Game Design Learning-Developing AMobile Game

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Abstract. In the digital multimedia curriculum, the practical project of creative productions isassumed to be the learning attainment in the process of integrating and applying of learning. This research adopted studio-based pedagogy to establish a project group of fourmembers and a mentoring teacher. They usedFacebook to create a discussion group and made it the major communication channel. Based on the discourse analysis, this research focused on the case study of the interactive e-portfolio for three consecutive semesters. Thispractical project of creative productions provided the experience of game design and social actionsto the students, and was devised to comprehend different stages of the social interaction and creativity. The results of this research will be the reference of teaching plans forfuture curriculum design.

Keywords:discourse analysis • social construction • game design learning • mobile game design

1. Introduction

The design thinking in 21st century prefersproactive and in action design. Teachers are no longer on the central stage in design education. In fact, the situation or topic has been explored from multiple perspectives [12]. The new development of curricula and teaching/learning is open-minded, active, relevant, creative, and system-oriented [4]. The social network of Facebook as a community is established to break the limitations of classroom learning. It advances the relationship between teachers, students, and peers [11]. It also combines the learner's social network with learning. The teacher's role becomes anobserver and sometimes to inspire possible ideas and development through Internet interactions. The student's learning and social network plays a role on the central stage of teaching strategy. Students become the active designers to produce knowledge and participate in the social network of designing. Students can creatively and collaboratively solve complicated and open-ended problems. They work together on media projects to better develop their abilities of participation, cooperation, and sharing of expertise and critical thinking skills. This case study applied studio-based pedagogy to establish a group of four members and a mentoring teacher. This researchhas analyzed the development of designing a mobile game for three consecutive semesters and the members' social network onFacebook. It also explored and discussedthe influential factors of studio-based pedagogy of game design learning on thecreative process and the learner's constructionof a social network on Facebook.

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2. Related literature

2.1 Studio-based pedagogy

A studio-based pedagogy basically establishes situated learning. Its teaching objective is to guide the students through the designing process and simultaneously teaching them how to design [8]. In this pedagogy, the student is trained as a designer, to develop his/her design concepts and understanding of the design process, and which also promotes design ideas. In studio-based pedagogy, the student has to perform the project-oriented tasks and to solve complicated and open-ended problems.The student can plan and re-plan the design in a fast tempo after facing frequent formal or informal criticism. The heterogeneous problems, creative applications, and limitations have to be put into considerations precedent all media design.

2.2 Argumentation

The argumentation on educational issues recently has attracted increasing interests. The critical part of establishing the argumentation is the inquiry and collaboration. The process of argumentation allows students to have new comprehension, restructuring problems, creatively solving problems, and to become co-creators of knowledge [2].The learner works in a collaborative environment, exposed to interactive demonstrations, problem-solving oriented, and metacognition reflection and consensus establishment. This process includes a dialectical thinking of inquiry, reflection, liberation, and reconstruction, and constant adjustment and assimilation through interacting with others[10].

2.3 Learning community ofFacebook

Asinformation, communication, and cloud platform development progress, a mix of these technologiesis also involved in the learning process. The computer aided collaborative learning issuitable for self-management and problem-oriented learning [3]. The learner should be the center of a situated learning environment. Facebook can be an interactive resource center which integrates university courses to advance communication and interaction [9]. It provides the flexibility of conveying course content [7]. The learner establishes his/hermultilateral relationship with the community, peers, the mentoring teacher, and experts,collaboratively learning with them in this co-constructed environment.

2.4 Discourse analysis

The language is no longer just a vehicle of information exchange, but also gradually seen as a channel of understanding the social complex and the reality of organization construction [6]. It also provides a hierarchical system andcontextual meaningsof personal experiences[1]. Collective forms of discourse are viewed as the product of many mutual interactions[5]. Through discourse individual beliefs, practices, and knowledge can construct integrity and offer a way of sharing understanding of the existing world [5].Achtenhagen and Welter[1]constructed three stages of the discourse analysis: to analyze a wide range of discourse to find out the general discourse patterns andthe hidden data; to analyze the cross-leveled discourse focused on the primary and secondary discourse topics and the conveyed images through language; and to connect discourse and context, and to analyze the relationship between the subjective and objective data. In this discourse analysis, the mission is to explore the relationship between discourse and reality.

3. Methodology

Through developing and constructing a game design project, the entire program has guided and taught students how to designdigitally. In the end, the authors adopted the discourse analysis to analyze the learning process through the student's social interactions on Facebook by using communication technology and the community to communicate, coordinate, and collaboratively learn their subject matter.

3.1Participants

The participants of this research include fourjunior students majored in digital content design (DCD, the Department of Digital Content Design, Ling Tung University, Taiwan) andwho started working on the graduate project of designing and developing a game for the mobile platform.

3.2 Course design and objectives

This research is based on studio-based pedagogy. The goal of this course is to train the student's ability to solveproblems,as well asapplying and integrating learned skills and knowledge. Their task was to develop a game on the mobile platformand to establish a situated learning phase of three consecutive semesters (second half of junior and entire senior years). There were three stages of this learning phase: planning, producing, and arranging exhibitions. In the planning stage, they have to write a project plan, to explore related sources and references, to structure a story of the game, to set an artistic stylefor the characters and scenes, to draw storyboards, to plan an interactive game playing structure,create a flowchart, and to set a production schedule on the Gantt chart. The production stage includes the animatic script, gesture and movement design, scene rendering, programming, sound design, post-production editing, andmodification and changes.In the last stage, arranging exhibitions, the team's works includes the poster design, promotional videos, and merchandise design. The learning activities before the program execution consist of observing the Young Designers' Exhibition and collecting inspiring ideas. During the production stage, the industry consultantwould provide practical perspectives for studentsin order to understand the requirements of industrial standards in the real world. In the second half of their senior year, students are required to arrange, display, and demonstrate their productions in exhibitions. While participatingin off-campus exhibitions, the students would be required to train themselves toanswer questions from their audience. In the last stage of attendingthe Young Designers' Exhibition and contests, students would observe and learn from others, and would be trained on how to respond to contest judges and the audience.
Studio members comprise of a mentoring teacher and four students in the DCD to establish a Facebook community as a method of communication and coordination. Files are shared throughthe cloud storage service provided by Dropbox.Flash CS 6 ActionScript 3.0 is used as a development tool. The mentor/teacher guides students to find solutions through complex and open-ended problems in design.Through the exchanging of ideas inthe group, a proposal is presented, theanimatic is created, and production is completed over the course of three semesters.Nine teachers of the department guide the learner to consider the integrity of the heterogeneityof a production so that they can identify available resources andcreate new ideas, further advancingtheir critical thinking skills and ability to transform. With limited time andresourcesintechnology, they can explore all the possibilities.

3.3 Learning evaluation criteria

The evaluation criteria is set explicitly and announced to students in a written document:In the second semester of the junior year, the planning stage is to be

completed. During the first semester of the senior a third of the production is to be completed and graded for the midterm. During the same semester the whole production is to be completed and graded for the final. . In the last semester of their senior year,all the publicity design and exhibitions (inside or outside school and the Young Designers' Exhibition) will be graded. The evaluation is the average of grades provided by all the colleagues in the department.

3.4Game design content

3.4.1 Game story

The game title "Evil Rush" is derived froma metaphor which means to drive away demons inside people's minds. The creative idea wasinspired by a Taiwanese religious belief that: "peoplewho dobad will go to hell", integrated with morality and loyalty. The core concept is "One will get punishment relativeto the bad things done. Men should have the courage to admit wrong doing, ruminate, and demonstrate good behavior to have a bright future." This game'splot depicts a story of the god of death and a gang member. Yama (the god of death) saw gangs disturb common people's liveseverywhere, so he listed all their wrong doings on theDeath Book. Topunish the devious gangs, Yama ordered the Hey-Bian-Wu-Chang (god of Impermanence) to sendthe mafia boss to the hell. One of hisloyal gang members wanted to rescue his boss and begged Yama redeem his lifeand return himto the human world. Yama saw the repentance of mafia boss from the Evil Mirror and would permit him to return to human world under three conditions:one would risk going to hell,find the Pan Guan-Bi (Judgmental Pen), and defeat the avatar of Yama. If someone couldcomplete these three missions, he/she would have the right to reverse the fate of mafia boss on the Death Book. One of the gang members, Lee Kun-Kun, jumped into the hole of hell and began his adventure to rescue the mafia boss. The mafia boss repented while in hell and turned to good behavior. Lee Kun-Kun attained the Pan Guan-Bi to revise the Death Book. Both of them escaped from the hell and returned to the human world. Since then, the mysterious figure, the mafia boss, did good deeds everywhere he went.

3.4.2 Game design and development

This game's design and developmentcan be divided into five stages: pre-production,planning, production, testing, and publishing (Fig. 1). On the start page (Fig. 2) are listed the different missions available to the player and they do not need to be done in order. The level design consists of five levels. Each level begins with a reel of task tips which explain the rules and the mission, including thedifferent interactive modes for each mission. The character and scene design integrate the Chinese motives and inferno elements of religious legends to increase interest in the game (Table 1).

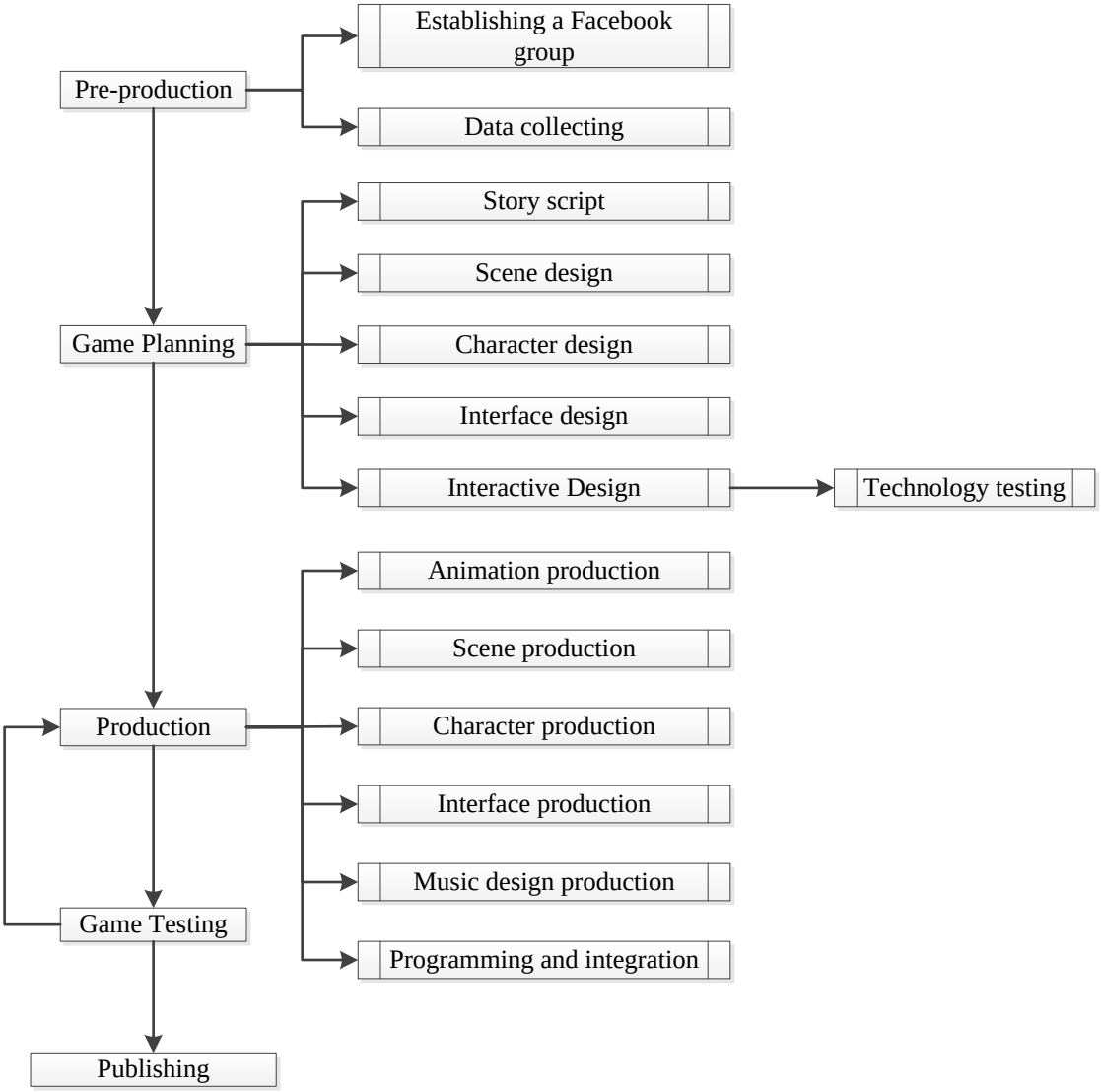
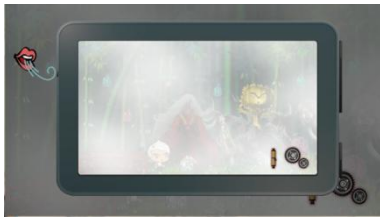
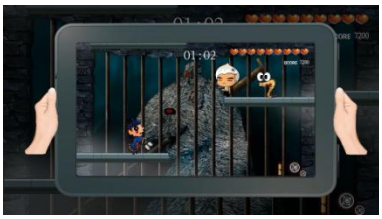


Fig. 1 Game design and development flowchart

Fig. 2 Start page design

Table 1 Level design

Level design & Inferno element	Mission	Interactive mode
Misty Terror	The player has to blow air into the microphone port. The longer the blowing, the quicker the mist clears. The puzzle has to be solved before entering into another level.	
Blood River Inferno	Lee Kun-Kun moves forward automatically. The player can “tap” to jump the character. The player should keep the character from touching the traps and falling into the blood river.	
Abyss	Lee Kun-Kun is falling down and needs to dodge the monsters. In this level, the character must gasp the critical item--Pan Guan-Bi (Judgmental Pen)	
Oil Pan Inferno	Lee can use bubbles to jump up. Blue bubbles are for going up and red bubbles take Lee’s points down.	
Ice Inferno	Yama (god of death), where are you?	
Under-world palace	With limited time, the player must slide away Yama, extra points for sliding Hey-Bian-Wu-Chang (god of Impermanence), Nu-Tau (Cow Head god), or Ma-Mien (Horse Face god).Yama can attack with bombs.	

4. Discourse analysis and Results

In discourse analysis, the task is “to explore the relationship between discourse and reality."The content of this discourse analysis includes any form of text, file, or image of the learning process in the community of Facebook.The authors list examples written on Facebook and describe the meaning implied, and analyze the critical concept of each stage and the related social interactions (Table 2). The results are showed in a concept map of the critical factors of game design and their relationships (Fig. 3).

Table 2 Discourse analysis of learning process: examples

Description (media analysis)	Interpretation (processing analysis)	Explanation (social analysis)
The graphic is ok. Animatic frames have to be tested if fluent	Storyboard discussion	Peer criticism
Sie Ya Yun:You have scene designs of two levels. Don’t you remember? The first and the fourth. I did not see the fourth last time. Huang Rezung: I know. I am drawing them. I will not finish them. I am so bored. Owww!!:((Sie Ya Yun: Cheer up! :))~	Distribution and progress	The leader supervises and encourages her team members.
Wong Yi Wen: Problem for now: I don’t know how to make it work to step on the ladder in the second level. I don’t know how to do it. Mentoringteacher Wu: The ladder problem resides at the registered point of the protagonist. It should be on the feet. However, the registered point of the ladder is above them. If you set them on the middle, it will cause problems.	Encountering programming problems. The teacher explains cause of the error.	Exchange of views between mentor and students to find the solutions
Consulting industry consultant ◎Color chart for different ages ◎Refinethe important objects ◎Bright and dark sides to make something appear 3D ◎Refine the major characters	 Original version Improved vers	Interaction between students and the consultant for practical understanding of the industry requirements and detailed correction
Proposal and presentation	Each teacher offers his/her views to the students to revise the details previously ignored	Students and jury teachers
Contests outside the school	Presenting the best expression of their work and learning from other entries.	Attendants and judges
Exhibitions outside the school	Explaining and demonstrating game play to an audience of different ages	Exhibitors and spectators

5. Discussion

5.1 Game design learning

In the concept map of the learning process (Fig. 3), the game design learning is for learners to prove their knowledge and skills. It is not the same as cognitive learning, but a learning way of integrating cognition, affection, and skills. The entire design process required self-awareness from the student designers to understand the views of others such as peers, teachers, judges, and the audience (to replycorrespondingly), face the problems, and figure out the best solutions. To best express the student's affection, the student has to get along with peers and communicate with the teachers, the judges, and the audience in a decent and proper manner. The students learn or get a single technical training forsoftware skills, but the practical project of media designing offered an experience of goal-oriented integration of skills and knowledge. It encompasses an interdisciplinarytrainingand learning of art, music, programming, and technology.

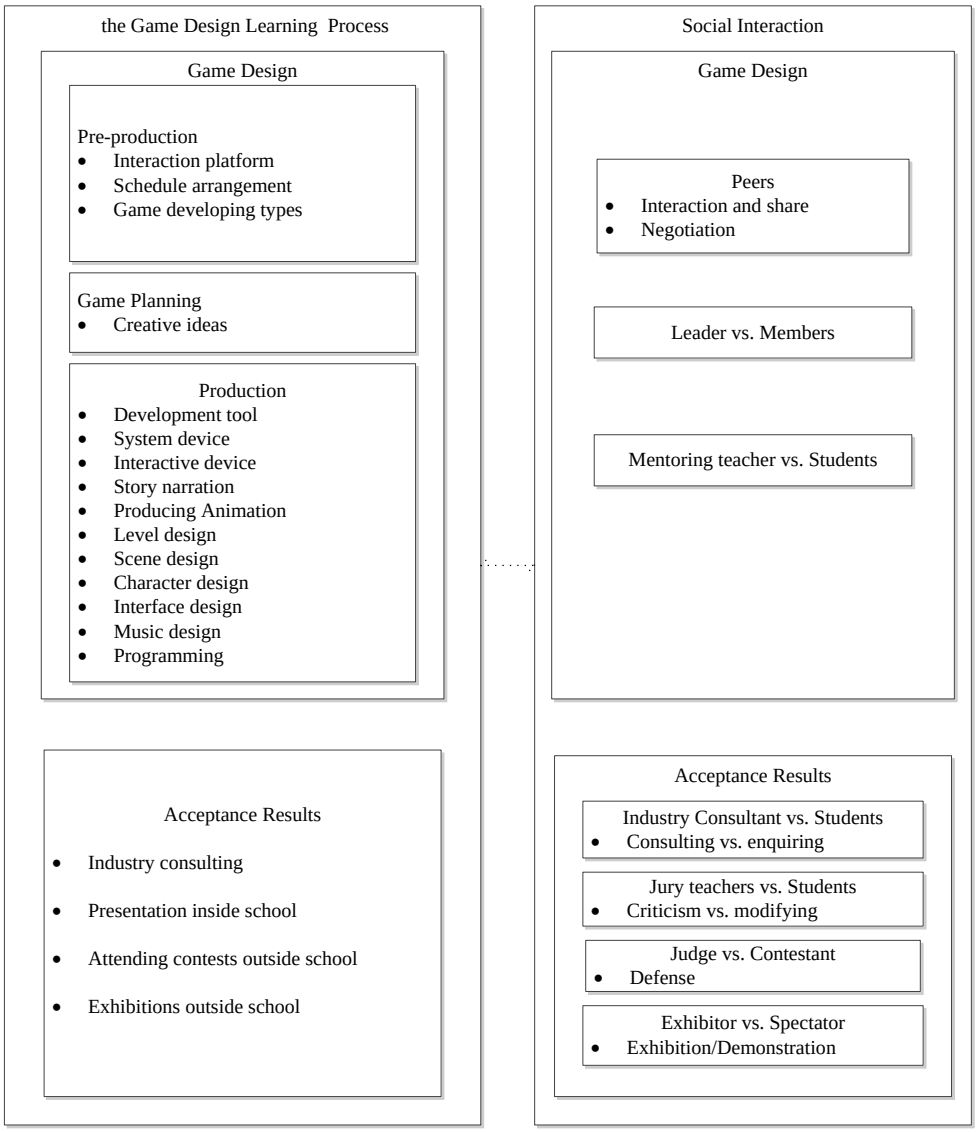


Fig. 3 Concept map of learning process and social interactions

5.2 Argumentation interaction leading the game design development

Game design learning process is divided into a number of stages. However, each stage has its cyclic procedure, a characteristic in common inall stages. Through argumentation interaction, the cycle progresses into another stage. The cycle proceeds as follows: encountering problems→collecting data→testing ideas and techniques→making creative ideas concrete→modifying details→solving problems(Fig. 4)

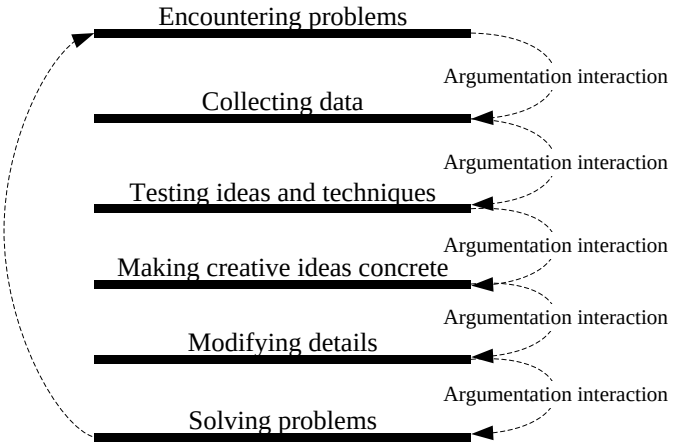


Fig. 4 Game design development

5.3Social interactions

In the process of game design and development, there were different social interactions between peers, the team leader and members, students and teachers, students and the industrial consultant, participants and judges, as well as students and their audience. Different social relationships construct different social networks. There will be inevitable conflicts among team members.The communicationof ideas or views clearly is arequired skill for individuals. Teachers should detect the problems in time, play the role of coordinating, and keep the relationships in harmony, which is the critical factor of success. The crew leader should follow the schedule to make timely progress, and confirm every member's contribution in a fair and open manner. The industry consultant provides students with practical experience and requirements, but will not force limits on their creativity. In presentations, teachers should examine and inspire students to observe and think in different angles. It can be the reference to support their future career while facing aboss or a customer's demands, they will seek better solutions to improve and enhance their problemsolving skills. Students need to participate in contests outside the school and provide the judges with sufficient information about their work and learn from others. In the exhibition outside of the school, student designers must convey ideas, introduce and market their own work to an audience composed of peopleofdifferent social statuses and age levels.

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