Masters in Serious Games Curriculum Framework

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Masters in Serious Games Curriculum Framework

Task 5.3 of the GaLA NoE

Task leader: A.G. Thin, T. Lim, S. Louchart, Heriot-Watt University

Contributors: A. De Gloria, I. Mayer, M. Kickmeier-Rust, R. Klamma, R. VeltKamp, S. Arnab, F. Bellotti, L. Boyle, R. Prada, W. Westera, S. Abbas Petersen

NoE coordinator: Alessandro De Gloria, University of Genoa

Contents

Masters in Serious Games

The aim is to develop a curriculum framework for high (Masters) level training and education provision in the field of Serious Games in order to help grow the European market by ensuring a supply of able and competent Serious Games professionals. Serious Games (SG) by their very nature are complex undertakings requiring knowledge and skills across a variety of different disciplines and the balancing of diverse and sometimes competing demands.

Definition of Terms

In order to ensure clarity and avoid confusion a number of terms that are often used with different meanings in different contexts will be defined:

Course: a unit of study

Module: a unit in a system in which each course unit carries the same number of credits (or multiple)

Programme: a set of educational components that are recognised for the award of a specific qualification

Qualification: any degree, diploma or other certificate issued by a competent authority attesting the successful completion of a recognised programme of study

Workload: indication of the time students typically need to complete all learning activities (such as lectures, seminars, projects, practical work, self-study and examinations) required to achieve the expected learning outcomes

Masters in Serious Games: used to refer to the curriculum framework being developed. This term is used in preference to "MSc" as there is the possibility that implementations may more appropriately lead to another type of degree award (e.g. "MA")

The Purpose of the Masters Programme

Historically, Masters level degrees were developed as advanced study in preparation for a career in research. However they now have a wider range of potential aims including:

- more specialised subject specific training
- issue-based multidisciplinary training
- research-based training
- preparation for a specific career

With regard to a Masters in Serious Games, multidisciplinary training and career preparation are primary considerations. However, more fundamental is the issue of breadth versus depth of coverage. There is no easy solution to this issue and at this point in time it

would be pragmatic to try and facilitate both breadth and depth by having both "Generalist" (i.e. breadth) and "Specialist" (i.e. depth) pathways in the curriculum.

Approach to developing a framework for Masters in SG

In order to facilitate the process of developing a suitable framework, four guiding principles have been adopted:

− The first is to recognise that the video game developmental process is organised around established job roles and that as far as possible these roles are reflected in the curriculum framework in order to maximise the accessibility of the Serious Games curriculum to the widest group of potential students as possible.

− The second principle is to maximise as far as possible flexibility in the way the curriculum framework can be implemented in part or whole.

− The third is to ensure compatibility with the relevant European Masters level frameworks from the outset.

− Given the wide and diverse multidisciplinary nature of Serious Games, the fourth and final principle must consider both the breadth of study and depth of study being accommodated in the curriculum framework.

Modules that Make up Curriculum Framework

Serious Games, however one chooses to define them, more often than not they are complex undertakings to produce. The production process is much more than simply the design, and requires contributions from multiple disciplines in order to be successful. Furthermore, the production of a video game can be viewed as the development of an entertainment experience over-and-above what is already a rather complex software engineering project. Similarly the production of a Serious Game can be viewed as the development of a learning experience over-and-above an entertainment video game (albeit with less emphasis on the entertainment aspect).

In considering the syllabi and its implementation, a first exploratory probe was conducted at AS1 (Alignment School 1). Feedback, particularly on the 'Team challenge' and the workshops covered materials on SG game design, SG domain and fit-for-purpose, game mechanics, process and level planning, project management, stakeholder investment schemes and consultancy. The course curriculum requirements regarding the context and content for SG courses, industry needs and programme implementation accessibility were established during AS2. The resulting core courses listed herein are aimed at redressing

the deep fragmentation of the SG infrastructure, i.e. from knowledge to deployment. The following are the core SG modules proposed for the Masters in SG:

– Nature of Serious Games

– Serious Games in Society

– Professional Skills

– Serious Games Design Core

– Serious Games Design Specialist

– Serious Games Programming Core

– Serious Games Programming Specialist

– Visual and Audio Design for Serious Games Core

– Serious Games Video Design Specialist

– Serious Games Audio Design Specialist

– Narrative in Serious Games Core

– Serious Games Production Core

– Serious Games Production Specialist

– Business of Serious Games Core

– Business of Serious Games Specialist

– Application Field Case Studies

– Individual Project

– Interdisciplinary Group Project

Learning Outcomes

In the Life Long Learning Framework "learning outcomes" means statements of what a learner knows, understands and is able to do on completion of a learning process and learning outcomes are defined in terms of "knowledge", "skills" and "competence".

"Knowledge" means the outcome of the assimilation of information through learning and is the body of facts, principles, theories and practices that is related to a field of work or study. In the context of the framework, knowledge is described as theoretical and/or factual. **Masters level learning outcomes relating to *knowledge* will involve:**

• highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research

• critical awareness of knowledge issues in a field and at the interface between different fields

"Skills" means the ability to apply knowledge and use know-how to complete tasks and solve problems. In the context of the framework, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments).

Masters level learning outcomes relating to *skill* will involve:

- specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields

"Competence" means the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development. In the context of the framework, competence is described in terms of responsibility and autonomy.

Masters level learning outcomes relating to *competence* will involve:

- manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches
- take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams

Masters Level Workload

There is significant variation across Europe in the period of study (i.e. workload) required for a Masters level qualification. In terms of ECTS credits, typically 90-120 ECTS credits are required. However, the minimum is set at 60 ECTS credits (i.e. workload of a typical academic year). The teaching staff should define the learning outcomes of each programme component, describe the learning activities and then estimate the workload typically needed for a student to complete these activities and then express it in ECTS credits. This procedure may result in different numbers of credits being attributed to single components (e.g. 3, 5, 8). By using this option, institutions allow for maximum freedom in designing each component with regard to the learning outcomes and related workload. On the other hand, components of different sizes may be problematic when it comes to multi-disciplinary or joint programmes or mobility. Alternatively, the size of units may be standardised at the outset, giving each one the same credit value or multiples of it. In this case, the units are often called 'modules'. It is recommended that in either case components should not be too small, to avoid fragmentation of a programme.

ECTS Key Documents

Course Catalogue

Includes academic information and general information for students (examples: http://ec.europa.eu/education/lifelong-learning-policy/doc48_en.htm)

Student Application Form

The ECTS Student Application Form has been developed for mobile students who will spend a limited study period in another institution. (http://ec.europa.eu/education/lifelong-learning-policy/doc48_en.htm)

Learning Agreement for mobile students

An ECTS Learning Agreement is drawn up for a semester or a year of study and must be signed by the home institution, the host institution and the student. A student should not be asked to negotiate academic recognition with individual academic staff members. (Standard Learning Agreement: http://ec.europa.eu/education/lifelong-learning- policy/doc48_en.htm)

Learning Agreement for work placements - Training Agreement

Learning Agreements for work placements or Training Agreements are also essential for work placements that are a required part of programmes. (Standard Training Agreement: http://ec.europa.eu/education/lifelong-learning-policy/doc48_en.htm)

Transcript of Records

Many institutions produce a transcript of records for each student at the end of each semester or year. The ECTS Transcript of Records is such a certification, in an agreed format. It is an important formal document, providing evidence of progress and recognition. (Standard Transcript of Records: http://ec.europa.eu/education/lifelong-learning-policy/doc48_en.htm)

Quality Assurance

The ECTS requires institutions to have formal mechanisms for the approval, periodic review and monitoring of their programmes and awards. The quality assurance of programmes and awards is expected to include:

- development and publication of explicit intended learning outcomes
- careful attention to curriculum and programme design and content
- regularly published and up-to-date, impartial and objective information, both quantitative and qualitative, about the programmes and awards offered

The implementation and use of ECTS by higher education institutions should be quality assured through appropriate processes (e.g. internal and external quality reviews and students' feedback).

(Standards and Guidelines for Quality Assurance in the European Higher Education Area, European Association for Quality Assurance in Higher Education (2005) http://www.ond.vlaanderen.be/hogeronderwijs/bologna/documents/Standards-and-Guidelines-for-QA.pdf)

Credit Framework

For a Masters level qualification a minimum of 60 ECTS credits are required over the course of 1 year of study requiring around 1,500-1,800 student effort hours. This means ECTS 1 credit is equivalent to 25-30 hours. The table 1 lists the various different modules in the framework and illustrates a number of different module combinations that go up to make the various different ECTS totals at Master's level.

Module	Scenario 1		Scenario 2		Scenario 3
	60 ECTS	60 ECTS	90 ECTS	90 ECTS	120 ECTS
	Gen	Spec	Gen	Spec	
Nature of Serious Games	4	4	4	4	4
Serious Games in Society	4	4	4	4	4
Professional Skills	4	4	4	4	4
Serious Games Design	4	4	4	4	4
Serious Games Programming	4	4	4	4	4
Visual and Audio Design for Serious Games	4	(4)	4	(4)	4
Narrative in Serious Games	4	(4)	4	(4)	4
Serious Games Production	4	(4)	4	4	4
Business of Serious Games	4	(4)	4	4	4
Serious Games Design Specialist	12	12		12	12
Serious Games Programming Specialist	(12)	(12)		(12)	12
Serious Games Video Design Specialist	(12)	(12)		(12)	(12)
Serious Games Audio Design Specialist	(12)	(12)		(12)	(12)
Narrative in Serious Games Specialist	(12)	(12)		(12)	(12)
Serious Games Production Specialist	(12)	(12)		(12)	(12)
Business of Serious Games Specialist	(12)	(12)		(12)	(12)
Application Field Case Studies #1	4	4	4	4	4
Application Field Case Studies #2	(4)	4	4	4	4
Application Field Case Studies #3	(4)	(4)	4	(4)	(4)
Individual Project	N/A	N/A	12	12	12
Interdisciplinary Group Project	20	20	30	30	40
Total ECTS	60	60	90	90	120

Table 1. Illustrative examples of various different module combinations that go to make up generalist and specialist Masters at the various different overall ECTS totals at Master's level.

Credit Transfer Framework

The Credit Transfer Framework is based on the workload students need in order to achieve expected learning outcomes. Learning outcomes describe what a learner is expected to know, understand and be able to do after successful completion of a process of learning. Workload indicates the time students typically need to complete all learning activities (such as lectures, seminars, projects, practical work, self-study and examinations) required to achieve the expected learning outcomes. 60 ECTS credits are attached to the workload of a full-time year of formal learning (academic year) and the associated learning outcomes. In most cases, student workload ranges from 1,500 to 1,800 hours for an academic year, whereby one credit corresponds to 25-30 hours of work.

Credits awarded in one programme may be transferred into another programme, offered by the same or another institution. This transfer can only take place if the degree-awarding institution recognises the credits and the associated learning outcomes. Partner institutions should agree in advance on the recognition of periods of study abroad.

Applying the Framework

The Masters Programme should be viewed as an enabler for change. It provides a strategic view of the serious games industry and workforce needs with the aim of developing sustainability for the future. The intention of this framework is to address the complexities of developing, validating and deploying serious games. By providing a clear framework of education and career development would ensure that both knowledge and the skill mix are cohesively realized.

Modernising the way in which game studies are conducted is ambitious work. However, it must also be recognised that proposing and running a new Maters Programme requires a business model that is acceptable to the Institution and its immediate agendas. With this in mind the following are guidelines from which the proposed generic Masters level framework can be adopted or adapted to ensure serious games students are well equipped to meet the challenges and opportunities of the future. Note: European Qualifications Framework for Lifelong Learning outcomes (LO's) has been utilised in the design of all course components (core, specialist, and research).

For inception of a new Masters Programme:

1. *Provide Program Description and Purpose.* This includes justification/rationale for the programme and how it relates to the mission of the Institute. This Masters Framework provides information and methods to determine the uptake on game studies for proposers to establish the needs and the requirement planning. [See: Modules that Make up Curriculum Framework]

2. *Provide a mission statement (objective) for the programme.* Include educational and learning objectives. [See: Modules that Make up Curriculum Framework]

3. *Provide a catalogue description for the programme.* This will be specific to the programme and the Institute, and is effectively a handbook which describes the core content and any other associated information. The framework suggests the implementation and use of ECTS.

4. *Provide the course requirements for the programme*. This will include all major and/or minor requirements and is typically accompanied with a sample declaration/audit form for each major and/or minor. Related curricular elements such as Advance Placement credits and limit of programme/course transfer credits are Institution dependent. However, for standardization across the EU the framework suggests the implementation and use of ECTS. Optionally, a sample academic plan for students completing the programme being proposed could be provided.

The proposed program must reflect the range of approaches (disciplinary, interdisciplinary, and/or divisional) already at the Institution. It is possible that courses can be shared, reused or merged to provide the student cohort with qualified staff in the subject area. One recommendation of the framework is to investigate where such components are already established at other institutions, and establishing any differences and/or consistencies. To this effect, the framework also suggests the possibility of joint Masters Programmes. Obviously the scope and range of modules that a given institution can offer will to a large extent dictate the range of options that they can offer. However, collaboration between institutions will be particularly beneficial in this regard. Given the extensive range of combinations of modules that can be offered, particularly in range of different specialist roles, a series of scheduling schemes have been suggested that maximise the number of potential combinations. These are shown in figures 1-5.

Beyond the scope of this framework, it would be beneficial to consider any possible areas for future academic development of this programme, to involve external reviewers, to detail resources, the governance and staff involved.

For a successful inception prior discussions with key members on their roles in the proposed programme would ensure that staff has thought through their future obligations to the faculty/department and Institute.

Redevelopment or extension of an existing course:
It is expected that at this stage, an identified need has been established. However, it requires justification for approval. The following are general steps to adhere to ensure documentation is structures and readied for review:
1. *Provide detailed course information*. It is critical that the learning outcomes must aligned with the objectives of the whole programme and not simply the course.

2. *Justification of Course*. Often the proposal would fall into one or more categories of strategic significance. This will need to be detailed accordingly. The framework provides information and methods to conduct an evaluation on the demand of such a course.

3. *Provide Course planning details*. The course/module descriptor is key as it includes details and breakdown of topics, involvement and assessment.

Beyond the scope of this framework, it would be useful to consider the organisational arrangements for the course, i.e. the managing/owning faculty/department, any collaborating faculties/departments and any other internal/external partners.

Conclusion

It is expected that across not all academic institutions will be able to run a new Masters programme in SG. However, there is scope for adoption into existing courses at the discretion of the faculty/department and the course leader. Therefore it is anticipated that selected topical units from the proposed core courses would be adopted as part of an existing course as and when it arises. The framework was intended to be flexible to cater for all circumstances and has thus been design as such.

Potential Module Scheduling Implementation Schemes
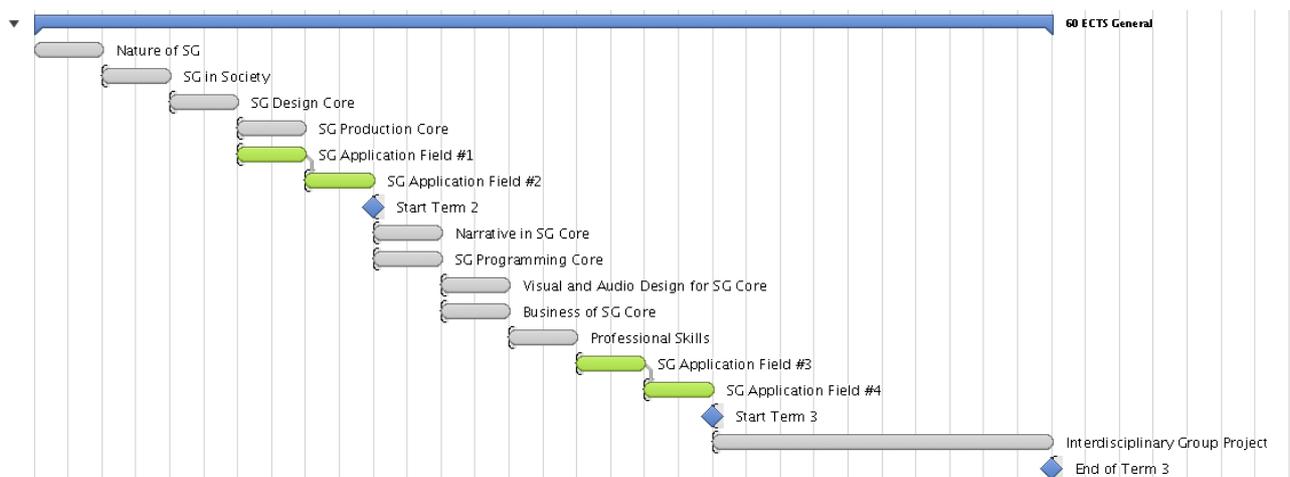
Figure 1. Potential Implementation Schedule for 60 ECTS Generalist Masters in Serious Games
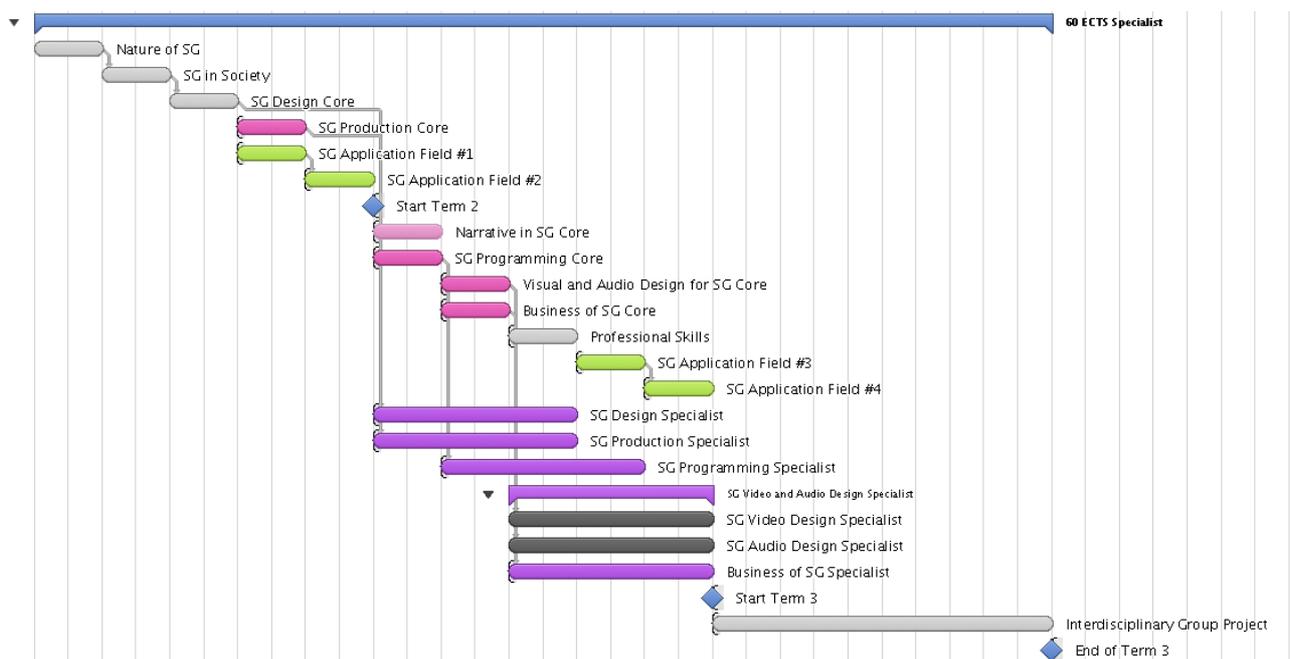
Figure 2. Potential Implementation Schedule for 60 ECTS Specialist Masters in Serious Games including options and dependencies between Specialist and Core modules
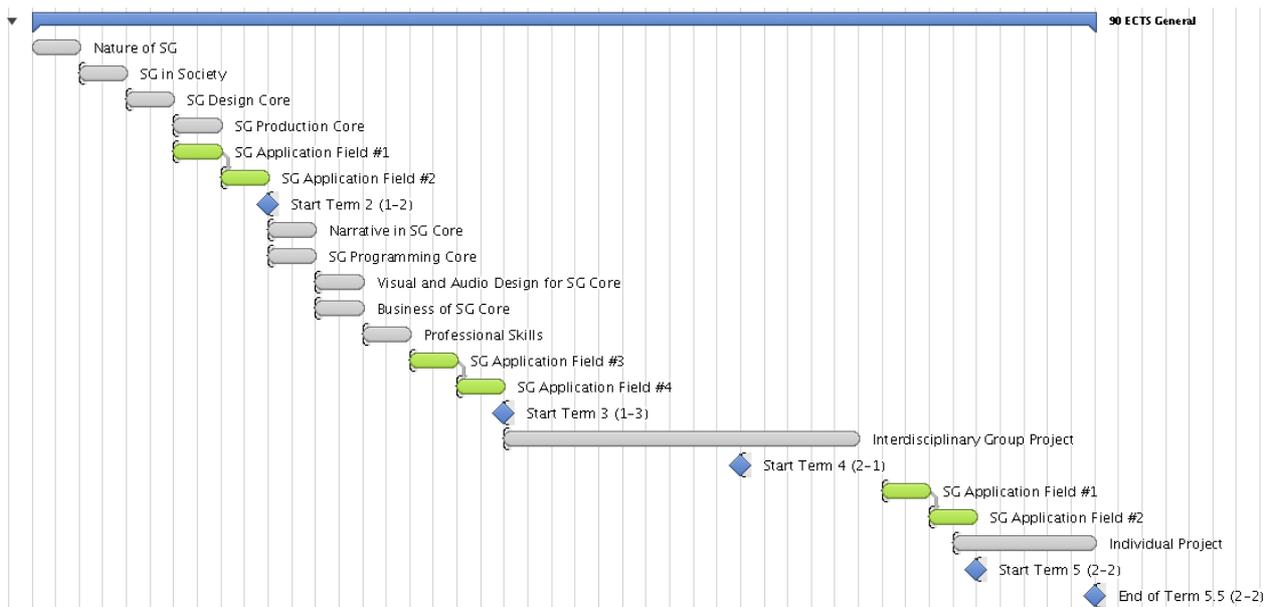
Figure 3. Potential Implementation Schedule for 90 ECTS Generalist Masters in Serious Games
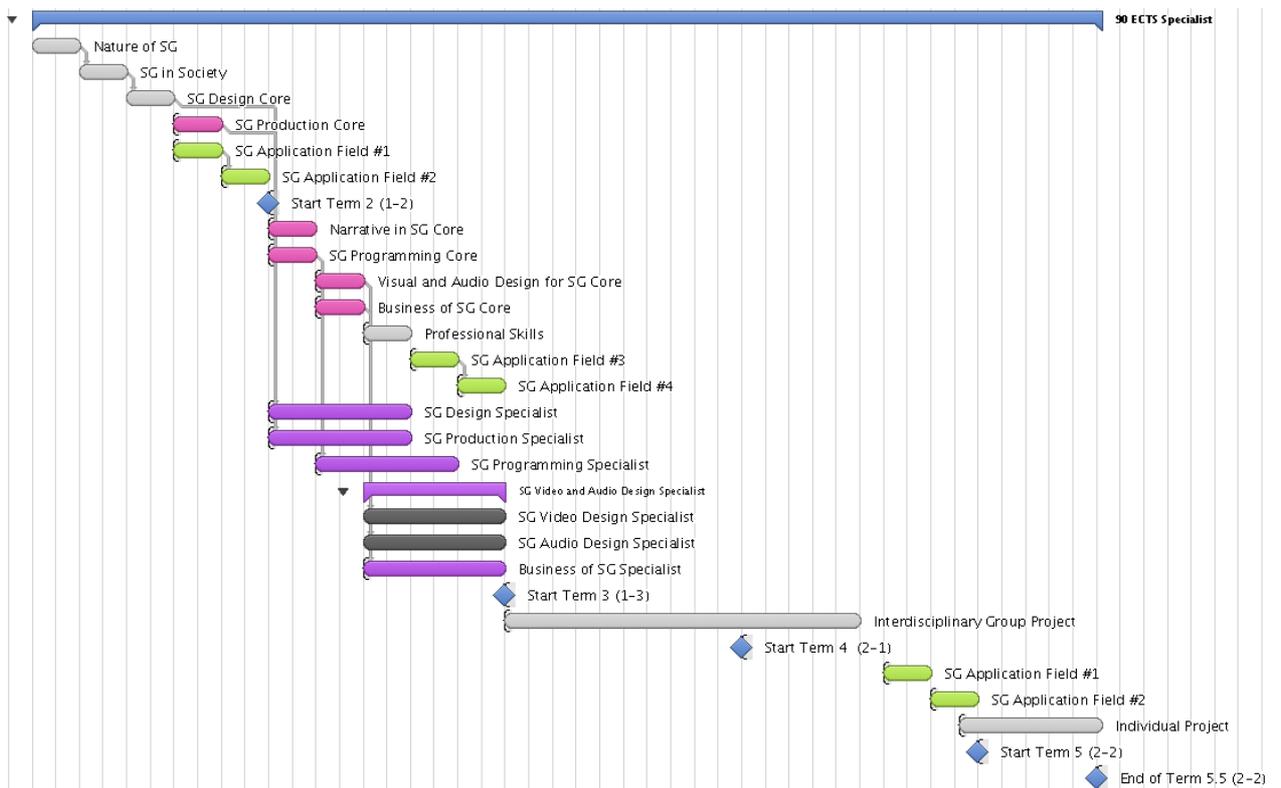
Figure 4. Potential Implementation Schedule for 90 ECTS Specialist Masters in Serious Games including options and dependencies between Specialist and Core modules
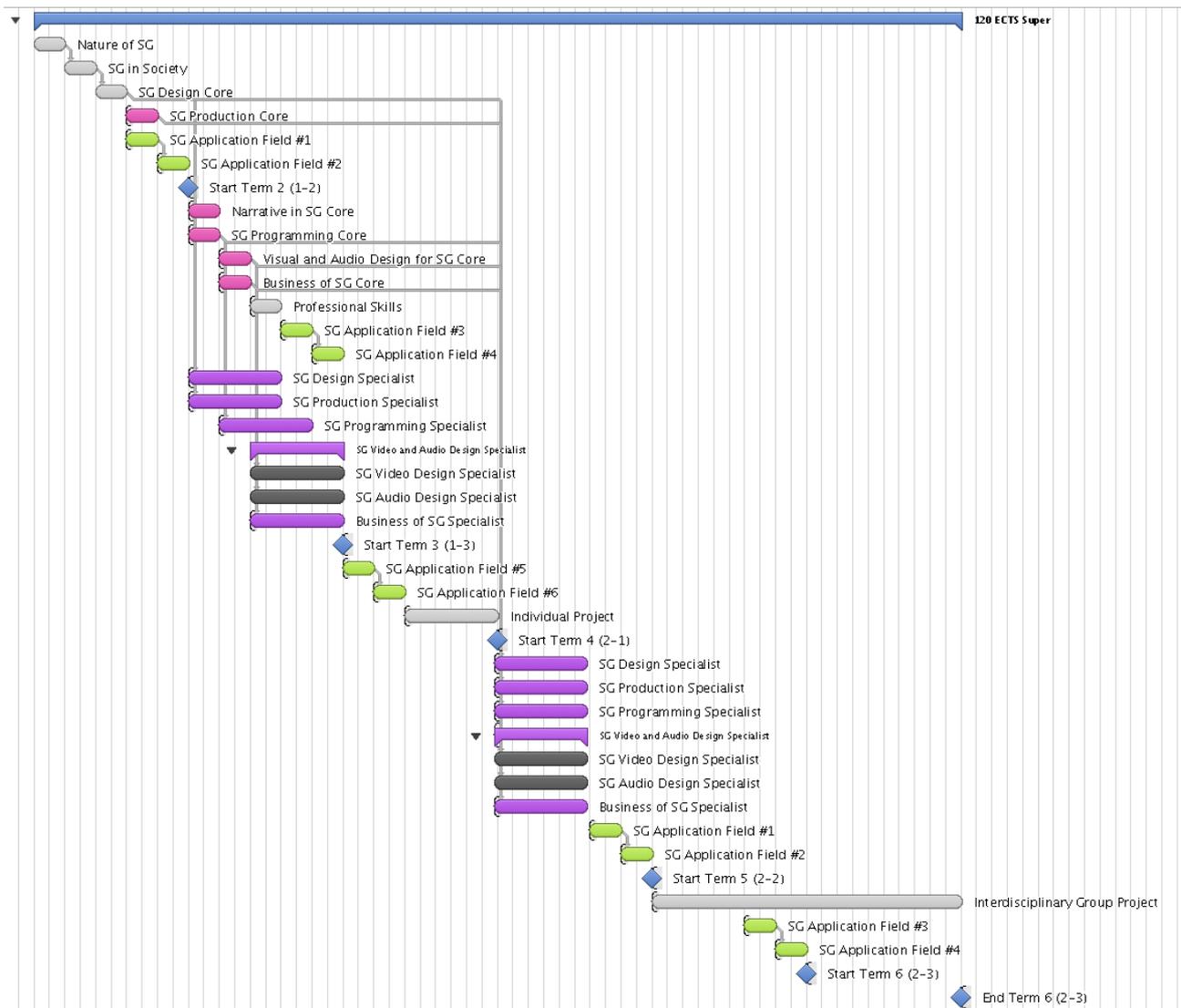
Figure 5. Potential Implementation Schedule for 120 ECTS Masters in Serious Games including options and dependencies between Specialist and Core modules

Masters in Serious Games - Individual Course Descriptors

Nature of Serious Games
Credit: 4 ECTS - 100 Hrs

Overview of Course

This course presents an overview of serious games goals, foundations and nature. Along with the definition of Serious Games, students are brought to fore on the elements critical for game-based learning, in particular the association of pedagogical goals and theories to ludology.

Content

- History of games and learning
- Pedagogical theories
- Foundations of ludology
- Serious games taxonomies
- Serious games mechanics

Learning outcomes

At the end of this course students will:

Specialist Knowledge

- understand the basic principles of ludology
- be familiar with serious games taxonomies
- understand the features and goals of frameworks for serious game description

Interdisciplinary Knowledge

- understand the meaning of pedagogical goals and be familiar with the learning theories
- be able to elaborate the foundations of serious games that link ludology and pedagogy

Cognitive Skills

- be able to critically assess a serious game from both a technical and pedagogical point of view

Practical Skills

- be able to document a serious game using appropriate frameworks
- be able to map serious game mechanics to learning processes

Mode(s) of delivery (face-to-face, distance learning)

Flexible

Any Prerequisites and co-requisites

No prerequisites or co-requisites

Recommended optional programme components

None

Recommended or required reading/resources

Books

Zagal, J.P., Ludoliteracy: Defining, Understanding, and Supporting Games Education. ETC Press, Pittsburgh, 2010

Serious Games

Any Business, Hot Shot Business, ReMission, Shortfall, Thiatro

Planned learning activities and teaching methods

- 8 weeks course; each week there are:
- 3 hours lecture (24 hours total)
- 2 hours reading (16 hours total)
- 4 hours self-study (32 hours total)
- 2 hours tutorials (e.g. tools, techniques, serious game examples/studies, etc.; 16 hours total)

Assessment methods and criteria

Final one-day hands-on assignment (5 hours) and oral exam

- 40% theoretical oral exam
    Based on knowledge outcomes on all the topics covered by the course
- 60% course work (assignments, projects)
    Making serious game studies with appropriate state of the art tools

Serious Games in Society
Credit: 4 ECTS - 100 Hrs

Overview of Course

Serious Games have a much wider societal context than entertainment games because it seeks to engage the user deeply in learning processes. As the culture of gaming changes, games and play in society present new challenges to the boundaries of cognitive aspects and perceptions. This course triangulates the social culture of gaming, the impact of game aware cognition and game design elements. The topics covered are intended to provide students with knowledge on "How Serious Games be used for formal learning, corporate training and informal learning in wider society.

Content

• Serious games design elements: audio-visual, content creation, imparting fun and motivation, impact of games on society
• Pedagogically-driven design: design process, learning psychology, pedagogical strategies, instructional design
• Assessment: effectiveness of Serious Games (game metrics/analytics) design
• Organizational adoption: training needs, technology uptake
• Methods to leverage social networks to engage people in societal issues through games

Learning outcomes of the course

At the end of the course students will:

Specialist Knowledge

• be able to distinguish design elements for entertainment games and how they apply to Serious Games
• understand the uniqueness of Serious Games in societal learning

Interdisciplinary Knowledge

• be able to recognize the psychological aspects of serious games for both formal and informal learning.

Cognitive Skills

• be able to apply serious game domain-specific knowledge to address sensitive societal issues, societal changes, formal learning and cooperate training

Management and Transformation

- be able to implement strategies for serious game design using best practices for implementing and deploying societal serious gaming formats

Professional Practice

- be able to contribute to the development and review of serious games professional knowledge and practice

Mode(s) of delivery (face-to-face, distance learning)

Flexible

Any Prerequisites and co-requisites

No prerequisites or co-requisites

Recommended optional programme components

None

Recommended or required reading

- Berne, E. (1964) Games People Play, Psychology in Human Relationships.
- Järvinen, A. (2011). State of Social in Social Games. Casual Connect. Retrieved from http://casualconnect.org/lectures/community-social/state-of-social-in-social-games/
- Mäyrä, F. (2008) Open invitation: Mapping Global Game Cultures. Issues for a Sociocultural Study of Games and Players. European Journal of Cultural Studies, 11:2. 249–57.
- Mäyrä, F. (2007) The Contextual Game Experience: On the Socio-Cultural Contexts for Meaning in Digital Play. DiGRA 2007 Situated Play Conference Proceedings.

Professional Skills
Credit: 4 ECTS - 100 Hrs

Overview

There is growing interest in (digital) Games-Based Learning (GBL), Serious Games and Simulation-Gaming (both abbreviated as serious game) entails a growing need to understand how best to control and achieve the effects intended through its use. To meet this need, specific core skills are essential for Serious Games professionals. This course presents the science, methods, tools and principles from which serious game professionals can apply and validate the practical use of serious game.

Core content

This course focuses on three interconnected serious game professional worlds: Developer, Facilitator, and Researcher.

- Effects or consequences of the application of serious game and gamification
- Professionalism and ethics
- Project dynamics: information gathering and management, preparation, execution, and moderation and debriefing of a serious game in a complex learning context
- Analysis methods: case-based reasoning, critical appraisals, short and long-term validation
- Critical reflection: design review processes, role integrity and reliability, assets and reconciliation management
- Philosophy: role of games in society, philosophy of science
- Methodology: experimental design, psychometric testing, research methods, statistics, usability test
- Tooling: game analytics, logging of data
- Heuristics literature searching and critiquing, academic skills
- Ethical framework for Serious Games Professionals
- Design of experimental interventions
- Effect of research design on results, living lab, metrics development, naturalistic research settings
- Non-invasive, not intrusive methods for Serious Game evaluation, incl. neuroscience
- Strengths and weaknesses of the clinical, Randomized Controlled Trial approach versus action research and quasi experimental approaches

Learning outcomes of the course

At the end of the course students will:

Specialist Knowledge

- be able to describe potential effects or consequences of the application of serious game and gamification
- be able to describe the roles and responsibilities of serious game developer, serious

game facilitator and serious game researcher roles

Practical Skills

- be able to formulate an initial client request into a creative, practical and/or academically sound project proposal
- be able to design an experiment that allows useful data to be gathered from the serious game play

Mode(s) of delivery

Flexible

Any Prerequisites and co-requisites

None

Recommended optional programme components

Use of serious game as a research method: e.g. crowd-sourcing, data mining

Recommended or required reading/resources

- Argyris, C., & Schön, D. A. (1974). Theory in practice: increasing professional effectiveness. Jossey-Bass Publishers.
- Bloom, B. S., Hastings, T. J., & Madaus, G. F. (1972). Handbook on Formative and summative evaluation of student learning. Studies in Art Education, 14(1), 68–72.
- Chandler, D., & Torbert, B. (2003). Condescending ethics and action research. Action Research, 1(2), 37–47. Retrieved from http://arj.sagepub.com/cgi/content/abstract/4/1/37
- Kato, P. M., Cole, S. W., Bradlyn, A. S., & Pollock, B. H. (2008). A video game improves behavioral outcomes in adolescents and young adults with cancer: a randomized trial. Pediatrics, 122(2), e305–17. doi:10.1542/peds.2007–3134
- Kickmeier-Rust, M. D., Steiner, C. M., & Albert, D. (2009). Non-invasive Assessment and Adaptive Interventions in Learning Games. Intelligent Networking and Collaborative Systems 2009 INCOS 09 International Conference on (pp. 301–305). IEEE. doi:10.1109/INCOS.2009.30
- Mayer, I. S. (2009). The Gaming of Policy and the Politics of Gaming: A Review. Simulation & Gaming, 40(6), 825–862.

Planned learning activities and teaching methods

The course consists of:

- an (online) introduction lecture

- several (online) guest lectures by serious game professionals
- one or more reflective case study
- writing a game proposal on the basis of real or simulated problem
- writing a research design for this serious game.
- number of trainings and tutorials where students organize and facilitate simple serious game sessions.
- Mandatory readings
- Workshops and tutorials
- Case studies
- Writing a research, project proposal

Assessment methods and criteria

- Continuous assessment
- Group or individual case study

Serious Games Design Core
Credit: 4 ECTS - 100 Hrs

Overview

This module will give a basic introduction to the principles and basic methodologies involved in the design of a serious game. Topics will include consideration of the learning context, player experience and learning, balancing fun and learning and the role of modelling and simulation in serious games. It will also include prototyping and play testing and design documentation and how to consider evaluation at the design stage.

Core Content

Topics will include:
- feedback, game concept, game design, game mechanics, game patterns, motivational psychology, plot and drama, rewards/incentives
- context of use, learning context, learning mechanics, pedagogy for Serious Games, Serious Games mechanics

Learning outcomes

Students at the end of the course will be able:

Specialist Knowledge

- Describe the nature of play and games
- Describe the role of motivation and emotion in games

Interdisciplinary Knowledge

- Describe player models and learning styles
- Describe learning theories and pedagogical approaches relevant to serious games

Problem Solving Skills

- Identify stakeholders' needs
- Iteratively design a prototype for a serious game
- Perform play-testing of a prototype serious game
- Document the serious game design process

Mode(s) of delivery

The course will comprise a mixture of lectures and seminars and design tasks.

Any Prerequisites and co-requisites

None

Recommended optional programme components

Game development tools

Recommended or required reading

- The Art of Game Design: A Book of Lenses. Jesse Schell. Morgan Kaufmann, 2008

- Game Design Workshop: A Playcentric Approach to Creating Innovative Games. Tracy Fullerton. Morgan Kaufmann, 2008

- Fundamentals of Game Design (2nd edition). Ernest Adams. New Riders, 2009

- Rules of Play: Game Design Fundamentals. Katie Salen and Eric Zimmerman. MIT, 2003

- What Video Games Have to Teach Us About Learning and Literacy (2nd edition). James Paul Gee. Palgrave Macmillan, 2007

- Digital Game-Based Learning. Marc Prensky. Paragon House, 2007

Planned learning activities and teaching methods

Lectures and discussion of the main topics focused on serious game design and the game development process including assigned readings.

Assessment methods and criteria

Group design project including production of a prototype including play-testing and evaluation. Assessment criteria will include the quality of the design document and the quality of the game prototype.

Serious Games Design Specialist
Credit: 12 ECTS - 300 Hrs

Overview

This module will build on the foundation of the Serious Games Design Core module and explore more advanced topics that help to enhance both the potential and the impact of serious games.

Core Content

Topics will include:
- adaptation, drama, interaction design, intervention strategies, learning objectives, learning theories, pedagogy, personalisation, storytelling
- audio design, authoring tools, balancing fun and learning, game prototyping, interface design, user needs analysis, visual design
- digital asset libraries and content management
- neuroscience, social psychology, player models, psychology of motivation

Learning outcomes

Students at the end of the course will be able:

Specialist Knowledge

- Describe the role and importance of various different game elements
- Describe how various different game elements can be combined to increase impact

Interdisciplinary Knowledge

- Describe the link between serious game mechanics and learning processes

Problem Solving Skills

- Model and incorporate dynamic systems into a serious game
- Manage player progression through a serious game
- Incorporate design features that enable a serious game to adapt to the progress of an individual learner

Professional Practice

- Engage in player-centric design
- Work in a team to collaborate on the design of a serious game

Mode(s) of delivery

The course will comprise a mixture of lectures and seminars and design tasks.

Any Prerequisites and co-requisites

Serious Game Design Core module

Recommended optional programme components

None

Recommended or required reading

- The Art of Game Design: A Book of Lenses. Jesse Schell. Morgan Kaufmann, 2008

- Game Design Workshop: A Playcentric Approach to Creating Innovative Games. Tracy Fullerton. Morgan Kaufmann, 2008

- Fundamentals of Game Design (2nd edition). Ernest Adams. New Riders, 2009

- Rules of Play: Game Design Fundamentals. Katie Salen and Eric Zimmerman. MIT, 2003

- What Video Games Have to Teach Us About Learning and Literacy (2nd edition). James Paul Gee. Palgrave Macmillan, 2007

- Digital Game-Based Learning. Marc Prensky. Paragon House, 2007

Planned learning activities and teaching methods

Lectures and discussion of the main topics focused on serious game design and the game development process including assigned readings.

Assessment methods and criteria

Group design project of a serious game to address a particular educational objective. This will include the production of a prototype and play-testing and evaluation. Assessment criteria will include the quality of the design document and critique and also the quality of the game prototype.

Serious Games Programming Core
Credit: 4 ECTS - 100 Hrs

Overview

This course presents the basics of programming (serious) games. Games are complicated programs, since they have to deal with a lot of different things, such as different input devices, graphics, interaction, networking and so on. The main governing structure of a game is the game loop, which continuously updates and draws the game world. In this course, we will focus on developing 2D games, using C#. C# is the language of choice to learn how to program. The language is very well structured and avoids some of the problems of Java. It is also a more modern language. Furthermore, moving from C# to C++, which is still the most important programming language in the game industry, is relatively easy.

Core Content

The course will deal with topics such as player input, game objects, game worlds, game states, levels, animation, physics, and intelligence. The student will be guided through the development of four games showing the various aspects of game development. Starting with a simple shooting game, we move on to puzzle games consisting of multiple levels, and conclude by developing a full-fledged platform game with animation, game physics, and intelligent enemies. We will give an overview of commonly used techniques in games, such as drawing layers of sprites, rotating, scaling and animating sprites, showing a heads-up display, dealing with physics, and handling interaction between game objects. At the same time, the course provides a thorough introduction to C# and object-oriented programming, introducing step by step important aspects of programming in general, including many programming constructs and idioms, syntax diagrams, collections, and exception handling.

- Interaction/communication between game objects: game physics, animation, interaction, input devices, artificial intelligence
- Game software engineering: game architecture, game design patterns, game engines, play testing, user-interface design
- Game programming: collections/arrays, exception handling, collision/intersection detection, object-oriented programming paradigm

Learning outcomes of the course

At the end of this course students will be able:

Specialist Knowledge

- to describe how game development differs from game design
- to construct the basic architecture of a game engine and use such an engine to produce enticing games
- to apply the object-oriented programming paradigm to the development of serious

games

Problem Solving Skills

• be able to solve programming problems by characterizing and classifying them and using known programming patterns to solve them

Professional Practice

• be able to describe 'best practices' for game development and programming

Mode(s) of delivery

Face-to-face

Any Prerequisites and co-requisites

Basic mathematical knowledge

Recommended optional programme components

None

Recommended or required reading

Learning C# by Programming Games

Planned learning activities and teaching methods

Lectures, tutorial sessions, lab assignments.

Assessment methods and criteria

Lab assignments and Exams

Serious Games Programming Specialist
Credit: 12 ECTS - 300 Hrs

Overview

The goal of the course is twofold. First, a practical introduction to programming in C++ will be given. It will also present a set of useful techniques for efficient and reusable C++ programming, including design patterns. Next, how C++ is used to implement techniques used in game engines will be discussed. At times examples will be given of specific development techniques for Windows applications (like the Win32 threads or sockets), but the course generally presents multi-platform concepts. It will look at a collection of advanced programming techniques, such as abstraction, exception handling, templates, and plugins. It will also cover game engine mechanisms such as scripting, user input management and game loops. There will also be an analysis of the structure of 3D game engines by looking at their architecture, as well as the design patterns that are applied.

Core Content

• Introduction to C++programming
• Techniques for efficient and reusable C++ programming, including design patterns
• Threading and multi-platform concepts
• Game engine mechanisms

Learning outcomes of the course

Students at the end of the course will be able:

Specialist Knowledge

• demonstrate and understanding of 3D game engine architecture

Interdisciplinary Knowledge

• to apply advanced C++ programming techniques

Problem Solving Skills

• to demonstrate advanced 3D game development

Professional Practice

• make use of common game development design patterns

Mode(s) of delivery

Face-to-face

Any Prerequisites and co-requisites

• Serious Games Programming Core
• Understanding of algebra and geometry

Recommended optional programme components

None

Recommended or required reading

Book: C++ for Game Programmers: 2nd Ed

Planned learning activities and teaching methods

Lectures, lab assignments.

Assessment methods and criteria

Series of practical assignments

Final assignment will include a presentation/demo of the game created based on a game engine that the student has developed

Narrative in Serious Games Core
Credit: 4 ECTS - 100 Hrs

Overview

This course presents methods and techniques to create compelling narratives to maximize the impact of a Serious Game. Writers and designers of interactive works to have a solid understanding of traditional narrative theory, character development, plot, dialogue, back-story, and world creation, as well as experimental approaches to storytelling in literature, theatre, and film with relevance to games. In addition, interactive storytelling requires familiarity with new tools and techniques, including the technical aspects of writing for this new medium, algorithmic storytelling, and collaborative story construction. In this Core Topic, these approaches are applied to the unique context of interactive storytelling in games.

Core Content

- 1st versus 3rd person perspectives: content generation, cost-benefit analysis, genres, narrative theories, plot-based approaches, role of storytelling for learning, story creation tools
- Implementing a story: content reuse, knowledge collection, measuring effectiveness, tools
- Abstraction, Adaption and Drama: emotional engagement, empathy, learning scaffold, measuring effectiveness, moral content, narrative grammar, perception of reality, personalization, role-playing, social content
- Defining core message: reasons for using storytelling, role of the storyteller

Learning Outcomes

Students on completion of this course will be able:

Specialist Knowledge

- to describe the role of storytelling in serious games
- to explain the operation of interactive storytelling systems
- to enumerate the most important storytelling techniques
- to explain the core concepts (characters, players, play, etc.) and their relationship to the player
- to explain assessment techniques in interactive storytelling
- to outline different storytelling tools, their strengths and weaknesses

Interdisciplinary Knowledge

- to explain relevant narrative theories (origins of narrative, from Aristotle) and practices (e.g. roleplay, theatre)

Cognitive Skills

• to decide and justify design decisions for particular storytelling applications
• to be aware of different users background (experiences, proficiency levels, …) and can use this background in storytelling
• to assess the achievement of an interactive story in terms of learning outcomes

Practical Skills

• to apply methods, materials, tools, and instruments
• to design a story for interaction with regard to serious learning outcomes
• to weave relevant content into a story
• to use different storytelling tools

Mode(s) of delivery

8-week course with weekly lecture, reading, tutorials, self-study + 2 assignment days Can be delivered completely face-to-face or almost completely online (except the assignment days, which are easier to do with physical presence)

Any Prerequisites and co-requisites

None

Recommended optional programme components

None

Recommended or Required Reading/Resources

Books

• J. H. Murray: "Hamlet on the Holodeck: The Future of Narrative in Cyberspace" (1998)
• M. L. Ryan: "Narrative as Virtual Reality: Immersion and Interactivity in Literature and Electronic Media" (2003)
• Aristotle: "Poetics" (translation)
• M. Matthias: "New Aristotelian Theory"
• Vladimir Propp: "Morphology of the Folktale" (1968)
• J. Campbell: "The Hero's Journey" (2003)
• C. Crawford: "Chris Crawford on Interactive Storytelling" (2004)
• D. Bordwell: "Narration in the Fiction Film" (1987)
• "Choose your story" (http://chooseyourstory.com)

Papers

Games

Heavy Rain, Fahrenheit, LA Noire, Journey, Facade

Storytelling Systems

• HYPDYN (Alex Mitchell, Singapore)
• Fatima (INESC ID, Lisboa, Portugal)
• DDM - Distributed Drama Management (Sandy Louchart, HWU, Edinburgh)
• youTell (RWTH Aachen University, Germany)

Planned learning activities and teaching methods

8 weeks course; each week there are:

• 2 hours lecture (16 hours total)
• 3 hours reading (24 hours total)
• 4 hours self-study (32 hours total)
• 2 hours tutorials (e.g. systems, techniques, etc.; 16 hours total)
• final two-day hands-on "assignment days" (2 days x 6 hours # 12 hours)

Assessment methods and criteria

• 50% written exams
◦   Based on knowledge outcomes
• 50% course work (assignments, projects)
◦   Writing a design for an interactive story
◦   Writing a critique of a story in a game

Serious Games Production Core
Credit: 4 ECTS - 100 Hrs

Overview

This course will be give an introduction to the effective management of the development of a serious game.

Core Content

- development methodologies (e.g. waterfall, spiral), platforms, player logging, project management, quality assurance, team working, tools
- specific Serious Games Development process (e.g. Triadic Game Design model)
- interaction between game designers and game developers
- incorporation of evaluation in the production process
- documentation, limited budget/resources, visual tools
- standards (SCORM, LMS, QML)
- balancing multiple stakeholder interests, interoperability
- core game technology background (graphics, animation, interaction, artificial intelligence)

Learning outcomes of the course

Students on completion of this course will be able:

Specialist Knowledge

- to demonstrate basic knowledge of the processes involved in the production of a serious game

Interdisciplinary Knowledge

- to demonstrate knowledge of general project management processes and techniques
- to describe the varying disciplinary perspectives of key actors in a serious games production team (e.g. pedagogical perspectives, psychological implications, etc.)

Problem Solving Skills

- be able to integrate knowledge from different fields to apply it to Serious Games production process

Cognitive skills

- be able to assess risk at each stage of the serious games production process

Practical skills

- demonstrate the use of various different project management skills and techniques relevant to the serious games production process

Professional Practice

- to reflect on student's own contribution to the team work exercise and identify strengths and weaknesses

Mode(s) of delivery (face-to-face, distance learning)

Face-to-face, mentoring, tutoring

Any Prerequisites and co-requisites

None

Recommended optional programme components

None

Recommended or required reading

The Game Production Handbook Game Development and Production Digital Games and Learning

Planned learning activities and teaching methods

Lectures, tutorials, mentoring, and a serious game production project

Assessment methods and criteria

- Coursework
- Group project
- Exam

Estimated number of hours required (student workload)

- 15 hrs Formal Classes (10 hrs lectures, 5 hrs tutorial and mentoring)
- 15 hrs Directed Learning Activities (resource-based learning)
- 30 hrs Course Work (game production project – team work)
- 30 hrs Self-Directed Study (reading, revision, exploratory learning)

- 10 hrs Assessment (exams, Presentation of project work, Pitching of game produced in the production team))

Serious Games Production Specialist
Credit: 12 ECTS - 300 Hrs

Overview

This course will focus on how to optimize and enhance the serious game production process.

Core Content

- challenges of multiple standards, practitioner involvement
- cost/benefit trade-offs, libraries, standards
- intellectual assets, out-sourcing, Serious Game company model/sustainability
- integration of serious games with other systems
- re-use of digital assets

Learning outcomes of the course

Students on completion of this course will be able:

Specialist Knowledge

- describe how the use of knowledge from a multidisciplinary setup can be optimised towards a successful serious games production

Problem Solving Skills

- be able to analyze and solve problems that emerge at any stage of the serious games production process

Practical skills

- to demonstrate application of a range of project management techniques and tools across the entire serious games production process

Management and Transformation

- manage a section of a serious games production team

Professional Practice

- evaluate the serious games production process and identify and document the lessons

learnt

Mode(s) of delivery (face-to-face, distance learning)

Face-to-face, tutorials, mentoring, company attachment

Any Prerequisites and co-requisites

Serious Games Production Core

Recommended optional programme components

None

Recommended or required reading

- The Game Production Handbook
- Game Development and Production
- Digital Games and Learning

Planned learning activities and teaching methods

Lectures, tutorials (discussions), mentoring/attachment with an existing serious games production team, project assignments

Assessment methods and criteria

- Assignments
- Case study evaluating Serious Game production team effectiveness including techniques and tools employed
- Exam

Work placement(s)

100 hours work placement as part of an existing Serious Games production team

Estimated number of hours required (student workload)

- 30 hrs Formal Classes (20 hrs lectures, 10 hrs tutorial and mentoring)
- 20 hrs Directed Learning Activities (resource-based learning)
- 100 hrs Course Work (game production project – team work)
- 30 hrs Self-Directed Study (reading, revision, exploratory learning)
- 100 hrs Field work (exploratory learning, observations – attachment with existing

Serious Games companies)
- 20 hrs Assessment (exam, presentation of Case Study)

Application Field Case Studies (Generic Descriptor)

Credit: 4 ECTS - 100 Hrs

Overview

This course will explore the nature and scope of serious games in the application domain of *specify application domain*.

Core content

The course will cover a range of different applications and examples of serious games that are currently available. It will also involving both current and future user learning needs and potential applications in the future. Consideration will also be given to current learning issues, key stakeholders and financial/business considerations for serious games in the application field. A series of case studies will be used to provide examples of both good and bad practices.

Learning outcomes of the course

Students on completion of this course will be able:

Specialist Knowledge

• to give a broad description of the serious games application field in terms of learning needs and issues, stakeholder requirements, financial/business considerations
• to demonstrate an appreciation of potential future developments and opportunities in the application field

Cognitive skills

• to identify, classify and organize needs from a range of stakeholders in the application domain
• to map needs requirements to different serious games' types and mechanics

Mode(s) of delivery

8-week course with weekly lecture, reading, tutorials, self-study

Any Prerequisites and co-requisites

None

Recommended optional programme components

None

Planned learning activities and teaching methods

8 weeks course; each week there are: - 3 hours lecture (24 hours total) - 2 hours reading (16 hours total) - 4 hours self-study (32 hours total) - 2 hours tutorials (e.g. tools, techniques, serious game examples/studies, etc.; 16 hours total)

Assessment methods and criteria

- 30% exam
- 70% course work (assignments, projects)

Individual Project
Credit: 12 ECTS - 300 Hrs

Overview

Given that the Serious Games field is still rather experimental in nature, much knowledge is contested and there is a need for more research training. In a setting where there more time/a longer period of study is required/expected, the inclusion of an Individual Project that allows for more in-depth study/research with a more narrow focus.

Core content

A project description and a project plan must be defined by the student, in consultation with his/her supervisor. The project will then be implemented by the student and concluded by writing a report and giving an oral presentation.

Learning outcomes of the course

Students on completion of this course will be able:

Specialist Knowledge

Depending on the type and topic of the project, one of the following:

• to apply serious game design knowledge in a game research project
• to apply serious game programming knowledge in a game research project
• to specify and realise video components in a game research project
• to specify and realise audio components in a game research project
• to design and realise narrative elements in a game research project

Interdisciplinary Knowledge

• to deal with one or multiple disciplinary perspectives in a serious game research project
• to synthesize theories from different disciplines into purposeful gaming research solutions

Problem Solving Skills

• identify and formulate a research problem
• analyse the problem, and describe alternative solution approaches
• assess alternative problem solving strategies, and choose among them
• implement, test, and evaluate a chosen solution
• verify the results with respect to the problem

Management and Transformation

- write a project plan that fits with the chosen development methodology
- apply project discipline during project execution
- identify problems and risks at an early stage and act upon these
- communicate about project execution with project supervisor and stakeholders
- monitor project progress and apply quality assurance processes

Professional Practice

- link theories with practical work
- make substantiated design decisions based on scientific evidence, while taking into account practical constraints
- select and use required methodologies and tools
- deliver agreed results timely and in accordance with agreed criteria

Mode(s) of delivery (face-to-face, distance learning)

The model of delivery is either face to face, or online distance tutoring, reporting, and assessing. Although face-to-face meetings are preferable, their feasibility will be low in a cross-European setting.

Any Prerequisites and co-requisites

For participation in the project, the students should have completed at least 8 core modules of the curriculum, one of which is a specialist module. Alternatively, work experience or courses completed elsewhere can compensate for this.

Recommended optional programme components

Part of the project can be a short stay at the location of one of the stakeholders. For example, the student can stay at a company or institution that provides data that is relevant for the project.

Recommended or required reading

The supervisor will provide a list of suggested reading, depending on the specific topic of the project. The student takes that as a starting point for doing a literature study or state of the art review.

Planned learning activities and teaching methods

To be defined specifically per project.

Assessment methods and criteria

Assessment will be done based on:

- the quality of the work delivered
- the quality of the report
- the quality of the end presentation
- the project management skills of the students (e.g. being able to finish on time, being able to write a useful planning etc)

Specific assessment criteria may be defined depending on the project.

Work placement(s)

The work can be done are a variety of places. Research projects are performed at the university, a knowledge institute, or a research department of a company. Development and design projects are performed at, or in close collaboration with, the primary stakeholder.

Interdisciplinary Group Project
Credit: 20/30/40 ECTS - 500/750/1000 hrs

Overview

Interdisciplinary team-working as an essential part of the Serious Games design and development process. This interdisciplinary project is intended to give the students the opportunity to engage in a full serious game design and development process, while they have to deal with the complexities and problems of serious game design and the technical and practical constraints associated with it. The project reflects an open, highly self-regulated learning process, which needs careful planning and organisation and also a clearly defined scope in order to ensure that it is reasonably achievable in the time available. The project anticipates the facilitation of inter-institutional team-working to ensure sufficiently broad-based groups of students to ensure the success of the Masters initiative.

Core content

The purpose of the interdisciplinary project is to offer students an integrative learning setting about serious game design and development. In the project the seven specialist roles that are identified in the Masters curriculum are to be covered by students:

• Serious Games Design Specialist
• Serious Games Programming Specialist
• Serious Games Video Design Specialist
• Serious Games Audio Design Specialist
• Narrative in Serious Games Specialist
• Serious Games Production Specialist
• Business of Serious Games Specialist
The role of project leader is covered by the serious games production specialist.

Learning outcomes of the course

Students on completion of this course will be able:

Specialist Knowledge

Depending on role assignment

• to apply serious game design knowledge in a game development process
• to apply serious game programming knowledge in a game development process
• to specify and realise video components in a game development process
• to specify and realise audio components in a game development process
• to design and realise narrative elements in a game development process
• to arrange and lead the process of serious game production
• to specify exploitation models and develop business opportunities for serious games

Interdisciplinary Knowledge

• to deal with different disciplinary perspectives in a multi-disciplinary serious game design project
• to identify a shared common ground while being aware of the limitations of their own knowledge
• to exploit the potential added value of working in a multidisciplinary project
• to synthesize theories from different disciplines into purposeful gaming design solutions

Problem Solving Skills

• identify and analyse problems in a collaborative problem context
• describe a shared understanding of the problem
• define and assess problem solving strategies
• define and assess solutions while taking into account differences between contributing disciplines

Management and Transformation

Depending on task assignment

• write a project plan that fits with the chosen development methodology
• apply project discipline during project execution
• identify problems and risks at an early stage and act upon these
• communicate about project execution with project participants and stakeholders
• monitor project progress and apply quality assurance processes

Professional Practice

• link theories from different disciplines with practical work
• make substantiated design decisions based on scientific evidence, while taking into account practical constraints
• select and use required methodologies and tools
• deliver agreed results timely and in accordance with agreed criteria

Mode(s) of delivery (face-to-face, distance learning)

The model of delivery is online distance collaboration and tutoring. Although face-to-face meetings aren't necessarily excluded, their feasibility will be low in a cross-European setting. Therefore a shared workspace for project groups will be made available for collaborative work and tutoring.

Any Prerequisites and co-requisites

For participation in the multidisciplinary project the students should have completed at

least 10 core modules of the curriculum, one of which is a specialist module. Alternatively, work experience or courses completed elsewhere can compensate for this via APL (Assessment of Prior Learning). Having 7 students available for the 7 roles would be a main prerequisite. However, smaller groups are allowed if appropriate role-rotation is applied and total workload is reduced proportionally. The minimum group size is 4 students in order to maintain the challenges of multidisciplinary collaboration.

Recommended optional programme components

None

Recommended or required reading

Searching for appropriate and topical scientific articles will be an essential part of the learning activities, in particular for substantiating design choices, decisions about methods and tools, evaluating the outcomes and the writing of documentation reports and a conference paper. A number of basic references will be available from the start. Also the tutor may guide students to relevant literature.

Planned learning activities and teaching methods

The project is composed of the following main activities, the core of which may be carried out partly in parallel and iteratively.

Project Initiation

The project will start with lining up activities of the students. The student introduces themselves and express their personal ambitions and goals. A basic problem case will be devised by the students as a starting point for the project. It is strongly encouraged that authentic educational problems or ambitions derived from the students' own work context or professional network are used for this. Ideas for creating a serious game are generated, one of which will be selected as the target of the project. The students agree to adopt the various roles (they are allowed swap between whiles) and take responsibility for activities and output. Upon task specification and distribution of responsibilities the workload should be estimated and equally distributed among students. The outcome of the line-up is a project outline covering logistics, task distribution and responsibilities. A central issue in the project outline is the definition of the core research question to be addressed. Quality management and communication are indicated. The project arrangement and tasks will be discussed and allocated and an overall schedule will be made.

Needs assessment and requirements analysis

Outcome: Project Plan

This activity requires a thorough problem and context analysis. Starting from an authentic problem case is highly recommended. Students analyse the educational problem context: e.g. its current pedagogical approach, the advantages and disadvantages of current practice, the goals pursued, the ambitions that can be identified. They also explore how a serious game could be positioned as a solution, what possible constraints go with such a serious gaming solution, and what advantages. Critical success factors and risks are

identified, as well as contingency measures. The approach will preferably be user-centered, that is, representatives of the end-users will be involved and appropriate instruments should be selected. The output of this activity is a project plan, including a business case, detailed task allocation and milestone planning.

Serious game design

Outcome: Functional Game Design Plan

The design starts with an evaluation of design methodologies and a substantiated choice for an approach e.g., Annetta, 2010 (6 nested I's); Harteveld, 2011 (Triadic game design); De Freitas et al., 2010 (Four dimensional framework); Gunter et al, 2008. (RETAIN); Nadolski et al., 2008 (EMERGO); Schell, 2008 (100 Lenses). The serious game design should address learning goals, pedagogical strategy, learning activities, feedback and support, game play/narrative, game content specification, reflection/debriefing, adaptivity, interaction and presentation style, required technologies, runtime conditions, practical constraints and a specification of usage conditions (hardware, software, infrastructure, budget, time, integration in user context). The output of this activity is a functional design document of the pursued serious game, including a graphical mock-up.

Content development

Outcome: Content Assets and Report

The output of this activity is the content components of the game (e.g. video/audio/text assets). Exploration of existing contents (based overall game design). Decisions about re-use or content creation. Legal issues/copyrights. A substantiated choice of production tools is required. Elaboration of game narrative elements. Possibly scriptwriting for text, audio and/or video, animations. Recording and editing. Asset delivery, including 2D or 3D objects/spaces. The outcome of this phase is a set of required content assets and a report explaining content creation decisions.

Serious game application development

Outcome: Technical development plan and serious game beta-release

This activity produces a technical development plan which covers the technical design, including components, interfaces and architecture, a substantiated selection of technologies, and a detailed planning and milestones. Activities include technical development of components, the implementation of game rules, assembly of a technical prototype, content assets conversion and import, server configuration, technical testing and functional testing. This activity realises a beta release of the game.

Serious game evaluation

Outcome: Evaluation Report

This activity start with a methodological design and selection or creation of required tools. The evaluation includes collecting user data for validation, both qualitative and quantitative. The evaluation checks to what extend the problems are solved and project goals are reached. The evaluation includes effects on learning, appreciations by end-users, feasibility of the business plan, feedback from stakeholders (if available), integration

in learning context/curriculum, runtime arrangement.

Implementation and Business Plan

Outcome: Implementation and Business plans

Implementation and usage of the game is highly recommended (but may not always be possible), In all cases an implementation and business plans should be composed, which describe the practical and financial conditions of game implementation, e.g. arrangement of technical conditions, staff conditions (training), helpdesk, marketing, scale issues, partners, costs, funding.

Assessment, reflection and debriefing

Outcome: Conference Paper

This activity includes the self-evaluation and peer-evaluation of both at the group level and the individual level. The evaluation includes the learning gains, the performance and the quality of deliverables. The self evaluations and peer evaluations involve are fed into groups discussions. The process is guided by a tutor. In addition the tutor and/or examiner assesses the quality of deliverables, group performance and individual learning.

Assessment methods and criteria

An assigned examiner will be responsible for summative assessment. The assessment will be based on the various deliverables, viz. design documents, reports and the realised game instance. The assessment will target individual mastery, but also includes group performance. For the assessment a set of subtasks and associated criteria will be used in a grading rubric. Deliverables to be assessed and the associated criteria:

- Project Outline
  - problem case outline
  - tasks and roles distribution
  - core research question
  - quality management, logistics and communication
  - schedule
- Project plan
  - problem and context description
  - problem and context analysis
  - substantiated serious gaming solution
  - end-user involvement
  - description of constraints and boundary conditions
  - CSFs, risk assessment and contingencies
  - business case outline
  - planning
- Functional design plan
  - design methodology
  - learning goals specification
  - pedagogical design and scientific evidence
    - target group description
    - learning activities

- ▪ feedback and support measures
- ▪ reflection/debriefing
  - ◦ game and interaction design
- ▪ game play/narrative
- ▪ game content specification
- ▪ adaptivity and interaction
- ▪ presentation style
  - ◦ required technologies
  - ◦ runtime conditions, constraints and usage conditions
  - ◦ graphical mockup
- • Content assets report
  - ◦ search for reuse of existing content
  - ◦ copyright issues
  - ◦ tooling
  - ◦ content design
  - ◦ content assets
- • Technical development plan
  - ◦ technical design
  - ◦ a substantiated selection of technologies,
  - ◦ detailed planning and milestones.
  - ◦ technical development of:
- ▪ components,
- ▪ implementation of game rules,
- ▪ assembly of a technical prototype,
- ▪ content assets conversion and import,
- ▪ server configuration,
- ▪ technical testing and functional testing
- ▪ runtime management
- ▪ a beta release of the game
- • Serious game evaluation (evaluation report)
  - ◦ methodological design
  - ◦ selection or creation of required tools
  - ◦ user data collection
  - ◦ game evaluation
- ▪ project goals
- ▪ effects on learning,
- ▪ appreciations by end-users,
- ▪ feedback from stakeholders (if available)
  - ◦ feasibility of the business plan
  - ◦ integration in learning context/curriculum
- • Implementation and business plan
  - ◦ arrangement of technical conditions,
  - ◦ staff conditions (training)
  - ◦ helpdesk,
  - ◦ marketing,
  - ◦ scale issues,
  - ◦ partners, costs and funding
- • Project evaluation report
  - ◦ self-evaluation and peer-evaluation of performance both at the group level and the individual level:
  - ◦ learning gains,

- ◦ performance
- ◦ quality of deliverables.
- A conference paper

In case of two or more parallel groups of students working on different projects mutual peer group evaluations will be arranged (one group assessing the other). Formative assessment includes peer feedback and guidance by a tutor.