The Mirror's Edge

Creating a dynamic games course that reflects industry practices and manages student expectations.

Richard Hurford
Senior Lecturer in Games Enterprise
University of South Wales
Faculty of Creative Industries, Adam Street, Cardiff, CF24 2FN
richard.hurford1@southwales.ac.uk
+441443 661842

Jessica LaCombe
Lecturer in Computer Games Design
University of Wales Trinity Saint David
Dynevor Centre, De-La Beche St
Swansea, SA1 3EU
j.lacombe@uwtsd.ac.uk
+441792481000 x3117

Adam Martin
Senior Lecturer in Computer Games Design
University of South Wales
Faculty of Creative Industries, Adam Street, Cardiff, CF24 2FN
adam.martin@southwales.ac.uk
+441443 661839

Abstract

Industry simulation is an essential part of an undergraduate games student's education. It has been outlined by The Association for UK Interactive Entertainment (UKIE) as essential to developing graduate skills for the workplace. This paper highlights the importance of simulating industry practices within a games degree program, bringing attention to the need for cross-course collaboration and to provide a dynamic environment that reflects industry practice. This paper presents a case-study highlighting methods for maintaining student engagement and enhancing project management skills, as well as showcasing techniques for managing student expectations and preconceptions of their individual responsibilities.

The study focused on providing small-scale projects, where students worked in cross-course multidisciplinary teams of between eight and twelve students. Academic staff have acted as executive producers for each student team, reinforcing the professional context of the project. The module has used a live-brief provided by a games industry professional or an external competition, which allowed for creative interpretation by students and challenging them from a game design perspective. The conclusion of this study shows that including cross-course collaboration between students and providing a structure mirroring industry practices has been essential in preparing students for a games industry career.

1 Introduction

Knowledge of industry practices is essential for developing graduate's skills for a career in games design. The efficacy and success of a games degree course is only as potent as its ability to provide the skills required to meet the current needs and wants of the industry (UKIE, 2017).

Creating a games course that reflects industry practices requires a program that can constantly iterate and adapt to technological changes and innovations. The course content must be designed to be agile in principle, moving away from traditional waterfall design methodologies, and into a more fluid and iterative learning and development process. This enables the curriculum to incorporate external events, new production practices, changes in technology, shifts in career focus and other opportunities as they arise.

Students perceive the games sector as a vibrant, cutting-edge and ideas-driven industry, so the course should aim to reflect this within the curriculum. This however, can be challenging for academics who have to balance the competing priorities of student contact hours, timetabling and assessment policies.

Understanding the needs of the games industry with regards to graduating students is also a challenge that lecturers have to contend with. Should, for example, a course produce graduates well-versed in the latest software tools or instead focus upon the fundamental principles of artistic practice and design thinking? Given that there are a limited number of contact hours per year and the diversity of students within each cohort presents a significant number of challenges for educators, it is important to remember that there is no one-size-fits-all approach that suits every student.

This paper presents a guide to building a games degree course that prepares students for work within the games industry. This is done through design based learning approaches, studio simulation and the production of a portfolio of work. This provides students with an understanding of what to expect from the games industry, as well as what the games industry will expect of them.

2 Defining Industry Standards

Publications within the field of games design have sought to explore and define terminology related to areas such as aesthetics (Robson & Tavinor, 2018), game mechanics (Salen & Zimmerman, 2004), and level design (Totten, 2017). These areas have clear guidance and structure that informs the outcome of the final production. Similarly, there are efforts to explore the context in which games are published and ongoing discussions on effective production techniques (Futter, 2017). However, there is little guidance on consistent standards for industry practices in the production and development of games, and thus little information for universities to utilise when building courses to prepare students for careers in the games industry.

This issue can be addressed by encouraging communication between universities and industry, both locally and globally. Universities should reach out to their local games community and industry links to foster a more informed and diverse talent pool, helping to strengthen the games industry as a whole.

> *Employers need to be more involved in training future generations. Get into the unis and colleges, and provide real studio-backed guidance, use real-life examples to set assignments or give project direction, and get students learning the same tools and techniques that they'll need in a studio. Work with the universities and course leaders*

> *to develop a plan that will leave students with the skills and knowledge you want to see in your studio.* (Goodall, 2018)

Industry expectations vary in specifics from studio to studio, but there are commonalities that stretch across all studio types, be that AAA or Independent, "Indie" developers. How do we adapt the course curriculum to help students meet these expectations and ensure they obtain skills that allow them to remain competitive in this dynamically evolving field? How do we counter the challenges facing studios that make it financially impossible for them to take on and train students?

We need more diversity in the talent pipeline and we need more communication between industry and academia to make sure students are industry-ready (Harvey, 2019). With the information shared through this collaboration, we can break down the barriers that often leave the games industry feeling inaccessible and build a program that enhances student employability. This information allows us to prepare students for roles beyond just entry level positions, by identifying skills gaps and creating graduates who are capable of adapting to meet these industry needs.

We can define employability as, "a set of achievements, understandings and personal attributes that make individuals more likely to gain employment and be successful in their chosen occupations" (Knight & Yorke, 2004).

Games companies will generally be looking for a candidate who is passionate and driven. A graduate who is knowledgeable in specific skills, but can wear many hats and will be a good fit within the team culture. They will be looking for someone who shares their vision, can create a plan and has the initiative to execute those plans successfully, as well as someone who makes the most of opportunities for further development of their skills (Stewart, 2014).

A studio's needs and expectations of a student's understanding and achievements in relation to games design and development will vary greatly from the student's expectations. In the authors' experience, it is a common misconception amongst students that by obtaining a degree, a graduate is automatically guaranteed employment and a successful, lasting and fulfilling career (CIPD, 2017).

3 Managing Student Expectations

A large part of being a Games lecturer is managing student expectations, both for their own achievements, as well as what they will be learning and how. Managing what students expect to learn versus what they actually need to learn and through what methods is a major hurdle to any degree course, but it is particularly relevant to games design. Aside from the students who believe games design is about coming up with ideas and playing games, students will often approach class work as an elective exercise, doing only what they feel is important and only producing work during class times.

> *While creativity is important, creativity that does not contribute to the overall vision is ultimately counterproductive.* (Cagle, 2019)

There is also a misguided assumption in the causality between earning and learning, that an education is a guarantee, rather than a catalyst, to career success. As if, somehow, it is implied that a degree promises the graduate's level of desired employability skills.

Let's assume everyone your graduates are competing against has a games design degree, the person who ends up being hired is going to be determined by their portfolio of work, including work done outside of their degree course, and the usual markers.

- Do you have the basic skills expected for the position?
- Are you passionate about games?
- Do you make games or other immersive projects in your free time?
- Do you make the most of opportunities for further development of your skills?
- Can you quickly adapt to the type of the studio you are joining?
- Are you the kind of person who will fit well within the team?
- Are you the kind of person capable of completing a project?

How do we prepare the students for this scenario? What steps can we encourage them to take to present themselves as the best candidate?

Students need to be motivated to focus on team projects and working towards creating prototypes for portfolios filled with finished productions, or at least a vertical slice of the game experience. From day one students should be encouraged to participate in networking with industry contacts, whether online or at events. Taking part in game jams and workshops is also important for helping students to develop portfolio projects that stand out, giving them an advantage they would not have had if they had not ventured beyond their pre-established class schedules and social circles. It is important that students appreciate the value in leaving the confines of the classroom, allowing them to cultivate a practice of independent thinking, showing ambition, drive and self-motivation. (Singh & Maren, 2019)

3.1 Key Skills Required

The availability of University games courses on offer in the UK has grown substantially in the past five years, with 215 undergraduate games courses in 2014 (UKIE, no date) and 509 in 2019 (UCAS, 2019) course, but that doesn't mean that all these courses are capable of creating industry-ready students.

> *The message, loud and clear, is that education needs to focus on the fundamental skills of art, design, sound and programming. Practically, that means a student needs to understand the principles behind a subject, rather than just how to operate software packages.* (Deakin, 2018)

Software, is by necessity, a core component of the course. It is vital for students to gain an understanding of how to *learn* software, rather than being taught how to use it rote-style. This is due to game engine software changing rapidly, much faster, in fact, than most other creative disciplines taught within a university, which tend to go through annual revision, if at all.

Established software packages tend to have annual update cycles as well, which incrementally update workflows established over decades. Game engine software, on the other hand, has been revolutionised in recent years. Firstly, by the availability of free AAA quality tools, which are relatively new to the consumer market and secondly, by the need and ability to support a number of new platforms and hardware features. PBR rendering, VR, AR, Mobile and now real-time ray traced rendering are just a few examples of updates to the game engines introduced in recent years. Often the release notes for these updates can run into thousands of words and may contain dozens of new features or enhancements.

When we consider how often new features are added and how a new engine version may be released every 3 to 4 months, it would be impossible to remain conversant with the software tools by employing a traditional didactic approach. Within the three year period of a degree course; production methods, software tools and even the industry landscape may have changed significantly. If a degree programme were to focus solely upon software skills, students would be in a constant state of re-learning technology, rather than focusing upon game creation.

Students on a games course are not solely learning how to use software, they are studying how to make games. It is the process of active, immersive learning that provides the impetus to acquire the skills needed to realise games, as well as the theoretical knowledge needed to cogently reflect upon failures. Throughout the production process students can combine theory with practice, developing vocational and transferable skills intrinsically.

3.2 Design Based Learning

Games courses should be conceived as holistic and integrated experiences, incorporating a curricula that enables practical outcomes which are contextualised within a design-based approach to learning. This enhances a student's understanding of the subject matter through the practical application of theory and a structured game design process.

> *...it is not enough to copy old physical patterns. So that people will be able to make innovations and modifications as required, ideas about how and why things get their shape must be introduced. Teaching must be based on explicit general principles of function, rather than unmentioned and specific principles of shape.* (Alexander, 1964)

This experiential approach sits firmly within the active and enquiry based paradigm, where the students develop the ability to make games whilst working with others. Students should read, write, discuss, play and create games; developing an array of approaches to solve the myriad of creative, technical and experiential problems encountered during the games creation process. By necessity, students will have to create, playtest and redesign their games through an iterative design process, a technique by which many games and products are developed within industry. With this in-mind students are continually engaged with critical reflection upon their own practice, and the practices of others.

This process of making and reflecting upon what occurred, relates closely to Bloom's KSA, 'knowledge, skills and attitudes' taxonomy (Anderson, Krathwohl & Bloom, 2001) and should be a key tenet of games design education. KSA was originally developed to promote analytical skills rather than rote-learning, is not, in itself sufficient in producing 'final products'. However, as a games design student, the goal is to produce playable games that others can enjoy, rather than a continual cycle of reflection. Thus putting the student in a position where they must learn to accept compromise and the limitations of the iterative process. This gives a student a real-world understanding of the negative aspects of games design, where eventually time or budget constraints force a product to market, or result in abandonment.

Curriculum designers can take the intent of frameworks such as KSA and combine them with established design practices to form an approach termed Design Based Learning. As a course progresses it should quickly move from a didactic model of passive learning, where fundamental concepts and software tools are introduced, to a constructivist model of active learning, where learning is problem-focused and the iterative process can be applied. Students learn to be games designers by making games, resolving a multitude of issues during the process, rather than being instructed in how to make specific games or use particular tools.

> *Teachers facilitate both the process of gaining domain-specific knowledge and the thinking activities relevant to propose innovative solutions. Teachers scaffold students in the development from novice to expert…* (Gómez Puente, van Eijck & Jochems, 2018)

Design Based Learning (DBL) is the implementation of enquiry-based or problem-based learning, where the focus is upon solving design-tasks which resemble those found in a

professional environment. This approach supports deeper learning through the practical application of knowledge and iterative design practices, where students continually evaluate and redesign work.

4 Providing a Dynamic Learning Environment

The work environment, particularly within the games industry is becoming more complex, having to contend with changes to production demands and techniques, with fluctuating team sizes. There is a need for graduates who are creative, who think critically, and can communicate and collaborate effectively. The course recognises these skills as essential in preparing students for a future career in the games industry. Modules are designed as team based productions that promote an environment simulating real-world, studio experiences. Students must manage time effectively, plan projects, collaborate, communicate and problem-solve continually. The course encourages an entrepreneurial approach to games development, equipping graduates, whatever their background, with the knowledge, skills and attributes to achieve maximum intellectual and personal fulfilment.

4.1 Team Projects - the importance of working together

Throughout the duration of the course it is important for students to build upon their technical knowledge, but perhaps more importantly, they should learn how to communicate and work effectively in teams. Auteurship, compromise, planning and execution become a dominant focus, as students move from novice games designers into industry-ready graduates.

Therefore, one aim of a games design degree course should be to provide insight into the realities of working professionally. This is commonly done via 'studio simulated' projects comprising of cross-course teams working together on an industry-supplied brief. This simulated mode of learning reflects the reality of limited work-placement opportunities within the industry. It is not feasible to find 50 to 100 work placements per-year for a degree programme, so instead, students are required to emulate the working practices of a small indie company.

> *Developers lack the resources to build their projects, let alone have the capacity to assign mentors for fresh-faced interns. These are businesses, after all. They need to justify the time and financial investment, and in the case of placement, graduate and intern schemes, they simply cannot.* (Dring, 2019b)

4.2 Studio Simulation

Simulating an industry environment within a university setting is not without its own challenges. Firstly, universities rarely provide a dedicated workstation for each student. Often specialist rooms are highly contested between other courses and year-groups, with the annual timetabling melee scuppering many well-intended pedagogic plans. Secondly, university teaching policies will typically limit the number of lecturer contact-hours for a module. This may only be around 8 hours a week across a 12 week module. Thirdly, the modular structure of a course often necessitates that several modules run concurrently, meaning that student priorities must shift between practice, essay writing and often part-time work. And lastly, academic assessments often necessitate additional elements of reflective-practice and evidence-keeping that an employer would not usually require.

In short, this means that the simulated project can only replicate slices of a typical weekly working pattern. The resources required to provide a 9 to 5, five day working week are not generally available within an educational context. As educators, we can try to adapt our teaching practices to better reflect the realities of producing games. We should also give

careful consideration to the purpose of contact-hours with students. If the goal is to simulate an industry experience, we have to recognise the limitations of that simulation.

> *The issue is not that there aren't enough students studying games, the issue is that they are not studying the right things to get them work-ready.* (Deakin, 2018)

The message from industry is clear, therefore teaching staff cannot micromanage each project and instead should aim to facilitate the student teams. Each team, for example, may have an art-lead and a design-lead who work towards a common goal, providing the students with leadership experience as they try to coordinate other team members. These experiences should go some way towards creating graduates who have experience of managing others and of being managed. However, they may fall-short in reflecting the intensity encountered within a commercial context.

4.3 Assessment Strategies

As highlighted earlier, a well-designed course should support students in attaining high grades and a strong portfolio. This can be done most effectively by aligning assessment strategies so that they support learning. Assessment-for-learning is an important distinction to make, rather than exclusively assessing a project's outcome, such as a 'final game' or an artificial test or exam, the process of production should be the key focus for assessment.

It was reported at a recent education summit that industry recruiters were critical of universities' assessment policies and recommended that students should focus more on portfolio work.

> *Recruiters repeated the importance of building and creating a strong portfolio, even more so than obtaining good grades.* (Dring, 2019a)

There appears to be a misconception that students need to choose between achieving good grades or building a strong graduate portfolio. Good grades and a good portfolio should be synonymous.

> *However, universities responded that although this is fine for the graduates who can rely on the "bank of mum and dad," it is a huge demand for students who need to juggle family and work on top of their studies.* (Dring, 2019a)

The academic representatives sought to frame the criticism within a broader debate of student support and accessibility, but perhaps this reveals an inflexible mindset towards assessment within academia itself? The problem isn't necessarily a binary choice between high-grades or a good portfolio, the problem sits firmly with the assessment methods employed by the course.

4.4 Portfolio Building

A student portfolio should be more than just eye-candy, there is already a wealth of fan-art websites dedicated to this cause. Graduates, in addition to showing technical and creative prowess, should also evidence experience of group work, working to a brief, problem solving, design process, and a solid grounding in the theoretical principles of their specific discipline. Be that level design, game mechanics, environmental design, lighting, user interface, competitive play or any number of other specialist areas a games graduate may find themselves being drawn towards.

The traditional written dissertation can be used to formulate and demonstrate discipline-specific skills that an employer would value. Analysis of level designs which support

multiplier combat, explorations of horror genre techniques, or technical appraisals of new engine features are all valuable within a games design context.

As advocates of practice-based learning, the very act of building a portfolio should be considered a learning opportunity. The process of searching for a job, analysing the person-specification, curating ones portfolio to match the job, and writing the supporting documentation, is in itself an exercise that can be integrated into a curriculum. This process of learning-by-doing, combined with an assessment which supports the learning activity, such as a mock job interview, is engaging and provides a valuable experience.

The final portfolio produced by a graduate should contain a wealth of information, curated so that employers get a broad impression of a student's skills and abilities beyond a simple grade classification. There should be a variety of projects shown including experimental game jams, finished projects, high-quality imagery and concise appraisals of the work, all of which provide context for recruiters.

The graduate portfolio in itself requires concrete examples of practice, which is where educators can adapt their curriculum to provide a simulated work environment (Game Designing, 2019). This may be a combination of physical spaces, online tools and managed meetings where students can develop the communication strategies and design processes. This reflects production processes found in the workplace, whether for a large project or a series of short game jams. The goal should be to break students out of a didactic, teacher-led mindset and instil an ethos of independent learning and self-motivation.

5 Case Study and Analysis

This case study focuses on the delivery of a Level 5 Live Brief Collaborative Module at the University of South Wales. For context, this module takes part in the second year of study. It is a 40 credit module running over 12 weeks, which equates to approximately 400 hours of study, around 100 of which is based on-campus. The module spans the Easter break, so an additional three weeks is available to consolidate assets and bug-fix. This module, in various forms, has run for over 12 years with many of the same staff involved in its delivery. Over the years this has provided the opportunity to adapt and iterate module content and delivery methods to support new gaming technologies, industry models and student demographic. The module uses an active/experiential approach to learning, where we attempt to simulate the experience of working within a small indie game studio.

5.1 Collaborative Module

The module focuses upon collaboration between game art, game design courses and other complementary disciplines, which may change year-on-year such as: programming, music, sound engineering, script writing, drama and animation. It is important to note that the games lecturers are the owners of the module, other courses are invited to collaborate, but it remains a games-focused project. This mitigates the risk from other courses interfering with the main objective, which is to make a game. Past experiences have revealed that it is all too easy for the module to become an exercise in software engineering, or a game-like appendage to a traditional-media brief.

Industry simulation is an essential part of an undergraduate games student's education, however, large-scale game industry projects can take many years and hundreds of people to create. Obviously, this level of simulation is not appropriate or possible in an academic institution, therefore focus needs to be on smaller scale projects, which are often referred to as 'indie' games.

There are many positive aspects associated with group work, like deeper learning, strong information retention, and the development of communication and teamwork skills (Oakley et. al., 2004). Students on the module work in cross-course multi-disciplinary teams of between 8 to 12 members, with around 6 to 8 teams in total. Module staff act as executive producers for each student team, which reinforces the professional context of the project. These collaborations offer new experiences for the non-games students, who may have never worked with non-linear media before. Likewise for the games students, they now become the 'experts' in their field, supporting and advising others about issues such as: interactive narratives, game mechanics and the constraints of real-time gameplay. For the games student it is their role to not only make the game, but also coordinate the efforts of the other team members as they contribute skills from their specialist areas.

Prior to this module games students will have undertaken several project-based games modules and game course only collaborations. This is to develop their theoretical, technical, and team communication skills, so they can hit the ground running with this module's live brief.

5.2 Developing a Student Brief

The module focuses on a brief provided by a games industry professional or from an external competition. For several years module briefs were provided as part of a UK wide student competition run by the British Library and The National Videogame Archive called *Off the Map* (British Library, 2018). Students from the course were both finalists and winners during the four years the competition took place. In the earlier years of the module, briefs would be obtained from games industry professionals, sometimes these would be graduates from the course or industry contacts. There were usually a variety of briefs, with each team being assigned a different one.

More recently the course team decided to return to using commercial live briefs and worked closely with local developer Tiny Rebel Games (https://www.tinyrebelgames.com/), to produce a suitable brief. This process was started six months prior to the commencement of the module. It required us to liaise with the industry partner on the nature of this module and the structural requirements for the student brief. In particular, making them aware of the module duration, as it is much shorter than the usual commercial project time scale. This helped shape the scope of the student brief, which then sits within the wider assessment requirements for the module, including self-reflective journals and professional documentation.

Title:
"We're sorry to inform you that the world is about to end."
Constraints:
● The game is to be set inside a single room and the player cannot leave. ● The game starts with the user being informed (through in-world communication) that the world is going to end in 8 minutes. ● The player has some sort of communication with the outside world. ● The timeframe for the world ending is the length of the gameplay session - the game ends with the end of the world).

An interesting and appropriate brief is key to challenging and engaging the students. Ideally the brief is not for creating a generic or frequently implemented game idea, this is certainly demonstrated in the example above. This style of brief is designed to allow students to explore their creativity while enabling them to consolidate the technical skills they acquired in previous modules and stretching them into new areas where appropriate.

Specific constraints were added to subtly steer the gameplay away from large open-world spaces, therefore limiting the amount of time spent on asset production and environments. The communication mechanic and time-limited gameplay was intended to focus the game towards an oppressive narrative experience where the player soon realises there is no way out. Additionally the 8 minute time-limit allowed the students to produce a complete game within the 12 week period. This brief limited the potential for feature creep and excessive gameplay features.

5.3 Module Timeframes

The module tutors provide teams with a structured, milestone-based production plan. This provides a somewhat idealised framework for the teams to follow. Each fortnightly milestone is accompanied by a formal meeting with lecturing staff who act as producers for the project. Meetings comprise of a 40 minute review where progress is discussed, team cohesion is investigated and suggestions made for future planning.

The alternate off-weeks are used informally for practice-based support and to investigate gameplay features. Teams are required to meet consistently twice per-week outside of scheduled class-time to support team cohesion and communication. An indicative schedule is included below.

Week	Milestone	Outcomes
1	Brief Given	Teams are allocated and online communication tools setup
2	Initial Pitches	Two ideas are presented, including a VR option
3		Feedback from company - idea selection. Story structure, concept artwork and game concept outline started.
4	Milestone 1	First pass assets, Initial Game Design Document, Early playtesting using whitebox/block-in techniques.
5		Asset testing in-engine, mechanics refined, Playtesting
6	Milestone 2	Full asset production starts, block-in replaced with first-pass models. Playtesting
7		Iterative design continues, assets production continues.
8	Milestone 3	UV & Texturing, lighting tests. Design review and game demo
9		Full game production commences, script complete - voice actors recorded
10	Milestone 4	Art asset production continues, environment and lighting tests continue. Final Audio integration, extraneous features cut.
11		Final Asset Production and Handover Game testing and integration.
12	Milestone 5	Assets complete, promotional gameplay video shown
-		Easter Break (this provides 3 weeks to wrap-up production)
13	Assessment	Gameplay demo and 5 min presentation to client company

After the initial single-page pitches are submitted, the host company provides some initial feedback. This may be as simple as a single-line comment, or where more detail is forthcoming, perhaps a few sentences. This is quite a contrast from the typically verbose commentary students receive in academic feedback forms or tutorial sessions. Some students expect more feedback at this point, however the point is to put the students in the driving-seat and foster confidence in their own ideas.

5.4 Assessment Strategy

The module is assessed using a variety of assessment methods, this is to provide an opportunity for students to present their work as a completed product but also to provide evidence of their individual contributions to the project.

It is important to enable both the group effort to be recognised, whilst individuating grades for each student. Within the module there is no 'group grade' given to students, although we do use the group effort as a starting-point when looking at the work of individual team members.

A student's individual grade is based upon their contributions throughout the project and their ability to critically reflect upon their practice. Development journals are kept by students where they briefly document work undertaken each week, this is to ensure that hidden-work, dropped features or experimental investigations are considered within their assessment. Likewise, it is also apparent when a student has not been engaging fully with the project when they submit sparsely populated documentation.

The team meetings, group communications using online tools such as Discord and task-tracking spreadsheet all provide an insight lecturers can use to attribute contribution towards the project. These are reviewed throughout the module by the teaching team as part of milestone reviews and weekly meetings, to monitor student engagement.

The course team continually refines the assessment hand-in requirements to include contemporary communication tools and to balance the overhead of documentation. We have found that too little individual documentation can make individualised grading more difficult to achieve. However, it can be necessary to imply page limits and word-counts to mitigate excessive documentation. Typically, we would suggest a single page per-week for a journal although students often exceed this.

5.5 Reflection upon Practice

During the past couple of years the module has been transformed from being dubbed the 'Train Wreck' into one which receives positive feedback from students. The most common theme which students reflect upon is the need to improve their team communication skills. Often miscommunication and lack of transparency between team members is the biggest source of contention. The process of creating a completed game within a cross-disciplinary team supports students going into their final year and promotes collaborative opportunities for future projects. By completing this module students have a published game which can be downloaded, along with a wealth of supporting documentation and experience. This module also provides valuable materials for a graduate portfolio and evidence of transferable skills.

Working with students from other cognisant disciplines has pros and cons. Students often have pre-conceptions about other disciplines, which are sometimes negative (Denton, 1997). This interaction with students from other disciplines is essential in mirroring work-based practices in the games industry. As a result of this, more cross-disciplinary projects are being introduced into the curriculum at an earlier stage. So that the students are better prepared entering this module.

It is not only the students that have to collaborate during this module. Course teaching teams and the industry partners also have to collaborate. The project brief is sourced from an industry partner and tailored to fit the academic model and there is significant collaboration between course staff from each discipline in order to coordinate project milestones and chair team meetings with students. In order for the students to get maximum benefit, it is important for the industry partner to engage with the students throughout the module, so that they can provide valuable formative feedback.

Brexit has sharpened the focus on the talent pipeline and how we fill the skill gaps and shortages we face. Industry and education need to work together practically to address the issues. What we do need to do is work with colleges and universities to support them to teach what we need rather than teach what they know! Companies can have a huge beneficial effect on vocational education in the UK if they act jointly, rather than as individual businesses. (Deakin, 2018)

6 Conclusion

As academics and curriculum designers we should develop assessment strategies that support learning and provide outcomes suitable for inclusion into a portfolio of work. Moreover, a degree course in games should actively support students in creating an appropriate portfolio and network of contacts using online platforms relevant to the gaming industry. This may include some traditional assessment types such as essays or exams, but portfolios, reflective journals, and practical activities should constitute the predominant form of assessment.

Student projects of this type require guidance, such as project milestones, to scaffold the production process. Without which, deadlines are easily missed and teams fracture. There is a balance to be struck between lecturers guiding students towards what to do and when to do it, versus a free-form production process. There are many approaches which have been tried over the years, most of which will continue to evolve. Expectations of students will vary and indeed change, as they begin to realise teamwork and effective communication are essential to the production process, perhaps just as essential as technical skills and creative thinking.

The importance of incorporating appropriate industry 'live' briefs into a course is key to a successful experience for students, lecturers and industry partners. By liaising with industry partners and crafting a brief which incorporates time-limited gameplay, a fixed environment and an engaging theme, it is possible to manage and shape expectations for all involved. The constraints serve to nudge the students towards an achievable project, delivered within a relatively short time frame, the outcomes of which should be portfolio-ready.

Other industries are far more open to taking on juniors, trainees, interns and apprentices, but in games it's tough for studios to justify the time and resources spent on training, and ultimately it's the sustainability of the industry that takes a hit. (Goodall, 2018)

In conclusion, this paper demonstrates that incorporating cross-course collaboration and providing a structure mirroring industry practices is essential in preparing students for a career in the games industry. By focusing on group work, live briefs, and working prototypes, the curriculum can provide students with a simulated studio experience. Working on industry supported-briefs, completed projects can be produced which contribute towards a graduate portfolio that demonstrates their skills and achievements. In providing experience in an environment that reflects industry practices and participation in projects that incorporate local businesses, students can be prepared for a role in the games industry, meeting current studio demands and providing potential for a long-term career in games.

Projects are complex, have a great number of interdependencies and all too often the people who are coding have little to no guidance about what they are coding to, which usually translates to integration errors. Effective design early on goes a long way towards mitigating these. Yes, designs change over time - they should, because good design must account for discovery - but too often not knowing what you're

> *building until you get there means that what you end up with an inchoate mess.*
> (Cagle, 2019)

Games courses should be dynamic and adaptive to industry needs, providing a games industry workforce that is robust, resilient and sustainable.

References

Alexander, C. (1964) *Notes on the Synthesis of Form*. Harvard: Harvard University Press.

Anderson, L.W., Krathwohl, D.R. & Bloom B.S. (Eds.) (2001) *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives.* Boston, MA: Pearson Education Group.

British Library (2018) *Off the Map: Video-game & Interactive Fiction Design Competition*. Available at: https://www.bl.uk/projects/off-the-map (Accessed: August 2019)

Cagle, K. (2019). *Beyond Agile: the Studio Model.* Available at: https://www.forbes.com/sites/cognitiveworld/2019/08/28/agile-and-the-studio-model/ (Accessed: 28 August 2019)

CIPD (2017) *The graduate employment gap: expectations versus reality.* Available at: https://www.cipd.co.uk/Images/the-graduate-employment-gap_2017-expectations-versus-reality_tcm18-29592.pdf (Accessed 26 November 2019)

Denton, H.G. (1997) 'Multidisciplinary team-based project work: planning factors', *Design Studies*, 18(2), pp.155-170.

Dring, C. (2019a) *Education summit highlights divisions between UK universities and studios.* Available at: https://www.gamesindustry.biz/articles/2019-04-17-summit-highlights-divisions-between-uk-universities-and-studios (Accessed: 14 August 2019)

Dring, C. (2019b) *Eight ways the uk games industry can work better with education.* Available at: https://www.gamesindustry.biz/articles/2019-04-18-eight-ways-the-uk-games-industry-can-work-better-with-education (Accessed: 14 August 2019)

Futter, M. (2017) *The GameDev Business Handbook*. London, UK: Bithell.

Game Designing (2019) *How to Create a Game Design Portfolio.* Available at: https://www.gamedesigning.org/career/game-design-portfolio/ (Accessed: 26 November 2019)

Gómez Puente, S., van Eijck, M. and Jochems, W. (2012). A sampled literature review of design-based learning approaches: a search for key characteristics. International Journal of Technology and Design Education, 23(3), pp.717-732.

Goodall, I. (2018) Can the games industry be supported by UK-educated talent after Brexit? Interview with Maria Deakin and Ian Goodall. *Interviewed by Marie Dealessandri for MCV.com* Available at: https://www.mcvuk.com/can-the-games-industry-be-supported-by-uk-educated-talent-after-brexit/ (Accessed: 8 August 2019)

Harvey, A. (2019) 'Becoming Gamesworkers: Diversity, Higher Education, and the Future of the Game Industry', *Television & New Media*, 20(8), pp. 756–766.

Knight, P.T. & Yorke, M. (2004). Learning, curriculum and employability in higher education. London, UK: RoutledgeFalmer.

Lancaster, K.A.S. & Crother, C.A. (2003) 'Creating Effective Teams in a Classroom Environment', *Journal of Business and Behavioural Science*, 10(2), pp. 46-54.

Latané, B., Williams, K. & Harkins, S. (1979) 'Many hands make light work: The causes and consequences of social loafing', *Journal of Personality and Social Psychology*, 37, pp. 822–832.

Oakley, B., Felder, R. M., Brent, R., & Elhaji, I. (2004) 'Turning student groups into effective teams', *Journal of Student Centered Learning, 2*(1), pp. 9-34.

Robson, J. & Tavinor, G. (2018) *The Aesthetics of Videogames.* 2nd edn. Londond, UK: Routledge.

Salen, K. & Zimmerman T.E. (2004) *Rules of play: games design fundamentals.* Cambridge, Mass.: MIT Press.

Singh, B. & Maren, E. (2019) *Creative Assembly: From character to animation*, [EGX Careers Bar 2019]. 17 October.

Stewart, K. (2014) *How to get into the games industry – an insiders' guide.* Available at: https://www.theguardian.com/technology/2014/mar/20/how-to-get-into-the-games-industry-an-insiders-guide (Accessed 26 November 2019)

Totten, C.W. (2017) *Level Design: processes and experiences.* Boca Raton, FL : CRC Press.

UCAS (2019) *Games Undergraduate Course Search Results.* Available at: https://digital.ucas.com/search/results?SearchText=games&filters=Destination_Undergraduate (Accessed: 26 November 2019)

UKIE (2017). *State of Play.* Available at: https://ukie.org.uk/sites/default/files/cms/docs/Ukie%20State%20of%20Play%20-%20March%202017_0.pdf (Accessed: 2 May 2018)

UKIE (no date) *Game Industry in Numbers.* Available at: https://ukie.org.uk/research#Education (Accessed: 26 November 2019)