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Play in College: Shifting Perspectives and Creative Problem-Based Play

Agni Stylianou-Georgiou, Eliza Pitri

***Abstract*—**This study is a design narrative that discusses researchers' new learning based on changes made in pedagogies and learning opportunities in the context of a Cognitive Psychology and an Art History undergraduate course. The purpose of this study was to investigate how to encourage creative problem-based play in tertiary education engaging instructors and student-teachers in designing educational games. Course instructors modified content to encourage flexible thinking during game design problem-solving. Qualitative analyses of data sources indicated that Thinking Birds' questions could encourage flexible thinking as instructors engaged in creative problem-based play. However, student-teachers demonstrated weakness in adopting flexible thinking during game design problem solving. Further studies of student-teachers' shifting perspectives during different instructional design tasks would provide insights for developing the Thinking Birds' questions as tools for creative problem solving.

***Keywords*—**Creative problem-based play, educational games, flexible thinking, tertiary education.

I. Theoretical Framework and Objectives of the Study

PLAY and imagination were not always regarded as part of the "serious" business of schooling [1]. Recent research, however, indicates that play can be an essential learning medium. Play is a condition in which the cognitive functions of the mind can be allowed to function optimally [2]. As adults we may have lost the skill of playing with the innocence of a child but we can easily regain it. Play has a positive impact on creativity because it helps us both imagine and consider multiple perspectives in contexts that stimulate positive emotion, which research shows leads to greater insight and better problem solving [3].

Imagination, a mental quality that enables people to go beyond actual experience and construct alternative possibilities, can be perceived as the basis for cultivating creative thinking [4], [5]. Egan [6] argued that effective stimulation of imagination should take place across curriculums in diverse subjects, but the average classroom is not successful in stimulating imagination and sparking students' creativity. There is, therefore, a need for educational contexts to be developed to release students' imagination.

Greene [7] pointed out the transformative capacity of imagination. Her ideas bring the vitality of the arts to teachers and students challenging them to pose new questions, view ideas from different perspectives, making them want to pursue "What if?" questions [8]. In an effort to cultivate creative imagination in tertiary education, the researchers of this study wondered "What if students engage in creative problem-based play during instruction and learning at a university classroom? De Bono's Six Thinking Hats technique [9] was applied in order to encourage a creative problem solving approach adopting multiple perspectives through an interweaving learning game design contextualizing knowledge. This technique encourages problem solving utilizing six different modes of thinking symbolized by six different 'thinking' hats. De Bono suggested that when undertaking a problem, mind tensions might be similar to the bingo machine randomly drawing numbers. In order to avoid confusion and reach a solution in an efficient way, a problem solver needs to direct thinking towards one type of thinking at a time. Six colored hats (blue, white, red, yellow, green, black) represent six modes of thinking. The blue hat allows for coordination of the thinking process. A person who is familiar with the Six Thinking Hats technique usually is chosen to wear the blue hat so as to be able to control the sequence of the hats that will be used by thinkers and pose questions that will prompt thinkers to think. When wearing the white hat, one focuses on information available, the objective facts of the problem, what is needed and how it can be obtained. The red hat encourages thinking of emotions, feelings, intuition, and hunches about the alternatives. The yellow hat represents optimistic thinking, asking thinkers to list the benefits of the ideas proposed. Wearing the black hat, engages thinkers in a devil's advocate role, being judgemental and critical about the merits of the ideas. Finally, the green hat encourages creative thinking. When wearing this hat, one can generate as many ideas as possible on how the problematic case could be handled.

Research suggests that well-designed games can be effective educational tools [10]. However, Gaydos [11] argues that the design of a game is essential to its effectiveness and more studies need to focus on studying how or under what conditions educational games are effective. Researchers of this study aimed to provide a state of play in a classroom where teaching and learning would flow naturally, opening up opportunities for exploration and experimentation by both educators and students. The aim was to investigate how to facilitate creative problem-based play in tertiary education and how student-teachers' engagement in such a context would affect their ability to transfer theoretical knowledge into practice. Specifically, this study addressed two research questions:

- How can a university course context be modified to emphasize creative problem-based play through

A. Stylianou-Georgiou is Assistant Professor at the University of Nicosia, Cyprus (phone: +357-22842300; fax: +357-22842399; e-mail: stylianou.a@unic.ac.cy).

E. Pitri is Assistant Professor of Art Education at the University of Nicosia, Cyprus (e-mail: pitri.e@lunic.ac.cy).

educational games?

- How does adopting multiple perspectives during game design problem-solving affect student-teachers' games?

II. Methodology

Based on literature supporting playfulness as an attribute of creative imagination, a study took place at a private university as a collaboration between two instructors of the Department of Education and their undergraduate student-teachers. A Cognitive Psychology instructor collaborated with an Art Education instructor who taught an Art History course and modified the Cognitive Psychology course activities in order to engage students in a creative problem-based playful context. The modifications targeted stimulation of flexible thinking and adoption of alternative perspectives during problem-based game play while learning about cognitive psychology concepts (i.e. memory, perception, language development, mental representation, problem solving). Games seemed to be a worthwhile inspiring and innovative medium to be used in an educational setting, even at a university level. Researchers' challenge was to design immersive, engaging, entertaining and social educational games that would be used as instructional aids for each class meeting of the Cognitive Psychology course.

Researchers aimed to stress the importance of adopting multiple perspectives during creative problem-based play, even during decision-making in instructional design tasks. The cornerstone of this effort was De Bono's Six Thinking Hats technique [9], which introduces six types of thinking when puzzled by a problem. However, the hat-metaphor was replaced with a bird-metaphor. Each colored hat was substituted with breeds of birds of similar colors. The reason of such a decision was to transform the symbol used in each type of thinking with a living-creature that empowers thinkers with the freedom of viewing things from alternative perspectives prompting them to change directions as they engage in problem solving (see Table I). Therefore, thinkers extend their way of thinking and approach a problem with flexible views. Thinking Birds probe creative thinking, critical thinking, positive logical thinking, factual thinking, procedural thinking as well as encouraging thinkers to look after their feelings and intuitions.

In order to address the first research question, the researchers recorded the types of thinking that guided the design process of developing the six educational games described (see Table II). Qualitative methods were used to analyse the design process notes and discussions about the conceptual and practical problems during game development throughout the semester. Practical problems related to tools and materials used for game construction. The main conceptual problem was how to facilitate playfulness and at the same time introduce student-teachers to the six types of thinking while playing educational games that would target cognitive skills. An open coding system was used to analyze the game design process, which lead to a series of questions associated with the six types of thinking introduced by De Bono [9]. The questions had to probe students to coordinate thinking, attend to evidence, and encourage critical, creative and positive thinking as well expression of emotions experienced during problem-solving. These questions were given to students attending the Cognitive Psychology course when they were assigned a game design challenge at the end of the semester.

TABLE I
Multiple Thinking Perspectives

Thinking Birds	Type of Thinking
Kingfisher (blue bird) 	Procedural thinking
Little Egret (white bird) 	Informational/factual thinking
Blue-cheeked Bee-eater (green bird) 	Creative thinking
Blackbird (black bird) 	Critical -cautious-thinking
Black head Bunting (yellow bird) 	Logical positive thinking
Common Crossbill (red bird) 	Intuitive –emotive-thinking

The second research question focused on studying how adopting multiple perspectives during game design problem-solving would affect student-teachers' games. The data sources used to address this question were the students' written reports consisting of a description of the game (rules, narrative) and a recording of the types of thinking used during the game development (design, construction). The researchers selected four cases of games developed by students collaborating in groups. The specific groups were selected based on the degree of adopting different perspectives while engaging in game design. Each of the four groups consisted of four members (group A: 2 males and 2 females, group B, C, D: 4 females). The analysis was conducted by identifying keywords associated with the different types of thinking in the groups' texts. Additionally, student data were analyzed based on the requirements of the cardboard design challenge (target cognitive skill, suitability for K-12, use of cardboard as a main material, original construction, interactivity, promoting collaboration, original narrative). Data analysis focused on finding connections between students' game features and the types of thinking used during their development. For reliability control, two independent raters codified student data.

III. Creative Problem-Based Play through Educational Games

The instructors of the Cognitive Psychology and the Art History courses collaborated to design games to introduce the

six types of thinking from de Bono's Six Thinking Hats technique [9]. A narrative (see Table II) was created for each game to present a type of thinking through a Thinking Bird character targeting the development of specific cognitive skills (i.e. perception, memory, mental representations, language development). The games, which utilized Art History students' cardboard artwork, were used during the class meetings in the Cognitive Psychology course. Course instructors experienced play throughout the semester as they were engaged in educational game design. Their main challenge was how to shift perspectives while solving problems creatively. The challenge for the students attending the Art History course was to get inspired by the Art History course content and apply the theoretical knowledge of artists' techniques transforming cardboard material into two-dimensional and three-dimensional constructions. Cognitive Psychology students' challenge was to engage in creative problem-solving for designing and constructing educational games that would target cognitive skills.

The first game was *Who am I, How others see me?* The purpose of this game was to introduce multiple perspectives of how we view ourselves and how others perceive us. Two cardboard-made dices were used to play this game. The first dice had a thinking bird printed in each of its side. The second dice had its sides decorated with a symbol representing each thinking bird. Inside this dice, there were different objects hidden (e.g. kaleidoscope, hammer, bubble maker, etc.). Each player was requested to throw the first dice and follow the direction given by each bird. For example, if a player got "Blackbird" (the black bird), he/she was instructed to find the hammer from the second dice, hit it on a table and say something that others do that bothers him/her. This game was played during the first class meeting of the Cognitive Psychology class where students introduced themselves to their classmates.

The second game *Secret Code "Egret"* targeted mechanisms of cognitive development (assimilation, accommodation) in Piaget's theory. Players needed to collaborate to solve a puzzle and find a folder that included a cardboard African mask made by Art History students. In this game students formed six teams of approximately five members. Each team had to find one of the thinking birds which were placed outside the university classroom. When they would find a bird, they had to follow the directions in the message hanging from each bird's beak. The message was: "Return to base and open my door to the dice that will challenge your mind. A letter is what you initially need to get the mask you seek." Players needed to collaborate to solve the puzzle to find a folder that included the mask. Six puzzles were hidden in each side of a cardboard-made dice (the second dice used in the *Who am I, How others see me?* game). The answer to each puzzle was a letter of a word-code. The puzzles guided the players to adopt different ways of thinking. The game would end when all "secret-agents" would find the word-code, locate the folder with the correct code and manage to enter the "room" where the mask was being kept.

TABLE II
SKILLS AND THINKING MODES OF COGNITIVE PSYCHOLOGY EDUCATIONAL GAMES

Game Name	Game Narrative
Who am I, How others see me? 	Let's introduce ourselves guided by a thinking bird.
Secret code "Egret" 	For many months the agents prepare for this great evening! Tonight is the night that the secret mission "Egret" begins. The group consists of resourceful secret agents, who thanks to their observation manage to break security codes and enter the university where a very rare cardboard mask is kept. Agents should discover and combine letters to form a word-code that can identify the folder that contains the mask. The specific folder will be located along with another folder in a "room" that includes security laser and alarm. Players should recognize the folder with the correct word-code and get the envelope without triggering the security alarm. If agents manage to find the mask, they will win the most wanted title of being a worthy "Egret".
Touch-Feel-Identify 	Children lost their toys and are desperate. Egret, as a worthy observer, can assist them. It suspects that the magpie has hidden them in the "belly of the forest bodies". It's night and dark ... Egret is trying to solve the mystery of the missing objects. Will it manage to recognize children's toys? As a worthy Egret you are invited to participate in a game that will challenge your perception.
The Garden of Wishes 	A hidden labyrinth in a garden of wishes! Bunting, the yellow bird, invites you to a memory game called "The Garden of Wishes". In the game, players try to collect the shooting stars to make the children's wishes come true. But there are obstacles (walls hidden under the first level of the game) that would prevent the players in their effort to achieve this goal.
Chirp Chirp & Blah Blah 	Crossbill looks at himself in the mirror and goes through an identity crisis, feeling somewhat empty. Seeking help urgently ... it needs to hear an original story that causes emotions. Quickly Bee-eater travels through the forest to help his friend! You are requested to travel with Bee-eater to collect 6 items from the forest with which you can create your own story as a group, before the night falls. Your story should be subversive and emotional. All players' stories will be combined to create a story that will "shake" the Crossbill and make him experience intense emotions.
Routes 	Four travellers follow a route to reach a tempting destination (Laughter Village, Tickling Lake, Shooting Star Waterfall, Entertainment Mountain) What obstacles might appear on their way? Will they manage to reach their destination?

The third-week game was *Touch-Feel-Identify*, a tactile perception game which used a cardboard tree inspired by the prints in cave painting. This game was played by two players. A player challenged an opponent to see who could find an object hidden in a cardboard-made tree's hollow first. Each player would first draw an object card randomly and observe it carefully for 30''. Then, after the hourglass was turned, each

player would put his/her hand in the hollow to find the object shown on the card using only his/her sense of touch.

The fourth game developed was *The Garden of Wishes*, the board of which was created by Art History students utilizing their impressionistic cardboard landscapes. Two players could play this game. Each player had to avoid the hidden obstacles and get the shooting stars. Before the game would start, each player was asked to make their own wish box using a storigami (included in game instructions). Each player had a pawn containing a magnet which was joined to a metal bell that was under the first layer of the game board. If the player hit on one of the hidden walls, the bell would drop, forcing the player to resume the route. It was important that the players would remember where the hidden walls were as they navigated through the garden's maze. Mnemonic techniques could help them so as to quickly get as many shooting stars as possible. The game would end when the first player managed to reach the opposite site of the garden.

A fifth game targeting concepts of language development was *Chirp Chirp & Blah Blah*. Students collaborated in groups to create a subversive and emotional story involving a cardboard character created in the Art History course while studying expressionism. Each team had to choose randomly six items to create the story: 1) a picture to be used as the setting of the story, 2) a moody main character, Mr. Blah Blah, 3) a second character, an animal that had been captivated in a chocolate egg by the evil witch Anaesthesia, 4) an object shown when a dice from the series "Rory's Cubes: Voyages" was thrown, 5) the last exclamation sounded when bubbles would break (a team member blowed bubbles and other team members would start shouting in turns exclamation sounds associated with Mr. Blah Blah's facial expression. This sound would be used as something that Mr. Blah Blah would say in the story), 6) a picture from Herve Tullet's book "Le livre avec un Trou" to be used as an unexpected ending of the story. The game ended when all teams presented their stories and decided the order that could be put together to create a final story.

The sixth game was *Routes*, a design challenge targeting the concept of mental representations. This was a different game experience for Cognitive Psychology students since they had to get involved in designing the game narrative and rules based on a given game cardboard construction with surrealistic features, created at the Art History course. The game consisted of: a board paved with 81 tiles, a dimensional frame which is fixed on the board with elements associated with four tempting destinations (Laughter Village, Lake Tingling, Shooting Star Waterfall, Entertainment Mountain), 20 black barriers, and 4 pawns. Students were presented with the game elements and were asked to design a game that would: a) be suitable for preschool or school-age children (specify the age), b) be collaborative (specify the number of players or teams), c) include a script that creates an incentive for children to engage in problem-based play, d) a detailed description of the game rules. Students had one week to present in detail the process of designing the educational game Routes.

TABLE III
QUESTIONS TO FACILITATE MODES OF THINKING

Kaleidoscopic questions:
- What's in the agenda?
- What are the goals?
- Which direction should we take? What is our starting point?
- Which type of thinking shall we use?
- What is our progress so far? What do we summarize?
- What are the advantages of the ideas discussed so far?
- How do we proceed?

Descriptive (zoom in/zoom out) questions:
- What is a first impression of the problem and what do we see that makes us say that?
- What information do we get from how the problem is framed (i.e. problem description)?
- What do we know that could help us solve the problem?
- Which details could we spot with a focused examination of the problem?
- How the ideas and information presented are connected to what we know and have studied?
- Have we considered the problem facts to the ideas discussed so far?
- Adopting a panoramic view of the problem, what links do we find to information that did not seem related to the initial examination of the problem?

Tickling questions:
- What do I initially think about the problem? (Record as many ideas as possible)
- What else do we need to know or find about the problem?
- What additional information would help us? Which new ideas could extend or push our thinking in new directions?
- How could I make use of alternative means/materials, processes, strategies for solving the problem?
- What would be the opposite direction of what we have thought so far?
- Which possible problem-solving direction seems surprising and which seems funny?
- How would we solve the problem in a subversive / imaginary role / context (if I were a giant or an ant at the Lake of tickling / on the Fun Mountain / the Waterfall of Colours)?

Inspectioning questions:
- What are the possible obstacles that may arise in the implementation of the ideas proposed?
- What difficulties could we face?
- What should we be cautious about?
- What are the risks we take?
- What is still challenging or confusing for us?
- What questions, doubts, wonderings or puzzles do we have solving the problem (process, result)?
- What do we find worrisome about this idea?
- How different is what we initially thought about the problem solution compared to what we think now?

Shooting star questions:
- What is the first concrete task we wish we could do thinking about the problem?
- What steps might we take to increase our understanding of the problem?
- What would we want to explore about the problem?
- What are the advantages of the ideas/solutions proposed so far?

Mirror (endoscopic) questions:
- What are our feelings when we start to think about the problem?
- What do we feel during the problem-solving process?
- What excites us about an idea or suggestion?
- What do we feel after solving the problem?
- What do we care about and for what might the learners care in a problematic context?

Qualitative analysis of instructors' game design process indicated that shifting thinking perspectives would be facilitated by questions that would prompt student-teachers to consciously focus on one type of thinking at a time and realize the benefits of adopting different thinking modes to reach a creative solution (see Table III). For example, kaleidoscopic questions would prompt students to coordinate their thoughts and decide which type of thinking to adopt. This category was

named after a kaleidoscope, which provides the ability to get multiple views concurrently and make choices about focus. Kaleidoscopic questions were posed by Kingfisher (blue bird). Little Egret (white bird), posed descriptive questions to enable students to zoom in or zoom out on details and concentrate on available information regarding the problem-solving task. Tickling questions were posed by Bee-eater (green bird), in order to probe alternatives and generate many ideas through brainstorming. Blackbird (black bird) posed inspectioning questions to encourage critical thinking and monitoring of ideas. Black-head bunting (yellow bird) posed shooting stars questions to encourage positive thinking and Common Crossbill (red bird) posed mirror questions to encourage intuitive and emotive thinking.

At the end of the course, students had to submit and present their solutions to a cardboard game design challenge. The requirements of this challenge were to collaborate in groups to design and construct an educational game that would: 1) target a cognitive skill, 2) be suitable for K-12, 3) have cardboard as a main material, 4) have an original construction, 5) be interactive, 6) be collaborative, 7) have an original narrative. Groups were also required to record their thinking process as they were guided by the Thinking Birds' questions to design and materialize their idea for an educational game.

IV. Flexible Thinking and Students' Game Design

All students' educational games created and presented at the end of the semester in the Cognitive Psychology course were examined in detail after they were submitted, for the purposes of course evaluation. However, a sample of four games was selected and is included in this study based on the degree of fulfilling the requirements of the assignment. What follows is a description and discussion of the cases of the four selected educational games.

A group of students (group A) developed *The Golden Carrot* game (see Table IV), which was a perception game for 11-12 year-old children played by four players. The aim of each family (two players collaborating), as described in the narrative of the game, was to get the golden carrot and find a safe route to return home avoiding the opponent group who could claim the carrot during a carrot hunt. This game targeted the development of the cognitive skill clearly, since players had to perceive opponents' possible routes. The game rules were based on an original narrative and the cardboard construction had novel features, such as tunnels leading to different spaces on the board. This feature provided a dynamic aspect in the game since routes could change suddenly and players were required to remain alert at all times during the game. Based on the description of the thinking process presented by group A, the sequence of the thinking types that they engaged were: critical-cautious thinking (design problem requires effort and time), procedural thinking (several issues to consider), logical positive thinking (an advantage was the familiarity with cardboard), creative thinking (different opinions of how to make the game construction), critical-cautious thinking (disagreements about the game size), logical positive thinking (reaching agreement), critical-cautious thinking (doubts about stability of construction), creative thinking (coloring possibilities, positioning game elements), informational/factual thinking (aesthetic adjustments based on facts), intuitive-emotive-thinking (anxiousness, nerves and tension, satisfaction with the end product). It seems that students in group A shifted perspectives and adopted multiple ways of thinking during game development.

Students in group B designed a game named *The Path of Love* (see Table IV), a memory game for 7-8 year-old children. The two players (prince A, B) that could play this game had to compete to reach their destination (princess at the end of both paths) and utilize mnemonics to remember information that was acquired as they overcame obstacles on their way. This game targeted the development of memory clearly, could be considered suitable for the specific age group and had cardboard as the main material. However, the construction resembled the hopscotch game and did not encourage interaction and collaboration among players. The game narrative was similar to the narrative of the Chirp, Chirp & Blah, Blah game and was not considered highly original. The thinking process sequence as described by group B, was: creative thinking (cardboard possibilities, brainstorming of ideas), critical-cautious thinking (choose an idea which, when applied, would develop a game construction that could be easily moved at the university classroom), informational/ factual thinking (think of a game narrative and rules based on the cardboard construction), creative thinking (solve problem of having nine squares on the board and only six sides in a dice, solved this problem by using 2 dices), intuitive-emotive-thinking (enjoyed game construction). When group B presented their educational game, it was apparent that they limited themselves in a predefined cardboard construction. Even though they had adopted multiple perspectives to solve problems for game rules (i.e. numbers appearing of the sides of a dice), they failed to be flexible in their thinking when deciding the game narrative and the general game type limiting themselves to a flat cardboard construction.

The third group (group C) created a *Battleship* game (see Table IV). This was a strategy game for 9-10 year-old children. Two teams of three players each competed in an effort to arrange their ships on a grid. The game proceeded in a series of rounds. In each round, each team took turns to place one of their ships on the grid guided by advice given by the six thinking birds. The opponent team announced whether or not the grid on the other side of the board of the game was occupied by a ship or a bomb. The goal of each team was to avoid the bombs and place all the ships on the board. This game could be considered appropriate for the specific age group, but the group did not specify how it targets the development of a cognitive skill. The group used cardboard as a main material for game construction but the game elements were set up as the traditional Battleship game. The game allowed interaction among players and the students attempted to create an imaginary story as a game narrative. However, the game rules were not novel compared to the original battleship game. The text describing the sequence of the thinking types by group C was vague. The group did not demonstrate deep

understanding of how to use the Thinking Birds' questions to guide the design and construction of their game. They referred to logical positive thinking (think of fantasy settings for games), critical-cautious thinking (being critical about the game's target cognitive skill), logical positive thinking (positive attitude that they could materialize their ideas), informational/ factual thinking (construct game elements based on new facts) and intuitive-emotive-thinking (excited about their game) but failed to explain how they used the different types of thinking during the development of their game.

The final group (group D) designed a game named *Stop! Mr. T.C* (see Table IV). The group claimed that this was a perception and language development game for 8-10 year-old children. Two teams of three players each had to compete in order to move from start to end on a board with two separate routes. In each route the stop signs signified tasks that required knowledge regarding the traffic code. Tasks included a Sudoku puzzle, an acronym puzzle, a mathematical problem, and storytelling. The players had to successfully complete each task in order to proceed to the next. The game would end when one of the groups reached the finish line. During the presentation of the game, group D failed to explain how the game would target perception and the development of language skills. Students used cardboard as the main material and painted a flat board to resemble a street with a random setup of game elements. Their board lacked novel features and the game did not allow for interaction or collaboration among players. The game narrative was limited to basic information regarding the aim of the players. The sequence of the thinking types followed for game development by the group was: creative thinking (brainstorm many ideas but no clear indication of which ideas they thought of), procedural thinking (setting goals, think of the game process and the given facts (cardboard challenge requirements), critical-cautious thinking (being critical about initial idea-decide to transform cardboard into a street), logical positive thinking (positive attitude when thinking of other ideas based on new direction). Group D adopted all six thinking types once during their game design process. In their description of how they adopted each type of thinking there was no reference to how the questions guided the design of the game narrative and rules and cardboard construction.

TABLE IV
STUDENT-TEACHERS' EDUCATIONAL GAMES

Game Name	Game Narrative
Group A: *The golden carrot* 	Two hare families bet on who is the best carrot hunter. One day, as they quarreled in the center of a village, they decide that the best way to resolve their conflict is to make a real carrot hunt. They let a golden carrot in the center of the village and say "this is our prize" ... will you manage to reach the carrot first?
Group B: *The path of Love* 	Crossbill, as a sentimental character, worries because Witch Zafiro has put obstacles in the path of love and prince Robin cannot reach his sweetheart Isabelle. You are called to help the prince overcome all the obstacles and reach the place where the witch can be found. Every time the prince overcomes an obstacle, he discovers a word that he needs to remember. At the end of the route, the prince is asked to create his own touching story for the witch so that she lets him finally meet his beloved Isabelle. A happy ending will give joy to Crossbill.
Group C: *Battleship* 	Once upon a time, there was an island, where the inhabitants were immortal because of a magic drink. The island was called "Island of the Immortals". There was a wicked witch, "Thalassopnichtra", who stole the magic drink from the island and hid it in under a 20 meter-high rock. The governor of the island gathered a team of the most experienced sailors, called "Immortal Pirates". He gave them five ships and sent them to find the magic drink. The wicked witch found out their plan and created her own army of pirates called "Thalassopnichtres". She also gave them five ships in order to dismantle opponents' ships so as not to reach the place where the magic drink was hidden. A war began between the "Immortal Pirates" and Thalassopnichtres".
Group D: *Stop! Mr. T.C.* 	Stoppy and Starty are two cousins who are trying to reach their grandfather, Mr T.C (Traffic Code). In their path, they go through trials and adventures but are very excited because if they succeed, they will win the medal that has been made for them by their grandfather. Will they make it?

V. Reflecting on Shifting Perspectives and Creative Problem-Based Play

In this study, instructors questioned learning in formal educational environments of striving towards accountability and standardization in ways that minimize, if not outright exclude, imagination. They became players, experiencing, as Brown [12] points out, a sense of freedom from time and a diminished consciousness of self, engaging in play for its own sake. They took the risk of devoting class time to play in a university classroom, were open to interdisciplinary connections, exploring multiple solutions and demonstrated perseverance tackling conceptual and practical problems involved in game design.

An important outcome of the study was formulating questions associated with different thinking modes. Thinking Birds' questions could be used to facilitate creative problem-solving in various educational settings where problem-solving takes place, not just game design. In this study, instructors gave emphasis on formulating the questions for each type of thinking but failed to make visible to students their modes of thinking and shifting perspectives as they themselves engaged in game design. Even though they designed games for presenting each mode of thinking, the complexity of the game design problem-solving process was not evident to students. Students were not aware of the design process that the instructors were engaged in (different perspectives, thinking birds which lead to design decisions, how did the instructors made choices while designing a game). Students' weakness in consciously shifting perspectives while engaging in creative problem-solving was revealed when they were asked to present the game rules and narrative of the Route game as well as their own educational games.

Considering instructional design as a problem-solving process, student-teachers could use Thinking Birds' questions as tools to generate creative solutions. Kaleidoscopic

questions encourage multiple views concurrently and decision-making, descriptive (zoom in/zoom out) questions direct attention to facts, tickling questions probe alternatives and generate many ideas through brainstorming, inspectioning questions encourage critical and cautious thinking, shooting star questions encourage positive thinking, whereas mirror (endoscopic) questions encourage the expression of feelings. Further research could focus on when, how and in what order such questioning could be applied during instructional design in educational settings.

The need for innovation in education is ongoing, as theories lead to usable knowledge about and reform of instructional practice. This study provides a design narrative [13] of how the researchers targeted creative problem-based play in university classrooms. Such methodology can provide insights to researchers as well as educators regarding curricular interventions that can cultivate creative imagination and flexible thinking during problem-solving.

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