as Bogost suggests, production-oriented and aims to train students in practical skills and help them define a strong portfolio for entering the job market. They are founded by industry veterans who have worked for their tenure in the entertainment industry and are interested in passing on their skills, and so these programs have several key traits. First, skills-oriented programs and invariably the schools that offer them tend to be highly focused on one discipline, being defined by what those veteran instructors take with them. For instance, while a school like the Art Institute may offer game programming classes, the depth of the coursework in this area as opposed to art-oriented coursework is considerably limited within their program. In

contrast the Computer Games Technology program at Algoma University in Canada focuses exclusively on programming and mathematics. While this limits the worldview students develop within these programs it brings a philosophical satisfaction to students as they are able to find programs that are closely associated with their perspective on games and their own skill sets, backgrounds, and personal goals. Second, because of that focus and the focus the instructors bring with them, these programs are highly regimented. But for a few exceptions skills-oriented programs mainly consist of smaller art schools rather than large universities and the coursework is much more tightly defined. All students of a particular class level tend to take all the same classes at the same time. The scale enables instructors to work more closely with students while the regimentation of the course schedule gives students an ease of cooperation and helps focus their philosophical points of view more while at the same time lending a persistence to their teams that enables them to, to a short extent, define their own corporate culture within the class. Third, as these are often smaller institutions they aren’t challenged by scaling issues that a larger school may face and therefore aren’t challenged by the same budgetary concerns. However the budgetary needs of these skill-oriented programs are all the higher on a per-student basis as they must remain constantly up-to-date with the latest industry standards in hardware and technology. The small scale coupled with the high resource demands to maintain this standard and the privatization of these institutions often results in very high tuition without scholarships, rendering these programs inaccessible to many

students. Compounding the accessibility issue is their lack of academic accreditation. Within the schools themselves these issues hold no sway and the game industry itself prizes their portfolio value, but incoming students, as stated previously, come from a wide variety of backgrounds with varying degrees of knowledge and may feel compelled to seek out a more accredited institution either for intellectual or philosophical reasons or because they feel uncomfortable with such a narrowly focused program at such a small school.

B. The Academically-Oriented Approach

The academic approach to teaching game design is defined not by academically-oriented subject matter but by more traditional academically-oriented teaching methodology and philosophy. Only in the worst-case scenario does Bogost's proposed "game studies" social science-oriented program override students' goals completely and fail to prepare them for jobs. As stated before, most especially in the case of MSU and USC, the coursework of an academic program can be and is often inclusive of game production-oriented work. The difference here is that the pressures of legitimacy are much more strongly felt here than at more focused schools, though perhaps not necessarily from the instructors' perspectives. In these particular examples strong film studies and media arts programs already existed in the infrastructure of the universities and it was fairly natural that they adopt digital game design programs. Students always feel the pressures of academic legitimacy, though, as they are held to the rest of the University's standards regardless of the focus of their program, the demands of their courses, and the demands they place upon

themselves, which often prove more of a challenge to instructors in this situation than does the subject matter itself. It certainly presents a challenge to students; in a production-based area of study so filled with technical, communicative, and design challenges and with great personal demands that need to be met in order for students to get jobs, students can feel tremendous pressure in an educational setting that asks that they meet stringent general education and credit-hour requirements with course lists that rotate on the per-semester or even per-year basis.

The University setting itself, meanwhile, draws from a much larger pool of students with a much broader variety of skills and interests than skills-based art schools. On one hand this introduces students to a great many more perspectives on game development than does a more skills-based program and broadens their horizons considerably. On the other it mounts the worst-case scenario previously described wherein one student may not respect another's ideas and vice versa, and it can prove challenging for students to develop cohesive projects, particularly of the types that are consistent with their expectations and goals. What's more, though an academic program at a university draws from a larger pool of students it is difficult to predict what type and number of students will enter a game design program, and coordinating their skill sets in order to be conducive to making a game project can be very difficult. For instance, one year a class may consist almost entirely of artists with only a handful of programmers while the next it may be a more even distribution, but for that one year a considerable burden falls on both groups—

programmers because only they can make the game function and they may find themselves completely alone on a team, and artists because they may find their programmer unable to work to the needs of their project and have a failure on their hands regardless of how much effort they put into it. Cross-disciplinary programs like that found at MSU in particular tend to compound these issues very easily. Budgetary concerns further aggravate problems as the instructors do not always exist to fill desired positions and there isn't always enough of a budget at a University for all of the desired labs or equipment. This makes it extremely difficult to cater to students' expectations for an academically-oriented program despite what actual value it may hold. Meanwhile the coursework itself may face significant limits, forcing instructors to concentrate and condense content and making it difficult to digest important facts such as the mathematical intricacies of design.

On one hand all of these issues result in, to put it flatly, lower standards of quality from the projects that students produce as opposed to the ones seen from more skills-oriented programs, but there is a distinct advantage here in terms of the problem-solving ability and versatility that students in such a program develop. The challenges posed to students in this setting involve time management, self-sufficiency, and cooperative challenges that students in smaller, more skills-oriented programs do not face. With so many issues it can be difficult to recognize this value or the approach that programs like these are taking—which is to introduce students to as broad a set of ideas as possible and prepare them for a wide

variety of challenges, roles, and types of production. While the industry values specialized skills this is becoming recognized as a valuable set of traits. The intellectual standard that universities bring with them also has the potential to push the philosophy behind games forward as these academically-oriented programs do often emphasize the theoretical side of making games as well as the practical side.

IV. CONCLUSION

The challenges that academia faces with teaching students to make games are vast. The game industry's own issues snowball with the issues of teaching, presenting educators with the puzzling matter of trying to teach a single, cohesive field where no single philosophical definition of its product exists and where no single discipline is the absolute path to success. Both traditional academia and more focused institutions have developed ways of dealing with these problems, but in many cases both require some refinement. The skills-based route does present a more cohesive program that is closer to industry standards, but they're very expensive for it and skills-based programs are sometimes so intensely focused that it's difficult to say whether or not they can truly be called "production-oriented." They seem to prepare students more for individual roles in game development than the whole of it. The academically-based route, meanwhile, is a rockier path to tread but gives students insight into a larger view, presenting the whole world—not just within game design but around it, but only if they're willing to see it. In either case there are always exceptions, but in order for gaming to expand and grow one side will have to accept the values of the other, whether it's a

programmer deeply invested in games-as-invention who has to see and accept the value in what the team writer is doing or whether it's a rogue art student among staunch academics who must learn to understand the value in what's being taught to him as opposed to focusing on what *isn't* being taught. It's here, at the crossroad of disciplines and ideas, as with games themselves, that students and instructors alike can find greater strength.

REFERENCES

- [1] Winn, Brian. 2008, December 11. Personal interview regarding challenges in formulating MSU's game design specialization. East Lansing, Michigan.
- [2] Bogost, Ian and Assoc., 2006, "Game Design Education: Integrating Computation and Culture," IEEE online journal, 2008 December. Available <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=01642609>
- [3] M. Masuch and M. Rueger, 2005, "Challenges in Collaborative Game Design: Developing Learning Environments for Creating Games," IEEE online journal, 2008 December. Available <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=1419790&isnumber=30684>
- [4] Hilleman, Richard, 2008, October 8. "The Game Designer as Change Agent" keynote speech, Meaningful Play Conference 2008. East Lansing, Michigan.
- [5] Fullerton, Tracy, 2008, October 11. Personal interview regarding teaching methodology and focus at USC. East Lansing, Michigan.
- [6] Carson, Jamie, 2008, July. Personal interview regarding program at the Art Institute of Illinois and its intellectual standards. Schaumburg, Illinois.
- [7] Algoma University, 2008. "Degree Curriculum," [Online Document], October 2008. Available <http://masterygaming.com/program.php?pageid=53>.
- [8] Art Institute of Schaumburg, 2008. "Brochures and Catalogues," [Online Document], 2008 July [cited 2008 December]. Available <http://www.artinstitutes.edu/schaumburg/Admissions/BrochuresCatalogs.aspx>
- [9] Think Tank Training Centre, 2008, "Course List," [Online Document], 2008 October [cited 2008 December]. Available http://www.tttc.ca/Animation_School_Course_List/
- [10] Rochester Institute of Technology, 2008, "Game Design and Development," [Online Document], 2008 November [cited 2008 December]. Available <http://games.rit.edu/>
- [11] Adams, Ernest, 2008, November 25, "The Designer's Notebook: The Moral Panic Isn't Over Yet," [Online Document], Gamasutra, 2008 December. Available http://www.gamasutra.com/view/feature/3860/the_designers_notebook_the_moral_php
- [12] Miller, Paul, 2008, July 15, "Top 10 Pitfalls Using Scrum Methodology for Video Game Development," [Online Document], Gamasutra, 2008 December. Available http://www.gamasutra.com/view/feature/3724/top_10_pitfalls_using_scrum_php
- [13] Mencher, Marc, 2008, September 17, "Building a Great Team: Communication," [Online Document], Gamasutra, 2008 December. Available http://www.gamasutra.com/view/feature/3724/top_10_pitfalls_using_scrum_php
- [14] Hietahlati, Juuso, 2008, July 4, "Producers of the Roundtable: Structuring Your Team," [Online Document], Gamasutra 2008 December. Available http://www.gamasutra.com/view/feature/3716/producers_of_the_roundtable_php
- [15] Hietahlati, Juuso, 2007, December 26, "Producers of the Roundtable: Getting Coders and Artists to Communicate" [Online Document], Gamasutra, 2008 December. Available http://www.gamasutra.com/view/feature/3306/producers_of_the_roundtable_php
- [16] Guttenburg, Darren, 2006, April 13, "Student Feature: An Academic Approach to Game Design: Is It Worth It?" [Online Document], Gamasutra, 2008, December. Available http://www.gamasutra.com/view/feature/2661/student_feature_an_academic_php
- [17] Yim, Roger, 2001, February 26, "Taking Game Design Back to Basics: A Provocative Essay Calls for Innovation," [Online Document], 2008, December. Available [http://rproxy.iii.com:9797/MuseSessionID=4aca1b7bbab5361a5fccf8cd8919fd9/MuseHost=find.galegroup.com/MusePath/ovrc/retrieve.do?contentSet=IAC-Documents&resultListType=RESULT_LIST&qrySerId=Locale\(en%2C%2C\)%3AFOE%3D\(ke%2CNone%2C11\)game+design%24&sgHitCountType=None&inPS=true&sort=DateDescend&searchType=AdvancedSearchForm&tabID=T004&prodId=OVRC&searchId=R2¤tPosition=23&userGroupName=msu_main&docId=CJ70866045&docType=IAC](http://rproxy.iii.com:9797/MuseSessionID=4aca1b7bbab5361a5fccf8cd8919fd9/MuseHost=find.galegroup.com/MusePath/ovrc/retrieve.do?contentSet=IAC-Documents&resultListType=RESULT_LIST&qrySerId=Locale(en%2C%2C)%3AFOE%3D(ke%2CNone%2C11)game+design%24&sgHitCountType=None&inPS=true&sort=DateDescend&searchType=AdvancedSearchForm&tabID=T004&prodId=OVRC&searchId=R2¤tPosition=23&userGroupName=msu_main&docId=CJ70866045&docType=IAC)
- [18] Deutsch, Claudia T, 2002, April 1, "Some Colleges Take Games Seriously," [Online Document], 2008, December. Available [http://rproxy.iii.com:9797/MuseSessionID=b015fc3885e05049adc6f4c3c1dff20/MuseHost=find.galegroup.com/MusePath/ovrc/retrieve.do?contentSet=IAC-Documents&resultListType=RESULT_LIST&qrySerId=Locale\(en%2C%2C\)%3AFOE%3D\(ke%2CNone%2C11\)game+design%24&sgHitCountType=None&inPS=true&sort=DateDescend&searchType=AdvancedSearchForm&tabID=T004&prodId=OVRC&searchId=R2¤tPosition=16&userGroupName=msu_main&docId=A84340988&docType=IAC](http://rproxy.iii.com:9797/MuseSessionID=b015fc3885e05049adc6f4c3c1dff20/MuseHost=find.galegroup.com/MusePath/ovrc/retrieve.do?contentSet=IAC-Documents&resultListType=RESULT_LIST&qrySerId=Locale(en%2C%2C)%3AFOE%3D(ke%2CNone%2C11)game+design%24&sgHitCountType=None&inPS=true&sort=DateDescend&searchType=AdvancedSearchForm&tabID=T004&prodId=OVRC&searchId=R2¤tPosition=16&userGroupName=msu_main&docId=A84340988&docType=IAC)