



Kevin McGee

**Educating the Practitioner-Theorist
The Need for Interactive Digital
Media Research Studios**

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Practitioner-Theorist
The Need for Interactive
Digital Media Research
Studios**

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1 Introduction

Consider the following situation from the course I teach in game design. One of the design problems is to make a computer game automatically increase the game-play difficulty based on player performance. This is a well-known technique for having games automatically adapt to players. In *Tetris*, for example, the speed of the falling blocks is automatically increased as the player succeeds at clearing more and more blocks. For some things, it is relatively easy to determine “what makes something more difficult” – it can involve an increase in speed (or quantity) or a reduction in size. In other cases it is more challenging to identify what makes something more difficult; what makes one maze or logic puzzle harder than another?

However, even the “easy” design options raise interesting questions and challenges. Recently, one of the student teams was working on the design of their game. In the game, the goal was to shoot and hit falling targets. They were considering two different ways they could make the game difficulty increase automatically: increase the speed of the falling targets – or decrease their size. As part of their discussions they were also asking people to play-test their prototype, discussing the alternatives with the players, and so on. Ultimately, they decided to have the game increase in difficulty by having the targets fall faster. Their reason: players seemed to find this kind of difficulty-increase *more enjoyable* than the alternative.

This is an interesting hypothesis. Is it correct? How can we test it? Will the results of such tests suggest other important design rules or heuristics? Can we use such insights to identify other game parameters that make games more interesting or enjoyable? Traditional art training might help students to *make* things that are engaging, but it does not typically train them to pursue such questions. On the other hand, although conventional computer science helps prepare students to specify requirements, create an efficient implementation, and the like, it rarely has much to say about how to make products that are emotionally engaging.

This story highlights a number of challenging issues about the relationship between theory and practice, about our failure to adequately train students for existing and emerging research and industry opportunities, and about even larger opportunities that *could* be identified and developed if the appropriate kinds of training existed.

Contemporary interactive media are becoming more complex and are being designed to support a wider range of activities than ever before. Such media support artists, gamers, and researchers – people who have different goals, different ways of working and playing,

and different needs. Furthermore, depending on the context, people expect interactive media to function as anything from intelligent servants when booking flights to intelligent opponents in online games. This raises a number of foundational design questions that draw on such diverse fields as cognitive science, media studies, computer science and engineering, and art/design theory.

There are very real opportunities for innovative research and development in the emerging field of interactive digital media: new forms of entertainment, education, social services, and the like. But where will the innovators actually come from? For all the popular rhetoric in the world today about “educating a new generation of innovators,” the institutional structures still look as if they are either training students to be traditional scholars of new media – or simply training them to be skilled developers of existing products and applications (e.g., conventional computer games).

Conventional economic wisdom currently argues that wealthy nations are transitioning to economies based on “creativity” while manufacturing/implementation is migrating (being “outsourced”) to developing nations. To the extent that this is true, there is something paradoxical about a manufacturing model of education as the basis of training “creative industry” scholars, engineers, and designers. Although the model of “students coming off an educational assembly line” may be reasonably successful in the case of training students to work in well-established fields creating known products and services, it seems quite problematic for preparing students for their roles in a rapidly-changing world of innovation. There will certainly be creative jobs analogous to established vocations such as, say, literary criticism or animation or software engineering. But since we know precious little about how to design engaging interactive *experiences*, there is tremendous opportunity in “inventing the future” of interactive digital media – not just the technical infrastructure, but the media/technology that *meets the end-user*.

Is there demand? Indeed, there is tremendous unfulfilled demand from students, industry, and the research community. In our experience, students are deeply frustrated that they must choose between, say, a computer science education (with a smattering of interactive media lectures or courses) or an arts/humanities education (with barely a smattering of technical lectures or courses). Likewise, research and industry are desperate for individuals who have a combination of skills and experience – not just “designers who know how to *talk* to programmers” and vice versa.

The needs of computer-game design, to take just one example, challenges a number of educational traditions and assumptions about the division between academic scholarship, vocational “skills”, and tacit artistic expertise. There are, of course, scholarly courses on game studies, vocational programmes to prepare individuals for jobs in the game industry, and so on. But there is an alternative: a *theorist-practitioner* approach to interactive media design education. Such an approach is an alternative to both “the main purpose of practice is to make theory more concrete” and “the main purpose of theory is to inform practice.” The theorist practitioner approach is one that combines the development of new theory with the creation of innovative works.

2 Why isn't this problem being addressed?

One of the biggest barriers to addressing this problem is the institutionalized Balkanization of formal education.

To be sure, there is something of a tradition in academia of letting students take (some few) applied courses to make the (important) theory concrete. And there is a

tradition of arguing for the importance of theory in the training of skilled professionals. And certainly, art schools have invoked theory and more scholarly study in the form of anatomy, mathematics, and the like. However, there is a deep division that still persists between scholarship, vocational training, and the creation of engaging and meaningful artifacts/experiences. Such divisions manifest themselves in various forms of Balkanized education: divisions between universities as “centers of scholarship”, trade schools as centers of vocational training, and art schools as centers of “art production.” Such divisions and antagonisms even exist between faculties within the same university, where scholarly subjects are opposed to applied subjects (e.g., computer science, engineering, medicine, architecture).

To give one example, “human computer interaction” (HCI) is an important field that has emerged over the last 20 years. And yet, even today, there is utter confusion and chaos about “where it belongs” in a university. Should it be in a humanities faculty (*human-computer interaction*) or in computer science (*human-computer interaction*). The dilemma is so real that many universities put it in *both* (and then endure endless turf-wars between the two). And since such programmes are not actually inter-disciplinary, they wind up discouraging or rejecting students who are genuinely interested in combining, say, programming with the design of innovative end-user products and services.

The particular example of HCI is just one of the more general case: the requirements for developing engaging and important *end-user* interactive technologies requires a combination of skills and interests that cannot be adequately addressed by the current separation of scholarship/theory, design/implementation “skills”, and fine art technique. To give one concrete example: what kind of education currently prepares people to invent new attractions for amusement parks? This topic is often deemed “conceptually uninteresting” for university education, too “psychological” or “high level” for vocational schools and polytechnics, and too “concerned with research about what the audience wants” for many art schools.

This Balkanization is not just institutionalized by tradition and inclination, but also by funding and government-level policy decisions. Such agencies “naturally” view universities as the source of scholars, polytechnics as the source of skilled technicians, and art/design schools as the source of people who “make things that engage people.”

And the loss is not just in the form of amusement park attractions, but consists of countless other emerging (and yet-to-be identified) possibilities that include interactive digital media systems that automatically generate innovative entertainment, art, education, and health-care.

3 What We Could Do

This paper argues for the importance of the theorist practitioner. Readers familiar with the work of Donald Schon will recognize the allusion to his concept of the “reflective practitioner” (Schon, 1983, Schon, 1987a). Schon argued that practitioners should (and do) “reflect” on their practice. That is, skilled activity is not simply some vocational execution of learned skills, but involves complex forms of reflection, hypothesis-formation, modeling, and the like.

...reflection-in-action ...involves a surprise, a response to surprise by thought turning back on itself, thinking what we're doing as we do it, setting the problem of the situation anew, conducting an action experiment on the spot by which we seek to solve the new problems we've set, an experiment in which we test