GLOBAL EDUCATION IN THE 21ST CENTURY

Global Learning in the 21st Century

Tasos Barkatsas and
Adam Bertram (Eds.)

SensePublishers

Global Learning in the 21st Century

GLOBAL EDUCATION IN THE 21ST CENTURY SERIES

Volume 1

Scope

The *Global Education in the 21st Century* Series will address contemporary cutting-edge teaching, learning and research issues from a global perspective. The series will present a modern focus on the debates surrounding current and significant educational issues, as well as the technological advances that impact on contemporary educational practices during a period of rapid social and technological changes.

Global Learning in the 21st Century

Edited by

Tasos Barkatsas and Adam Bertram
School of Education, RMIT University, Melbourne, Australia

SENSE PUBLISHERS
ROTTERDAM/BOSTON/TAIPEI

A C.I.P. record for this book is available from the Library of Congress.

ISBN: 978-94-6300-759-7 (paperback)
ISBN: 978-94-6300-760-3 (hardback)
ISBN: 978-94-6300-761-0 (e-book)

Published by: Sense Publishers,
P.O. Box 21858,
3001 AW Rotterdam,
The Netherlands
https://www.sensepublishers.com/

All chapters in this book have undergone peer review.

Printed on acid-free paper

TABLE OF CONTENTS

Preface vii

Acknowledgements ix

1. Global Learning in the 21st Century: An Introduction 1
Adam Bertram

Section 1: Contemporary, Innovative Curriculum and Pedagogical Practices

2. What's in a Game? Game-Based Learning and Gamification 9
Nicola Carr and Matthew Cameron-Rogers

3. Developing Conceptual Understanding: Effective Instructions for Teaching Students with Special Educational Needs 29
Rebecca Seah

4. Reframing Professional Experience: Adopting a Distributed Open Collaborative Course Framework to Facilitate Third Spaces 57
Jennifer Elsden-Clifton and Kathy Jordan

5. The Arts within a Sustainable Educational Agenda 71
Alberto Cabedo Mas, Rohan Nethsinghe and David Forrest

6. Environmental Sustainability in Schools: Tensions around Teaching a Global Imperative 83
Annette Gough

Section 2: Affective Domain, Motivation and Engagement in 21st Century Education

7. Reading in the Teacher Education Classroom: The Affective Reader and the Effective Teacher 105
Pam Macintyre

8. Secondary Students' Attitudes Toward Learning Mathematics with Computer Algebra Systems (CAS): A Structural Equation Model 121
Tasos Barkatsas, Vasilis Gialamas and Claudia Orellana

9. The Theory of Planned Behaviour (TPB) in Educational Research Using Structural Equation Modelling (SEM) 139
Grant Cooper, Tasos Barkatsas and Rob Strathdee

Section 3: Inclusion and Social Context

10. Indigenous Education Policy Discourses in Australia: Rethinking the "Problem" 165
Rachel Patrick and Nikki Moodie

11. Contemporary Special Education 185
Phil Doecke

Section 4: Globalisation and Internationalisation

12. The Emotional Costs of a Globalising Learner Identity: Challenges and Opportunities for 21st Century Pedagogy in the Asian Century 213
Chunyan Zhang and Cheryl Semple

13. Internationalisation of Higher Education and Global Learning: Australia and China 231
Josephine Ng and Berenice Nyland

14. Enriching the Known: International Chinese Students' Adaptations to Tertiary Study in Australia 251
Jianli Wang and Jude Ocean

15. "I Wonder Should I Go or Should I Stay…": Retention of Higher Education Students in an Australian University 271
Mohammad Bagher Naghdi and Richard Johnson

16. Epilogue 295
Amanda Berry

About the Authors 299

PREFACE

This book presents a modern focus on some significant and current issues in teaching, learning, and research and the debates surrounding these and how these issues are potentially resolved in practice. In this 21st century, technological and social change has never been as rapid as it has been before, and educative practices must evolve and innovate to keep up.

We, the editors, saw an opportunity to present some of these issues and innovative practices that are currently being explored by some of our researchers in our newly formed centre at the School of Education (SoE), RMIT University, Australia.

An open request was sent to our academics of the School of Education (SoE), RMIT University, Australia. We invited expressions of interest to contribute chapters for the book. Eighteen SoE academics agreed to submit their chapters, either as sole authors or co-authored with their research colleagues from other Australian or international Universities.

Prospective authors were asked to submit an abstract describing their proposed chapter. Once the submissions were received and reviewed, the editors suggested the changes that were required and invited the authors to submit their chapters. Each chapter was reviewed by at least two academic reviewers. Finally, the editors invited Professor Amanda Berry (SoE), to write the book's epilogue.

We commend the research efforts of the authors, the high quality of their research and their willingness to author chapters in this volume.

Finally, we thank the editorial staff of Sense for their constructive advice and feedback about the book.

ACKNOWLEDGEMENTS

A warm and heartfelt thanks to all the authors and reviewers who have so kindly donated their time. We have a fantastic network of academics with extensive experience in their respective fields; it was a joy to work with all of you, and your contribution to this book has been valuable. This book was an idea conceived for our newly formed centre, the Centre for Education, Training and Work in the Asian Century (CETWAC). We thank Peter Kelly, as Centre director, for his support in this project at all stages of its development. We are also grateful that this publication has been supported by a Publication Submission/Presentation Grant from the Research and Higher Degrees by Research Committee, School of Education, RMIT University.

Acknowledgements to:

Amanda Berry
Alberto Cabedo Mas
Matthew Cameron-Rogers
Nicky Carr
Grant Cooper
Phil Doecke
Jennifer Elsden-Clifton
Heather Fehring
David Forrest
Vasilis Gialamas
Annette Gough
Richard Johnson
Kathy Jordan
Peter Kelly
Pam McIntyre
Nikki Moodie
Mohammad Bagher Naghdi
Rohan Nethsinghe
Josephine Ng
Berenice Nyland
Jude Ocean
Claudia Orellana
Rachel Patrick
Peter Rushbrook
Rebecca Seah
Cheryl Semple
Geoff Shacklock
Di Siemon
Rob Strathdee
Anthony Vella
Bruce Waldrip
Jianli Wang
Chunyan Zhang

A special big thank you to Claudia Orellana for her proof-reading of the final drafts and to Amanda Berry for her thoughtful, closing words.

ADAM BERTRAM

1. GLOBAL LEARNING IN THE 21ST CENTURY

An Introduction

INTRODUCTION

It is undeniable that our global societies are advancing rapidly toward a more integrated and connected world – and in this century, faster than ever before. It is imperative then that our education practices must keep pace. We must ensure that we are equipping learners with the necessary skills and competencies that empower them to succeed in a world where change is an inescapable constant. How then do educators support learning for change? What skills and competencies then become important? What aspects of current education need to be refocussed, emphasised, or even discarded? What new forms of education need to be introduced?

As our world becomes more globally connected and integrated, we also cannot ignore the increasing internationalisation of education. To this end, our education practices need to support our learners to be citizens of the world, not just of their own locale. Our students – who *will* become our future leaders, thinkers, and custodians of our fragile planet, and of humanity – need quality and relevant education to give them the diverse skills they might need for success. So, how is education and educational research responding to these challenges? We hope that this edited collection provides some insights into just some of the research that is preparing our students for these modern and changing times. This book sets out to examine some of the most significant and current issues in teaching, learning, and research; the debates surrounding these; and how these issues are potentially resolved in practice. Within different aspects of the curriculum, the contributing authors consider principles of teaching and learning and how these relate to planning, pedagogy, and assessment.

THE ASIAN CENTURY

While this book is designed for a global audience – much of the theory and research sits in the context of the dominant, Western/Eurocentric views of education. That being said, we do strongly subscribe to the idea that the 21st Century is *the* Asian Century. This idea recognises the emergence and refocussing of global dominance away from Euro-America (Law, 2004) to the economic rise of north, south, and east Asia. This development will have profound consequences throughout the globe.

T. Barkatsas & A. Bertram (Eds.), Global Learning in the 21st Century, 1–5.

As China and India rise as superpowers, other Asian countries (including Japan, Malaysia, Singapore, Indonesia, Thailand, and Korea) will also play major roles as the global centre of gravity shifts to this region (Australian Government, 2012). As a consequence of economic and political changes, there will be critical and dynamic shifts in the globalisation of cultural and social dimensions as well as technological. This has implications for education. How do we prepare our students for such changes and what then should we prepare our students for?

In a century of increased social networking, technological advances, and global communication, educators and business leaders agree that specific skills are required for students (Beers, 2011; McCoog, 2008; Moylan, 2008). Smith and Hu (2013), in their article "Rethinking Teacher Education: Synchronizing Eastern and Western Views of Teaching and Learning to Promote 21st Century Skills and Global Perspectives", provided a succinct summary of how we might prepare our students for this century.

These skills might/should include:

- critical thinking;
- problem-solving;
- creativity and innovation;
- collaboration and teamwork;
- leadership;
- cross-cultural understanding;
- communications and information fluency;
- computing and ICT fluency; and
- career and learning self-reliance (Moylan, 2008; Paul, 2012 as cited in Smith & Hu, 2013).

In catering for these student needs, education practices need to be responsive and pioneering, and ought to prepare students for the Asian century. It is our aim that the chapters in this book go some way to addressing this.

ABOUT THIS BOOK

This book grew out from this idea, and has been made possible through our School of Education's new centre – the Centre for Education, Training and Work in the Asian Century (CETWAC). The centre supports research around advancing educational and social research in the context of "emerging understandings of changing forms of education, training and work; childhood, youth and young adulthood; relationships and family structures; culture, politics and the economy; development, migration and strategic relations. The Centre contributes to debates about how these experiences are marked by growth, development and opportunities, and by crisis, marginalisation and exploitation" (Centre for Education, Training and Work in the Asian Century, 2016). We are grateful that we could collaborate with members of this group and bring together a collection of our current research work in this context.

While many of our authors are Australian – and RMIT academic staff – they are widely travelled and participate in and publish about research at an international level, and regularly publish with international colleagues and for international journals. Our contributors and international and local co-contributors write about issues that have world-wide currency and valid implications for global learning, even if some of the empirical research were conducted in Australia. A number of the studies reported in the book, however, have been conducted in Asia and Europe.

In this book, we believe that we have captured some of the most contemporary and innovative practices and issues that *are* impacting on education today on a global scale. Our chapters provide evidence for claims, substantiated from empirical research and/or rigorous academic discussion. They encourage the reader not to take things in teaching simply on face value, common sense, or just because "that's how it's done around here". In other words, the chapters will challenge the reader to distinguish unsubstantiated opinion from evidence-based practice. At the same time, the authors are clear about where there is a lack of clear evidence and when issues are contested.

The reader will be provided with evidence from the literature that may either confirm or challenge their opinions and experience. The book will raise issues that the reader might not have previously considered and challenge the often taken for granted rhetoric of teaching (for example, diversity is something that somehow needs to be "managed" rather than seeing it as a resource to celebrate and build on).

While the intended audience is teacher educators, academics, and educational researchers, the book will also appeal to recently qualified teachers, experienced teachers, administrators, curriculum developers, university tutors, and student teachers. The book will be helpful for anyone interested in education to understand current practices that help prepare students for a modern and global world.

STRUCTURE OF THIS BOOK

As mentioned above, education needs to be responsive and innovative. This book is our response to this, and is intended to showcase some of the work that our centre (CETWAC) at the School of Education, within the College of Design and Social Context, at RMIT University has produced.

Drawing on the particular research and expertise of our colleagues in the centre (and that of our international and national collaborators), we offer here our work that we believe aligns with equipping students with the necessary skills for the 21st century. When we did so, we saw four salient themes emerge around which the various research studies were centred. These themes then were a nice way of grouping the chapters into relevant sections of this book.

The chapters are presented in four sections that align with each of the four themes:

- Section 1: Contemporary, innovative curriculum and pedagogical practices;
- Section 2: Affective domain, motivation and engagement in 21st century education;

- Section 3: Inclusion and social context; and
- Section 4: Globalisation and internationalisation.

The first theme, and perhaps the most obvious, is that contemporary, innovative curriculum and pedagogical practices are important in the education of students in the 21st (Asian) century. In this section, we have grouped five chapters together. Chapter 2 opens the book by unashamedly delving right into current pedagogies that uses technology and game-based learning for a connected society. Chapter 3 explores innovative pedagogical practice that considers diverse student abilities (in this case, special needs students) in the learning of specific subject matter (in this case, mathematics). Chapter 4 syncs nicely with the view that teacher education needs to be a collaborative effort – that there is a shared responsibility. Partnerships between stakeholders (universities and schools in this case) produce effective and productive outcomes for their students. Chapter 5 prompts us to consider the importance of curriculum areas in the learning and development of skills for the 21st (Asian) century. It argues the place of the Arts in education and its future for sustainable education. The last chapter of this section (Chapter 6) presents a case for the need for sustainability education as an intrinsic part of global citizenship.

The second theme that emerged was that of research around affective domain, motivation and engagement. Three chapters are presented. The first (Chapter 7) explores the affective domain of students and how their engagement with literature can be a transformative experience. The second chapter (Chapter 8) explores student motivation and engagement with the learning of a particular subject area. A wide empirical measure was used to determine the relationships between students' confidence, confidence with technology, attitude toward learning, and their affective and behavioural engagement with mathematics. The third chapter (Chapter 9) critically examines a framework that might be useful for exploring learning behaviours and intentions of school administrators, teachers, and students. The outcomes of which may be helpful in managing psycho-social aspects of learning.

The next theme identified was that of inclusion and social context. Two chapters are presented. The first chapter (Chapter 10) explores indigenous education policy discourses within Australia. It argues the case that we need to look in our backyard, not just globally, to address participation and attainment levels for differing social contexts. The second chapter (Chapter 11) brings awareness to teacher educators about the importance of inclusive education, with particular focus on special needs education. It also reminds us of the diverse learners that constitute our classrooms and how we could cater to their diverse learning styles.

The final theme is that of globalisation and internationalisation. Here, we present the final four chapters of the book. As our world races toward the globalisation and internationalisation of education, what then is the impact on students, teachers, and educative processes? The first chapter (Chapter 12) of this section explores the notion of teacher and student identity in a global and changing world. The second chapter (Chapter 13) explores internationalisation through a case study whereby

Chinese education students would combine part of their study at an Australian institution. The chapter explores the efficacy of this international partnership. The penultimate chapter (Chapter 14) identifies important challenges and aspects of the process of transition for international students studying in Australia. It highlights ways in which educators might consider the impact of cultural norms and rules on the adaptation of international students in regard to their study. We conclude the book with a chapter (Chapter 15) that explores the retention of international higher education students. In particular, the chapter examines the relationship between internationalised curriculum offerings with international students' experiences. The outcome of which, provides insight to educators about how they might cater, not only for the international student experience, but also how they might better internationalise their curriculum.

REFERENCES

Australian Government. (2012). *Australia in the Asian century. White Paper.* Retrieved from http://www.defence.gov.au/whitepaper/2013/docs/australia_in_the_asian_century_white_paper.pdf

Beers, S. (2011). *Teaching 21st century skills: An ASCD action tool*. Alexandria, VA: Association of Supervision and Curriculum Development.

Centre for Education, Training and Work in the Asian Century. (2016). Retrieved from http://www.rmit.edu.au/research/research-institutes-centres-and-groups/research-centres/cetwac

Law, J. (2004). *After method: Mess in social science research.* London: Routledge.

McCoog, I. (2008). *21st Century teaching and learning*. Retrieved from http://www.eric.ed.gov/ERICWebPortal/recordDetail?accno=ED502607

Moylan, W. (2008). Learning by project: Developing essential 21st century skills using student team projects. *International Journal of Learning*, *15*(9), 287–292.

Smith, J., & Hu, R. (2013). Rethinking teacher education: Synchronizing Eastern and Western views of teaching and learning to promote 21st century skills and global perspectives. *Education Research and Perspectives*, *40*, 86–108.

SECTION 1

CONTEMPORARY, INNOVATIVE CURRICULUM AND PEDAGOGICAL PRACTICES

NICOLA CARR AND MATTHEW CAMERON-ROGERS

2. WHAT'S IN A GAME?

Game-Based Learning and Gamification

ABSTRACT

School education in the early part of the 21st century is coming under increasing fire for not preparing young people for 21st century society and workplaces, for not adapting to emerging trends in how people learn in a connected society, and for holding decreasing attraction to young people who have at their fingertips a world of information, networks and entertainment. Game-based learning and gamification are positioned as possible pedagogical approaches schools could adopt to engage young people in learning in ways that more closely reflect how people learn in a digital and networked world, and that can address some of the key 21st century skills that are more in demand in this digital age. This chapter takes a critical perspective on game-based learning and gamification and argues that, whilst there are inherent features of game-based learning and gamified curriculum that appear to have potential for addressing some of the current perceived shortcomings of schools, the context in which such approaches are applied is crucial.

Keywords: gamified learning; pedagogy

LEARNING IN THE 21ST CENTURY – A CONTEXT

The world in the 21st century is now seen as a place of constant change. The relative stability that characterised much of the 20th century has been replaced with near perpetual flux. In addition, technology has re-shaped how most of us live, work and learn (Siemens, 2005). There is a considerable body of literature in which it is argued that current education systems, still reflective of a 20th century paradigm, are failing learners in an increasingly digital world (Selwyn, 2011). As we move further into the 21st century, the call for pedagogies that promote 21st century skills to be adopted in schools to address perceived inadequacies grows louder from industry and governments around the globe. Schools are being asked to shift away from an industrial era frame characterised by a mechanistic (Thomas & Seely Brown, 2011) or factory/industrialised (Robinson & Aronica, 2015) mode, where the focus of the environment is to "learn as much as you can as fast as you can" with a one-size fits

T. Barkatsas & A. Bertram (Eds.), Global Learning in the 21st Century, 9–28.

all approach to curriculum and standardised testing regimes. Instead, schools are urged to adopt pedagogies that promote the development of critical thinking and problem-solving, communication and collaboration, creativity and innovation, and digital technologies skills (Kay, 2010).

Beyond the emphasis on 21st century skills, a different view of what learning might look like, and where and how it might take place, is beginning to emerge. For some time, some educational researchers and commentators have been predicting a future scenario for learning that represents a shift away from schools (Selwyn, 2011). People, of all ages, are engaging with information and other people in online spaces, learning about topics and concepts that are of interest to them. Formal education no longer comprises the majority of our learning. As Thomas and Seely-Brown (2011) put it, learning is now "a cultural phenomenon that takes place without books, without teachers and without classrooms" supported by a "massive information network that provides almost unlimited access and resources to learn about anything" (pp. 18–19). Seeing information as a resource for learning rather than an end helps to shift thinking about learning in purely cognitive modes as an individual process of information absorption, adaption and accommodation, and start thinking about learning as a cultural and social process of engaging with and making sense of the constantly changing world around us. Growth in connectivity, underpinned by rapid uptake of digital technologies, particularly mobile devices, and the dominance of social media platforms, have informed visions of learning beyond formal school systems that are grounded in collaboration and networking. Rather than learning from a teacher in a formal space, learning takes place in a Vygotskian framework of learning from more capable peers in informal networks that are enabled by digital technologies. The result is a "fusing [of] a vast informational resource with a deeply personal motivation" (Thomas & Seely Brown, 2011, p. 31).

Whilst the rise of informal learning can be seen as a potential threat to traditional schooling, it can also be interpreted as an opportunity. Educators, regardless of sector, are being urged to recognise the trends that are occurring with how people are learning and to integrate some of the features of this learning culture into their classrooms, to augment – rather than replace – traditional educational practices (Thomas & Seely Brown, 2011). Emergent 21st century school pedagogies can be characterised by their focus on inquiry, an increased emphasis on the role of creativity, imagination and play, as well as on connectedness and collaboration through challenge-based and problem-based learning. The challenge for education is to marry the structure of institutional or formal education with the freedom that characterises informal learning in the 21st century to make something new (Thomas & Seely Brown, 2011).

What emerges from these debates is a suggestion that school education should adapt to the transformations that are taking place in how people are now learning, and that continuing to support a mechanistic or industrialised model of education will make schools less relevant to today's learner. Learning environments instead need to be spaces where learners can explore, in a collective way, issues of interest

and relevance, in ways that promote inquiry and questioning, through exploration, creativity and play. It is in this context that this chapter examines the role of game-based learning and gamification as part of the response to the challenges schools face as we move further into the 21st century.

GAME-BASED LEARNING

Games have been a part of most civilisations since the dawn of time. Board games, card games, and physical games have been part of most cultures for millennia. More recently, the take up of digital games has been a significant outcome, as well as a driver, of our digital world. The immense popularity of digital games has transformed how people, particularly young people, spend their leisure time (Connolly, Boyle, MacArthur, Hainey, & Boyle, 2012). Once seen as a largely male domain, dominated by action-orientated first-person shooter games like Halo and car racing games like MarioKart, technological developments in recent years have seen the proliferation of MMOGs (Massive Multiplayer Online Games), played by people of all ages, genders and cultures. Mobile devices have given us Angry Birds and Candy Crush Saga, whilst online networks have supported online social games like Farmville. Games today have far more universal appeal across age, genders and cultures (Simões, Redondob, & Vilasb, 2014). There is almost universal acceptance that well-designed digital games are highly engaging and motivating, because of their combined impact on cognitive, emotional and social aspects of the player (Lee & Hammer, 2011).

Game-based learning generally refers to the use of computer or digital games to support learning in a classroom setting (Simões, Redondob, & Vilasb, 2014). The use of games, and specifically computer-based games, as educational tools has been a part of educators' and educational researchers' sphere for some time (Beavis, 2004). Whether students are pitted against each other in a pre-World War Two resource and politics simulation (Watson, Mong, & Harris, 2011), or investigating the biology of an imaginary alien world (Seelhammer & Niegemann, 2009), or engaging in "serious games" that simulate of real world problems in order to change behaviours and attitudes, game-based learning involves the use of computer-based games that aim to engage students with educational content through interactive and multimodal means. To achieve this, curriculum and pedagogy are adapted to revolve around the use and facilitation of these games. The games become a tool for learning.

The attraction of games to young people and the sustained engagement and motivation that digital games engender is seductive to educators who would like their students to be as engaged in their lessons as they appear to be in digital games. What drives people to continued engagement in an activity has been a point of focus for educators and researchers alike for more than a decade. Games and game-mechanics have long been identified as potentially effective in motivating student engagement (Beavis, 2004; Beavis & O'Mara, 2010; Gee, 2007; McGonigal, 2011; Prensky 2001, 2008). Researchers have explored the use of digital games

in classrooms and have drawn parallels between the playing of such games and principles of effective learning. Games reflect features of how current theory suggests people need to learn or are learning in a digital age (Pelletier, 2009) in that they are active, experiential, situated and problem-based (Connolly et al., 2012). In a sense, games become a metaphor for 21st century learning (Gee, 2003). Gee (2003) argued that learning and playing are synonymous. Playing games requires a considerable amount of learning and involves risk-taking; developing creative solutions to problems that can be solved in multiple ways; building skills that can be applied in more complex problems; consolidating solutions but then rethinking those as new challenges arise; and thinking systematically about possible impacts on own and others' actions (Gee, 2003). Games offer a more active and multimodal learning model than many traditional pedagogical approaches. Importantly, games represent Seymour Papert's notion of hard fun (Papert, 1997), that is, something that is doable but challenging, or as pleasantly frustrating (Gee, 2003).

All games share the traits of having a goal or specific outcome that players work to achieve, sequences of tasks that are carefully designed to suit the player's skills and that scaffold their skills to higher and higher levels, a series of rules that provide limitations or boundaries on how players can achieve the goal, and a feedback system that shows progress towards the goal (Domínguez et al., 2013; Gee, 2003; McGonigal, 2011). Goals provide players with a sense of purpose. Rules that limit the obvious ways of achieving goals promote strategic and creative thinking as players attempt to work within rules. Real-time feedback, including low penalties on failure, reinforces the idea that the goal is achievable therefore providing motivation to keep playing (McGonigal, 2011). The experience of failure (or at least potential failure) is a key game-mechanic for gamification and games in general. Be it in the form of timed challenges, lives, or a set of quest parameters, the chance to fail is especially present in computer-based gaming. However, unlike with school learning, failure in games comes at a low price (in good games players can start again) and is often seen as a way of learning how to win in the future by testing hypotheses about the game (Gee, 2008). Games provide the player with a sense of agency; "actions and decisions co-create the world they are in and shape the experiences they are having" (Gee, 2008, p. 35). These characteristics contrast with the learning experiences many students have in formal education settings.

The biggest drawcard of games to educators is the high levels of engagement they bring about in those who play them. Engagement can be the result of extrinsic or intrinsic motivation. Extrinsic motivation is categorised by one's participation in an activity for reward, outcome, or form of benefit. In educational contexts, a student might be extrinsically motivated to study so that they might achieve a certain score on an exam or make sure that they are on time to class to avoid an absentee mark. Game-mechanics like badges, levels and achievement boards provide students with goals that extrinsically motivate them to participate as they actively engage with tasks and activities in order to unlock the next challenge or level. Extrinsic approaches such as these can work in some learning contexts, but are not necessarily suitable

for all learners. For an intrinsically motivated student, engagement in the activity is reward unto itself. Be it reading in the library, playing basketball or practicing drums, intrinsically motivated student engagement is often driven by specific factors such as enjoyment and self-determination within the activity. *Flow* theory (Csikszentmihalyi, 1975) explores intrinsically motivated engagement as an optimal state "of absorption, focus and enjoyment" (Schmidt, Shernoff, & Csikszentmihalyi, 2014, p. 380). Characteristics of the optimal state are often described as:

- intense focus and concentration on the given task or activity;
- the merging of awareness and action as part of a deep sense of involvement;
- sense of control over the way in which one can deal with or approach the task or activity;
- a level of enjoyment and interest in the task or activity;
- experiencing a distorted sense of time, often that time has passed quickly during the task or activity (Schmidt et al., 2014, p. 380).

According to McGonigal (2011) this is an identical optimal state achieved by individuals engaging in a game. Games that seek to intrinsically motivate student engagement revolve less around reward systems and more on the creation of tasks, activities and learning spaces that allow students freedom in their approaches to tasks and curriculum that fosters enjoyment, collaboration and flow (Custodero, 2002; McGonigal, 2011; Ramirez & Squire, 2015). Competition and collaboration happily co-exist in a gaming environment, unlike in schools (Gee, 2008).

Extending beyond simply motivation and a multimodal means of engaging with content, the use of games for learning has matured and expanded in recent years, with significant investment from private and government sectors in the Australian context in recognition of the potential benefits offered to teaching and learning by games (Beavis & O'Mara, 2010). Many claims are made about the potential of games to enhance student learning. From a cognitive perspective, games are argued to promote content understanding and problem solving, collaboration, communication and self-regulation (Connolly et al., 2012; Egenfeldt-Nielsen, 2006; Perrotta, Featherstone, Aston, & Houghton, 2013). Claims are also made that games, in particular serious games, can promote affective aspects of learning such as motivation and attitude (Wouters, van der Spek, & van Oostendorp, 2009). Teachers who use digital games in their classroom believe that games are "fun" and engaging; that games are inherently motivating thus keeping students focused on the task, and that student learning will automatically flow from such engagements (Millstone, 2012). The fun element of games takes precedence over the learning, effectively disguising the fact that students are engaged in learning. Teachers also believe that game-based learning has the potential to benefit learners who might be disengaged within a traditional classroom context, in particular boys, who seem to respond to the competitive element inherent in any game-based approach (Beavis et al., 2014).

There are complicated links between digital culture, game play, and young people's identities (Stevens, Satwicz, & McCarthy, 2008) and learning. If we accept

that identity, our sense of self, is actively constructed in a social world aided by tools like social roles, rituals, clothes, and the stories and artefacts of our culture, then games represent another tool for identify formation. Games capture the player though identity building – a player takes on the role of an existing character or gets to create their own. But unlike in acting, where the actor behaves as they interpret the character to act, in a game, the player becomes the character – interactivity allows and indeed encourages the player to suspend their sense of self, take control and make disinhibited choices. Further, people who play the same games frequently form important social structures and connections, forming an identity within the affinity group. Gee (2003) argued that computer games foster multiple identities – the virtual or the identity of the game's character; the real, the human behind the screen; and projective identities, the identity space where the two identities come together respectively (pp. 48–54) and that it is through the establishment of identity in the game that leads to an extended commitment of self to the game. Gee argued that deep learning occurs only if there is an extended commitment of self.

CRITIQUE OF GAME-BASED LEARNING

Much of the literature related to game-based learning takes a largely uncritical and somewhat deterministic view that the affordances and qualities of games themselves will automatically improve student engagement, experience and achievement (Beavis et al., 2014) and that game-based learning can address the shortcomings of current educational practice. As Pelletier (2009) said:

> By bringing games into educational practice and theory, the hope is, it often seems, that the diseased, geriatric body of education can be treated through the rejuvenating, botox-like effect of educational game play. (Pelletier, 2009, p. 84)

The value placed on games as a "mediating plane" that facilitates access to learning outcomes through more relevant ways of teaching (Pelletier, 2009) has resulted in much of the research into game-based learning and gamification focusing on the form and subject matter of the game. However, other factors are equally important.

Games and game-based learning are frequently represented as universally appealing to all students. Instead, the diversity of students and context will influence how students experience game-based learning. Factors such as interest, cultural background, gender and socio-economic status will all influence students' responses to and participation in game-based learning. In the past, stereotypical views of gamers were of adolescent boys playing out macho fantasies in violent first person shooter games. Girls were, with some exceptions, not a significant part of gamer culture. These stereotypes are based on a narrow definition of gaming as confined to the highly visible "core games" played on consoles or computers, played mainly by a male audience and that generate the highest revenues. However, recent research in the UK suggests that with the advent of more mobile devices, females now account

for 52% of the UK gamer audience (Internet Advertising Bureau, 2014). The scope of games has expanded and now includes games that have more universal appeal. Despite this dramatic reversal of audience, certain scenarios and characters within a game may not have universal appeal, particularly those games that represent outdated gender and racial stereotypes. The practice of playing games with the associated level of competition may also be unappealing to some students.

Much of the hype surrounding game-based learning emphasises the inherent appeal of games to students, reflecting the notion that appropriating activities from students' out-of-school lives will make learning more engaging in school, and that higher levels of engagement will translate to improved learning. However, some games, particularly those designed for an education setting, can look and feel too much like school to engage learners.

Games initially carry with them a novelty factor, either in that playing games in the classroom may be new or the concepts, or characters and scenarios inherent to the game may be new and appealing. However, the game may become boring once the challenge has been mastered or may not appeal to some students on the basis of their content. A game-based learning approach, as with any other pedagogical approach, may lose its appeal if adopted too frequently.

The role of the teacher is critical to the success or otherwise of game-based learning. The pedagogical approaches that teachers adopt in game-based learning and their views of what learning is will influence how the diverse students in their classroom experience game-based learning. Such approaches invariably entail a shift in role for teachers. Teachers can feel a loss of control or a shift away from direct instruction to one that focuses on explaining how to play the game.

Time and resources are required to adopt game-based learning and develop appropriate pedagogies to support their effective use. Game selection can be a vital ingredient in the success or otherwise of game-based learning. Games need to be closely connected to the intended learning objectives and congruent with assessment. Logistics of when and where the game is played, during class time or at home, need to be addressed. Computer or video games require the use of digital technologies, which adds a layer of complexity to the classroom. For example, ensuring there are sufficient devices for the class, ensuring devices are charged, and that if the game is online, that there is adequate bandwidth. If time and resources are not sufficient, then game-based learning may not achieve the intended learning objectives.

Games are also heralded as "learning in disguise", where the learning is hidden behind fun and games, in an attempt to "trick children into learning what they have rejected by embedding it in a game. Nobody is fooled" (Papert, 2006, p. 583). Such educational games contributes to a problematic representation of learning as a nasty pill that must be sugar coated with fun and games (Papert, 2006). This suggests that the educational focus of games-based learning needs to be explicit and deliberate rather than positioning game-based approaches as "Trojan horses smuggling learning into unaware students' lives" (Beavis et al., 2014, p. 576). Further, when using games in the classroom there is a risk that the game takes over completely.

Where the learning purpose is too heavily disguised, or if the teacher does not adequately highlight it, the students may focus on the game play (Stanford & Francis, 2006) rather than focusing on the educational purpose.

Hiding the educational purpose of game-based learning reinforces the views of critics of game-based learning, including many parents, who argue that game-based learning has little if any positive impact on traditional measures of student learning (Provenzo Jr., 1991). Game-based learning is seen, by some, as frivolous, time-wasting and not "real" learning. In education systems that favour more formalised, authoritarian and didactic pedagogies, such as those in many Asian countries, it is hard to see game-based learning having any traction without more evidence of its contribution to student learning. To counter such criticism, research into game-based learning should shift towards the impact that game-based learning might have on learning processes and on student acquisition of 21st century skills like critical thinking and problem-solving, communication and collaboration, creativity and innovation, and digital technologies skills.

Critics of game-based learning also look to more general concerns (or possibly moral panics) about the perceived adverse effects of gaming. The gaming habits of some sectors of the population have been linked to rising levels of obesity (Calvert, Staiano, & Bond, 2013), online addiction (Kuss & Griffiths, 2012), and increased violent behaviours (Fischer, Kastenmuller, & Greitmeyer, 2010). There is a significant level of cultural resistance to digital games beyond education, manifested most clearly in the implementation of the *Cinderella Law* in South Korea, which bans teenagers from playing online games after midnight, and in the Chinese government's bans on the sale of games consoles (Wallis, 2011). Criticism of digital games beyond education becomes a potential barrier to those educators who wish to implement a game-based pedagogy in their classrooms. What the identification of these factors suggests is that a focus only on the features of games is at the cost of paying attention to the social, institutional and material context in which games are applied. Games do not exist in isolation and context is critical (Beavis et al., 2014; Pelletier, 2009). The introduction of games in a classroom is considerably more complex than a consideration of the functionality or content of the game.

CREATING GAMES

In many new generation computer games, players are empowered to create their own worlds, and in doing so affect the politics, culture and social aspects of the games they are playing (Lim, 2008). But rather than do this with someone else's games, young people are now able to create their own games. Game-based learning can also refer to the use of software applications that allow students to create their own digital games. Building on theories of learning that take a constructionist turn (Harel & Papert, 1991), that is, where learning comes about as a result of creating something either physical or virtual, recent research focuses on the potential for the creation of games to enhance learning. A plethora of game-making software tools

and applications, such as Gamemaker, Minecraft, and Scratch, enable even young children to create their own games. In using such tools, students shift from consumers of other people's games to "media producers, creating their own interactive stories, games, and animations" (Resnick, 2007, p. 20). Being a producer of a digital game enhances students' digital fluency (Kafai, 2006). However, this form of game-based learning is even less pervasive than the use of ready-made digital games in the school classroom, requiring even more technological and pedagogical knowledge and skills of teachers than introducing an existing game.

GAMIFICATION

If game-based learning seeks to incorporate the motivational and engaging elements offered by games by re-purposing them into "serious" educational games, gamification, by contrast, seeks to isolate and harness these beneficial game-mechanics as part of a new pedagogical approach. To be clear, the gamification of curriculum and pedagogy is not the use of games as learning tools, as with game-based approaches to learning. Instead gamification builds on the foundation established through prior approaches to game-based learning through the incorporation of game elements into the educational process, and includes the promotion of a dialogical discourse between teacher and students that aims to foster motivation towards learning tasks.

Gamification is the process of incorporating elements and characteristics from games (game-mechanics) into every day, and specifically, non-game tasks and activities. The theory of gamification is centred on concepts of challenge, feedback, reward, personal and personalised stimulation, which can be as readily applied to gaming itself as to education, marketing, as well as personal health and fitness (Hanus & Fox, 2015; McGonigal, 2011; Walz & Deterding, 2015).

Gamification theory, as described in *The Gameful World* (Walz & Deterding, 2015), seeks to promote ludic, or playful, approaches to everyday tasks and activities, achieving this through the incorporation of game-mechanics such experience point systems, achievements and achievement boards, challenges, and narrative structures. The incorporation and adaptation of these game-mechanics within a set task aims to build engagement and value with that task for the participants. In practice gamification often seeks to employ multimodal and collaborative forms to create a game world based upon enjoyable and authentic discourse.

Gamification in educational contexts could take the form of clear goals and achievements based around experience points and badges, teamwork, self-determined progression and a learner-centric difficulty curve. The gamified classroom is also heavily reliant on fast and effective communication between participants – both between teacher and students as well as between the students themselves. Rather than a single game-world being used as the learning tool, the whole classroom, curriculum and pedagogy can become the game experience. Gamification is not a tool in the educator's arsenal like learning games or laptops. It is a pedagogical and curriculum-based approach to learning capable of utilising

the learning tools available within a given learning context. There are, however, significant similarities in the effective planning and implementation of well-designed games for learning purposes and meaningful gamification in education.

Performance, achievement and social interaction are three characteristics of games that are key to any gamified approach (Bunchball, 2012, p. 2), with each of these characteristics further divided into and affected by specific game-mechanics. Performance is gauged through real-time feedback, transparency, and goal-setting; achievement is actualised via badges, levelling up, on-boarding, and mastery; and social interaction promoted through competition, and teams (Bunchball, 2012, pp. 3–5). The effective planning and implementation of gamification in a given context would strive to increase engagement in the three key areas of performance, achievement and social interaction through the adaptation and use of identified game-mechanics. One such game-mechanic identified by Beavis (2004) is the multiplayer experience.

Whether in an online game or table-top RPG (role-playing game), the multiplayer experience is an increasingly essential and complex staple of gaming. In these realms, gamers can engage with each other as combatants or collaborators, as part of a collective or as individuals – all the while consciously constructing an image of self and presenting it to their peers (Beavis, 2004). This social dynamic is not unlike that present in the average classroom. Team-based activities and group work have long been a standard part of educational discourse, along with the social pressures affecting how students interact and present themselves.

Indeed, there are many elements and practices already present in more traditional educational contexts that can be argued as already employing, or embodying game-mechanics. State and nation-wide testing provides leader boards of aggregate scoring that ranks students against each other just as any other competitive setting. Goals and "win state(s)" (Gee, 2007) are integral to any game as markers of progress and success, and well-designed assessment rubrics can provide students with clear objective markers and descriptors for achievement. Furthermore, these rubrics and marking systems are designed to be responsive to student failure as well as success. The experience of failure is a learning experience for both gamers and students, and has potential as a point from which positive growth can occur (McGonigal, 2011). While many points of crossover exist between game-mechanics and existent educational practices, the process of purposefully adapting and incorporating game-mechanics into education requires careful planning, design, and ongoing feedback between teacher and students.

GAMIFIED EDUCATION – IMPLEMENTATION AND PRACTICE

Conceptually, a gamified classroom would seek to engage students in learning through interactive and collaborative tasks and activities built upon clear goals, boundaries, and markers of progress. The effectiveness by which these goals are realised, just as for games, can be dependent on factors such as design, implementation, means

and extent of interaction, moderation and the rigidity/fluidity of rules within the gamified space.

A well-planned and executed gamified program can visualise feedback and progress to the potential benefit of engagement and authentic value to participants (McGonigal, 2011; Ramirez & Squire, 2015). This emphasis on feedback and thoughtful structuring of tasks, as well as the ability to fail and learn from that failure, are considered hallmarks of good game design (Ramirez & Squire, 2015), and are crucial for effective, authentic gamification. Beyond being thoughtful and targeted in the planning and implementation of a gamified intervention, a teacher in a gamified classroom must play an ongoing active and interactive role. Their pedagogy and curriculum must be dialogical, incorporating student responses and input alongside their own observations, training and experience as educators.

In practice, gamified learning seeks progression from the teacher modelling tasks, outcomes and behaviours, to scaffolding student participation, interaction, and finally removing the training-wheels and giving learners independence. When conducted effectively, this process is near identical to a well-designed game tutorial. The guide (teacher) will demonstrate and model competent and expert forms of participation and behaviour to the students within the context of an activity or narrative. The guide will then scaffold the students through the process of participation, as learners are given some degree of supported independence. Finally, with the tutorial over, the guide will step back and allow students to gain full independence. With this last stage at the end of the tutorial, the learners will also be given the chance to fail as part of their independence. This chance to fail is vital as a game-mechanic and part of gamified curriculum, as it provides learners with a potentially significant learning experience (Reiters et al., 2012).

Having completed the tutorial, students encounter one of the more serious stumbling blocks of gamified curriculum – are they motivated to participate further? The gamification of education seeks to harness the potential of game-mechanics to motivate and engage students in their learning, to bring about the absorption, focus and enjoyment characterised in flow theory, as discussed earlier in this chapter. Moreover, the means by which a given gamified curriculum aims to engage students, be it extrinsically or intrinsically, affects what and why certain game-mechanics are incorporated.

A large part of the allure to gamify education is the potential for gamification to tap into both extrinsic and intrinsic engagement forms and foster the flow that well-designed games produce. For this reason, the how and why gamification and game-mechanics are being used for given educational purposes becomes as important as which mechanics are employed, and what the intended outcomes are when planning a gamified curriculum. Such factors and elements are, by themselves, potentially complex issues for teachers with limited prior experience in gamified or game-based learning, and together they herald the need for extensive teacher training, support and resources for gamified approaches to learning. This additional cost in time and resources could be daunting for teachers and curriculum planners, along with the

added level of challenge stemming from the emergent nature of gamified education. Enter the allure of pre-made gamified curriculum and work units.

PRE-PACKAGED GAMIFICATION

Where there exists a need, industry will meet the need, and the growing industry of gamification consultancy is no different, with gamification.co and lithium.com providing two such examples. Both offer consultancy, books and seminars in the implementation and ongoing practice of gamification in different contexts, as well as specific pre-made gamified digital programs and work units for educational purposes, among many others. For a price, these pre-made gamified educational programs and units of work may simplify and streamline the process of planning and implementing gamification for teachers, schools and curriculum planners. Pre-packed gamified units and approaches from consulting firms are too often based on superficial and flawed understanding of key game-mechanics (Bogost, 2015, p. 68) seeking to capitalise on the gamification boom.

For gamification to be effective in educational contexts, it must be adaptive as well as reflexive in design and implementation. In theory, pre-packaged gamification may offer more accessible means of approaching the gamification of classrooms and curriculum, or at least a platform from which to plan gamified interventions. However, the success of their implementation is not guaranteed. Just as with game design, if the key game-mechanics do not match the task, learning goal, or support students' skill level, it is a poorly designed game and is unlikely to achieve the desired outcome.

Examples of Gamified Education

Although gamification is still in a relatively emergent phase of integration into educational contexts, the number of options and approaches available to teachers continues to increase with each year. Crucially, within the resources available there are significant areas of divergence – notably between the aforementioned pre-packaged gamified curriculum and those created "in house" by educators, as well as the platform/s through which students engage with them.

Vim Adventures (Linder, 2012) seeks to teach students keyboard shortcuts via a game world based on older video game motifs such as Nintendo's Zelda franchise. Students progress through a series of increasingly challenging puzzles as levelling up adds more keyboard-based solutions to their arsenal. There is prophecy, world building, and the potential for challenging other players based on score and times. It must be acknowledged that Vim Adventures, like the majority of gamified packages readily available online, takes the form of curriculum integrated within a videogame, or at least within a digital platform. Despite this reliance on specific forms of technology, which can be a limiting factor in student access, the adaptation of curriculum surrounding a program-based approach to curriculum such as

Vim Adventures may begrudgingly be labelled as gamified in a "loose and popular sense" (Bogost, 2015, p. 68). Vim Adventures and similar examples of gamified curriculum, whether or not they are digitally based, do have a practical advantage over those developed in house by teachers in terms of access to ready-made content and resources, and crucially in the time requirements for the development, implementation, and assessing curriculum. However, as highlighted previously, the relative inflexibility and often high reliance on specific forms of technology may hinder the accessibility and effectiveness of such an approach.

The alternative approach in which gamified curriculum is developed in house has the potential to be more time intensive, but also more adaptable and responsive. In his book, *The Multiplayer Classroom*, Sheldon (2011) explored a tertiary level game design class which he gamified using game-mechanics from massive multiplayer online (MMO) games. Game-mechanics such as boss and horde battles, multiplayer parties, experience points and all players starting at level one, were incorporated and adapted into the curriculum over the course of two semesters and different iterations of the class. This process of adaption and implementation relied heavily on the teacher's understanding of the game-mechanics in play as well as content, and the ongoing input of students was vital for improving each iteration of the curriculum. Furthermore, the gamified curriculum proceeded through several stages of testing and development before the teacher was satisfied with its design and implementation. Such an intense investment of time and resources may appear prohibitive for more conventional classroom settings, however, gamified curriculum that employs similarly adaptive, responsive, and multimodal approaches to education can allow for greater immersion and engagement (Sheldon, 2011).

CRITIQUE OF GAMIFICATION

In the more than a decade since Nick Pelling introduced *gamification* into the lexicon, some of the initial scepticism surrounding its use beyond marketing has faded (McGonigal, 2011; Walz & Deterding, 2015). The same is also true of its shine. A growing base of research into more traditional gamified mechanics such as badges, achievement and leader boards have yielded mixed findings. Highlighted are their potential benefits to student learning and engagement as well as potential detriment to those same areas due in large part to their use in competitive models. The potential for student competition in both gamified and game-based interventions to adversely affect student outcomes and disengage learners has been raised in numerous studies (Aesaert & van Braak, 2015; Meelissen & Drent, 2008; Volman, van Eck, Heemskerk, & Kuiper, 2005), and the use of such mechanics seen as an example of the dangers posed by gameful approaches to learning. When designed and implemented poorly, gamification becomes an inauthentic application of behaviourist principles (Ramirez & Squire, 2015). Participants' value and engagement in such a gamified task is fleeting, with ongoing benefits or interest in the activity an unlikely outcome (Lieberoth, 2015).