Why Be Concerned About Individual Differences?

The overall goal in doing as much individualizing as possible is to succeed in producing a competency distribution that is as narrow as possible. That does not necessarily require employing all the options listed above. Depending on the subject matter and on the target audience, a single track may suffice. Suitably beefed up to meet presenting requirements, there is no reason why it cannot suffice. The guiding decisions are concerned with just how many options to use, or which options to use, or which combinations to use so that the entire target audience is capable of reaching the end of instructional materials in relatively error-free fashion.

The overall premise is that it takes correct practice to reach satisfactory outcomes. Toward that end, error-free, it is hypothesized, is superior to error-correction. Better not to have to unlearn the wrong way to do something. What systematic attention to individual differences does is make that more assuredly possible.

Research Is Needed

Following the position taken in the previously cited article, it needs to be noted that these propositions and proposals are based only on rationales (Gropper, 2015). They are *not* based on any empirical evidence. It is desirable for confirmation purposes that there be data. Should the rationales provided be persuasive enough, ending on yet another mixed metaphor, they provide grist for a research agenda. □

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Recruitment Gaming: A New Tool at the Interface of Education and Employers

Gavin W. Porter
Michael A. Tanenbaum

Recruitment gaming embodies an exciting new tool at the interface of the education and private sectors. Employers and recruitment platforms add new complications to the already problematic relationship between game designers and educators. To better understand the emerging recruitment aspects of gaming and identify areas for those in educational technology to participate, the authors address two essential questions: What are the distinctions between recruitment games versus traditional classroom games, and what are the key educational and private sector issues surrounding the implementation of recruitment games? Their analysis is informed by the development and management of an award-winning recruitment gaming platform.

Introduction

Simulation and gaming platforms can now act as bridges to employers. This adds a third group alongside designers and educators that already have keen, but sometimes divergent, interests in gaming. Educators examine the value of a game in a course for enhancing interest in content and provoking thought. Entrepreneurial game designers

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are often compelled by the popularity of their product and financial considerations. Companies can use performance-related data from gaming, simulations, and other online credentials for employee recruiting, while embedding company ideology within the game at the same time. Designing a game platform that has enough demand from players to sustain the livelihood of the developers, educational value, and recognition by employers as a valuable tool presents an enormous challenge.

Existing reviews of gaming touch on many issues, including attempts to define what constitutes a game, motivational value, and the embedding of gaming into the student's curriculum. For a discussion of these and other overarching issues in gaming, the reader should consult several excellent reviews (Kirriemuir & McFarlane, 2004; Williamson & Sandford, 2005; Young *et al.*, 2012). Young's group stresses careful consideration in posing questions regarding gaming. Questions such as "Do games enhance learning?" have been contentious, owing naturally to the broad array of gaming platform styles, student abilities, and instructor savvy in implementation. Similar games may fail in one situation and succeed in another due to changes in any of the above. An additional problem in the existing literature is that the blunt bottom lines of game designers are not readily visible to educators. Heavy pedagogical theory discussions on gaming are not likely to be of substantial interest or use to game designers, nor to employers considering new ways to evaluate talent—they require some streamlining to make them relevant and digestible for those groups. The existing gaming literature points to knowledge and expertise gaps, as well as communication gaps, between game designers and educators (Kirriemuir & McFarlane, 2004; Stainton *et al.*, 2010; Young *et al.*, 2012). The addition of employer concerns adds yet another gap to this already problematic mix.

To aid in the construction of games and the promotion of constructive dialogue between educators and designers, numerous gaming frameworks have been elaborated. These vary greatly in format—from flow charts, to cyclical diagrams, to checklists, to Venn diagrams, to rubrics, to analogy diagrams, to a list of questions. A number of issues have been addressed in these frameworks, including: representation, content, and implementation of games (Stainton *et al.*, 2010), selection and use of games in formal learning contexts (de Freitas, 2006; de Freitas & Jarvis, 2006; de Freitas & Oliver, 2006), how project teams work together on educational games (de Freitas & Jarvis, 2006), and experiential learning and flow states in gaming (Kiili, 2005). All of these frameworks aim to improve one aspect of the game design or game utilization process. No previous gaming frameworks have directly dealt with recruiting or employer concerns. The use of game play results as data for employers to act on, and promotional advantages that can be utilized by the private sector represents a new trend that, in our opinion, has not been adequately addressed in any publication thus far.

To better understand recruitment gaming, keeping in mind a potentially broad audience, we address two key questions:

- What are the distinctions between recruitment games and more traditional games used in the classroom?
- What are the key educational and private sector issues surrounding the implementation of recruitment games?

As educational games used in the classroom represent the majority of the existing discussion, we compare and contrast educational versus recruitment gaming in regard to user motivation, context, opportunities for evaluation, and scaffolding. Informed by our own experience in the launch of a recruitment gaming platform, we elaborate key questions to aid in the construction of recruitment games, as well as ways to increase their pedagogical value.

Games as Inclusion and Exclusion Tools

Imagine you are running a new company—you want to find the best talent, wherever it may be (inclusion), and then, faced with a large number of applications, pare down to the best candidates (exclusion) using game performance data. Companies can use a gaming platform to involve a larger number of candidates (well beyond a typical campus visit approach) in whichever skill set a company values. Simultaneously, they can promote their company brand. The hospitality industry has used Farmville and Cityville (a farming or city simulation game) as a diagnostic for managerial ability (Phadnis, 2012), while industry giant Siemens has developed an online interactive game called Plantville that allows players to run a virtual factory to test their ability to allocate funds and improve efficiency, with an added hope that young college graduates will view these factory management positions in a more favorable light (Boese, 2011). In more controversial applications, military organizations are using gaming platforms (America's Army) in tournament settings to improve enlistment and provide a forum for promotional information (Nanez, 2007). Economic estimates appear quite favorable for the use of this particular platform, or "advergame" (van der Graaf & Nieborg, 2003), although moral questions abound.

Comparing survey results to other social network data has already demonstrated intriguing predictive value (Kosinski *et al.*, 2013). Investigation of user's "digital trails" and other solicited data is fueling the computational social science field (Giles, 2012; Lazer *et al.*, 2009). Credentialing can also exist outside of a gaming platform. For example, the open badges project of Mozilla attempts to display expertise and skills, particularly computer skills such as programming, in a formalized manner (Goligoski, 2012). Other platforms, like massively open online courses (MOOCs), could also act as performance-based screening conduits to employers.

Table 1. Distinctions between classroom and recruitment gaming.

	Classroom perspective	Recruiting/employer perspective
Game result, user motivation	Although student motivation can increase in a game setting, the most tangible result to the student may be the game's role in the course grade (only if the game performance is assessed, which is at the instructor's discretion)	High impact, could affect not only employment opportunity, but also subsequent position in a company "Play a game, get a job" mantra
Evaluation of gaming platform and opportunities for longitudinal studies	Learning gains over another intervention or traditional classroom practice Longitudinal study opportunities always exist and could indeed help to define some of the fuzzier learning outcomes (that may occur long after the classroom game play), but reporting in the literature is scant	Companies should have a high interest in following candidate performance in a quantitative manner because it affects their livelihood Streamlining, or expansion of the hiring process, depending on the company's wishes Cost savings and other practicalities of hiring employees
Placing the game in context	Teacher-guided, occurs in the context of a course, and is surrounded by lectures and other assessments	Opportunities for company branding and marketing, and to draw people to industries they might not consider attractive
Opportunities for debriefing and scaffolding of the game platform	Higher possibility of occurring Deemed fundamental for learning	Lower possibility of occurring, but may arise to some degree from social networks and gaming community groups Reconciliation of game tasks with day-to-day job environment, as opposed to enhancement of learning taking place with game play Could prevent mistakes made in the simulation from transferring to the real job

Distinctions Between Recruitment and Classroom Gaming

Since the existing gaming literature has largely focused on games used in a traditional classroom setting, we would like to point out several distinctions between the classroom platforms and recruitment gaming (see ***Table 1***).

First, the stakes of classroom games may be low in the eyes of the student, unless the game is used for grading purposes. Even then, the grade allocated for game play may form only a small percentage of the course. In recruitment gaming, performance on the game has the possibility to lead to a job with a company. This is indeed a mantra for some recruitment gaming initiatives ("play a game, get a job") (Jou, 2013). The first job post-graduation is highly prized by many college seniors, particularly in tough economic times—a potential motivational jewel that educational games confined to the classroom do not possess. Student motivation in business gaming simulations has been identified as an area lacking in suggestions and solutions (Stainton et al., 2010). Furthermore, factors identified for gaming motivation (goal setting, individual needs, the need to improve personal abilities) are often drawn from old and non-gaming-related literature. One simple change facilitated by online platforms are leader boards, which increase motivation in many cases (Moseley et al., 2009), and may be more even more meaningful when linked to the user's social network (Yap, 2010). Gaming results posted online can reach beyond the sole inspection of the classroom teacher.

Second, critical evaluation of a gaming platform in

the classroom may not be occurring unless the instructor has an active research project on the game and a way to reliably evaluate the game versus another means of instruction. Even if the gaming platform is evaluated in a classroom setting, it is difficult to measure learning gains over a comparator, as it is debatable as to when the learning is occurring and the multiple types of learning that could be imparted (Garris *et al.*, 2002). Recruitment platforms have the potential to be tied to more quantitative measures, which is in the interests of most businesses, and channeling such data back to the academic sector could be highly beneficial. There should also be a greater impetus for longitudinal studies in recruitment platforms versus traditional classroom settings. Job performance, much like learning gains, may not always be a readily measurable quantity, but in the financial sector it could include things like the number of deals done, successful trades, profit made for the company within a specified time period, or performance reviews from peers and managers. Longitudinal studies that investigate how classroom game performance relates to future career success are scarce. The last detailed longitudinal research on business simulation gaming and work performance was done in the early 1990s. It indicated a correlation between game performance (or at least the perception of another individual's game performance) and salary five years post-graduation (Wolfe & Roberts, 1993), but the business gaming landscape has undergone drastic changes with the arrival of the Internet and mobile smart devices. Longitudinal, quantitative post-game performance is more suited to the private sector, whereas university professors are likely to follow students for just one semester.

Third, learning in games is often increased when the game is placed in an appropriate context (de Freitas, 2006; de Freitas & Oliver, 2006). In the classroom, students have the course curriculum and other accompanying materials that would (hopefully, under the guidance of the instructor) place the game in context for the students. For recruitment gaming, the game can become a way for the sponsoring company to place itself in a favorable context for branding and advertising to attract candidates that may not traditionally consider that industry. The learning context is not likely to be a priority. Although the company can promote its brand, if large periods of time pass between an online aptitude test for a potential employee and further contact by the company, the employee may lose interest in the company (Chapman & Webster, 2003). Cloaking, or provision of games that are not linked to a specific company, may help to reduce such disinterest or feelings of neglect. There may be some benefit to having third-party platforms unassociated with a specific company, where gaming scores could reside for longer times before contacting the high performers.

Fourth, following from the context discussion are the debriefing differences for classroom versus recruitment games. The importance of debriefing (scaffolding) of a

game in the classroom has been stressed in the educational gaming field (Crookall, 2010). Debriefing is partly addressed through the user groups and communities surrounding certain games, but this could leave some educators unsatisfied. Quality debriefing has a much higher chance of occurring within a classroom setting, compared to an online platform for recruiting purposes. At the initial stage, recruitment games are more focused on screening as opposed to instruction. At later stages of recruiting, debriefing could increase the transfer of the skills learned in the simulation to the job itself (Garris *et al.*, 2002), and also reconcile the tasks of the game to the day-to-day tasks of the actual job, which may be more mundane and less thrilling.

Considerations for Recruitment Gaming Implementation

We have developed a deep frustration with financial institutions' candidate selection methods for highly coveted internship and full-time opportunities. The selection process for interviews and placement after hiring within an organization has tended to align more closely with socio-economic and ethnic background than aptitude and fit. Hirers often overvalue a candidate from an elite institution, and the perception of a candidate going to a lesser known school can be perceived as a "moral failing" (Rivera, 2011). This was disturbing to us. Moving beyond a small number of target schools with a widely available gaming platform to test skills seemed like a good way to escape entrenched "old boy" networks for recruitment.

Recruitment gaming platforms, like *ConnectCubed. com*, have received multiple accolades and positive press coverage [for *Connectcubed.com* coverage, see the *Wall Street Journal* (Jou, 2013), 2013 UNESCO/NetExplo Global Leader for Technology Innovation (Bry, 2013), and *Toronto Star* (Fong, 2012)], reaching a much broader audience compared to typical reports of gaming platforms in research journals targeted for academics. In fall 2011, the ConnectCubed recruitment gaming platform ran a pilot competition using a trading simulator platform, offering top performers the opportunity to participate in a New York hedge fund's training program. ConnectCubed sent two players to the program, which consisted of active portfolio management on the fund's advanced, proprietary trading platform. The other fund trainees were selected from established target schools through a traditional, on-campus recruitment and interview process. The two players selected by ConnectCubed placed first and second among their peers in the program, generating returns several times in excess of the third place trainee. Both of ConnectCubed's selected players had been passed over in the on-campus recruitment process offered at their universities. Through targeted online advertising campaigns using Google AdWords and Facebook, ConnectCubed attracted and assessed over 5,000 active

Table 2. Key issues for those in the education or private sector regarding game usage for screening/recruitment purposes.

If you are considering a recruitment game for your company:
• How much player involvement do you need to make a useful data point? Is it possible to derive that data using a game?
• Is performance in the game sufficiently correlated with work performance that you should consider it in candidate evaluation?
• Even if there remains a gap between the simulation and the job, does the simulation give you access to new talent pools who otherwise might not have considered employment at your firm?
• Are there readily identifiable thought processes taking place in the game that are relevant to practitioners in the field (biologists, accountants, historians, etc.)?
• Has the game been discussed and field tested with subject experts that are actively practicing in the field the game is purported to measure performance in?
• Does the game designer/vendor employ industrial-organizational psychologists and involve them in the design and evaluation of the tool?
• Is the designer/vendor willing to share data outcomes from studies demonstrating the validity and reliability of the tool?
• Can the vendor supply data to suggest that the cost savings from the game in recruitment expenses, employee turnover, and enhanced workplace performance justify the expenditure?
• Does the vendor have experience working cross-culturally?
• Does the tool match the technological penetration and standards of the market where it will be deployed (specifically Internet firewalls and technology platforms like mobile and access to 3G+ networks)?
• Does the game advance present goals around the firm's target candidate experience and employer branding?
If you are a designer or employer looking to increase the pedagogical value of a game:
• How will feedback, debriefing, and reflection occur? Have you allocated enough time for these processes? Will new employees be able to re-visit game performance and mistakes?
• If someone is not excelling in the game, can they easily learn why? Do you want the participant to have this ability, or is the game used only for screening out large numbers of applicants?
• Can someone else substitute into the game to cheat for a student/applicant?
• Can data be pulled from the game in order to monitor performance on specific aspects/questions?
• Can the game be modified by a teacher if necessary?
• Are you deriving rich feedback from current players that can improve the use of the game with the next cohort of players?
• Do you have a comparison to another non-game learning method for the same material?

graduate job candidates across 49 countries and territories for a fraction of traditional recruiting costs, even when not marketing against an active opening.

Both the trading simulator and quiz platforms on ConnectCubed enjoyed success with talent identification and placement; however, it underwent further modification to broaden its appeal and utility beyond the financial sector. Working memory, spatial reasoning, personality traits, and other rapid-fire quiz games were subsequently added, under the supervision of industrial/organizational psychologists. The platform strives to show the elements of work history, aptitude, and personality that help to predict performance at a particular company.

Through the experiences of launching, overseeing, and overhauling this recruitment gaming platform, we make the suggestions comprising *Table 2*.

Limitations, Implications, and Conclusions

Some technological developments, including automated essay grading systems (Markoff, 2013), create concerns that the evaluation of students will become overly result-oriented, quantitative, and focus on measurements that do not embody high-level and creative thinking skills. We share a similar concern. We do not intend to portray recruitment gaming as a panacea, and we do not believe that gaming should act as a replacement for sound human judgment. Indeed, judgment is paramount in the construction of the game environment and candidate identification algorithms.

Quality data will not arise from mid-air. Selection and interpretation of data will almost always be necessary, which will involve human judgment. Also, good recruitment algorithms should evolve over time and be re-tested for relevance.

We do feel that recruitment gaming platforms can effectively *supplement* evaluation of a candidate, hold potential for academics to leverage new data sources, and can identify talent in new places. How one distinguishes a test from a game and/or make tests more enjoyable is a key issue for educators. How one fulfills a myriad of validations required of an evaluation platform, and how those validations apply in different situations are essential for designers and employers. The educational issues in our framework may not be trivial for entrepreneurial game design efforts to address, and any game platform, recruitment or otherwise, can always benefit by scaffolding with additional content and guidance provided by an educator.

Specific, company-targeted platforms have value, but the more narrowly targeted the platform, the more difficult it becomes to sustain financially. One potential solution for broader platforms to enjoy better specificity is for companies to identify their top employees, get them to play the games, and then match to candidates with a similar performance profile. This top employee "cloning" strategy has been suggested previously by recruitment professionals for course and academy set-ups by companies (Jeffery & McKee, 2012).

The implications of recruitment gaming are vast, and the field is only in its infancy. Skills that are valued in the workplace change over time (rapidly in some fields), thus remaining relevant is a constant challenge facing higher education. Recruitment games designed with employer needs in mind could supply a remedy, as students and faculty can get a clearer gauge on the skills that employers value in a particular industry, and adjust curricula accordingly. Also, recruitment gaming can join learning management systems, online courses, and online textbooks, where student behavioral data is generated with each click, leading to a swath of information for learning analytics to interpret. If employer bottom lines focus on the demonstrable talent of employees, and if they can validate the skills of employees more easily and with better accuracy, they will feel more secure with new hires. Online courses (or even traditional brick and mortar universities) could tout the success of their students with an independent (third party) performance indicator in the form of a recruitment game. Performance by a university's students on recruitment games from highly regarded companies may engender some healthy competition and bragging rights among universities, which is good for all parties. Universities may also want to incorporate such platforms into their admissions process.

Growth in the use of more advanced statistical techniques by human resource departments bodes well for recruitment gaming. Identifying the reasons behind better performance among some employees and discovering those qualities in candidates demands a common set of parameters to measure both cohorts. Recruitment games alongside the traditional *CV* present a new avenue for gathering that data. Companies will hold an increasing stake in gaming platforms and online aptitude testing. Those in the educational technology sector should be eager to get on board for potential data sources, quality control, validation, and advising roles. □

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The Changing Nature of Educational Technology Programs

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Contributing Editor

The many changes in educational technologies have been well documented in both the professional and popular literature. What is less well documented is the changing nature of programs that prepare individuals for careers in the broad multi-disciplinary field of educational technology. This article is a first attempt to look at how educational technology programs have evolved in the last 50 plus years. In addition to looking at previous and current programs, a discussion of how future programs might evolve is included.

Introduction

A mantra that has guided much of the research and development in educational technology is this: technology changes; technology changes what people do, what they can do, what they will want to do, and eventually what they may want to avoid doing (Spector, 2012; Spector & Ren, 2015). The many and rapid changes in technologies, especially those involving digital devices and the Internet, have introduced many possibilities for improving learning and instruction (Downey, 2012; Gordon & Gayeski, 2013; Hartley *et al.*, 2010). While many examples of such improvements have been documented in the research literature, there remains little evidence of large-scale, systemic, and sustained improvement in education (Bransford *et al.*, 2005; Reigeluth & Carr-Chellman, 2009; Spector,

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