



Pedagogy of play

Enhancing student performance

Presented by

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North-West University
Potchefstroom Campus
South Africa

North-West University Anthem

Bokone Bophirima
Re kaêlê Morêna
Ka wêna re ka êma
Ra tshwarana

Ao, Morêna
O re gôgê
Leseding re gôrôgê

Waar die wilgers welig spruit,
Doringboom sy skadu spreï,
Soos ons groei in kundigheid
Mag U ons lei

Seën ons, o Heer
Lei met U hand
Laat U seën rus oor ons land

Three strong streams united flow
Africa stands proud and tall
As we learn, we trust, we know
God is in control

Bless us, oh Lord
Guide us with grace
May North-West be blessed always

Bless us, oh Lord
Seën ons, o Heer
O re tshegofatse
Morena
Seën ons
Bless us, oh Lord

Scripture and prayer

Prof. Alida Herbst

Director: School of Psychosocial Health



Word of welcome & introduction of

Prof. SM (Grieta) Hanekom

by

Prof. Awie Kotzé



Inaugural lecture

Prof. Grieta Hanekom

Deputy Dean: Teaching and Learning



Disclosure & acknowledgement

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Other

Content



Introduction

What is pedagogy?

ExMan-3D[®]: management through example

“It takes a village to raise a child”

What is pedagogy?

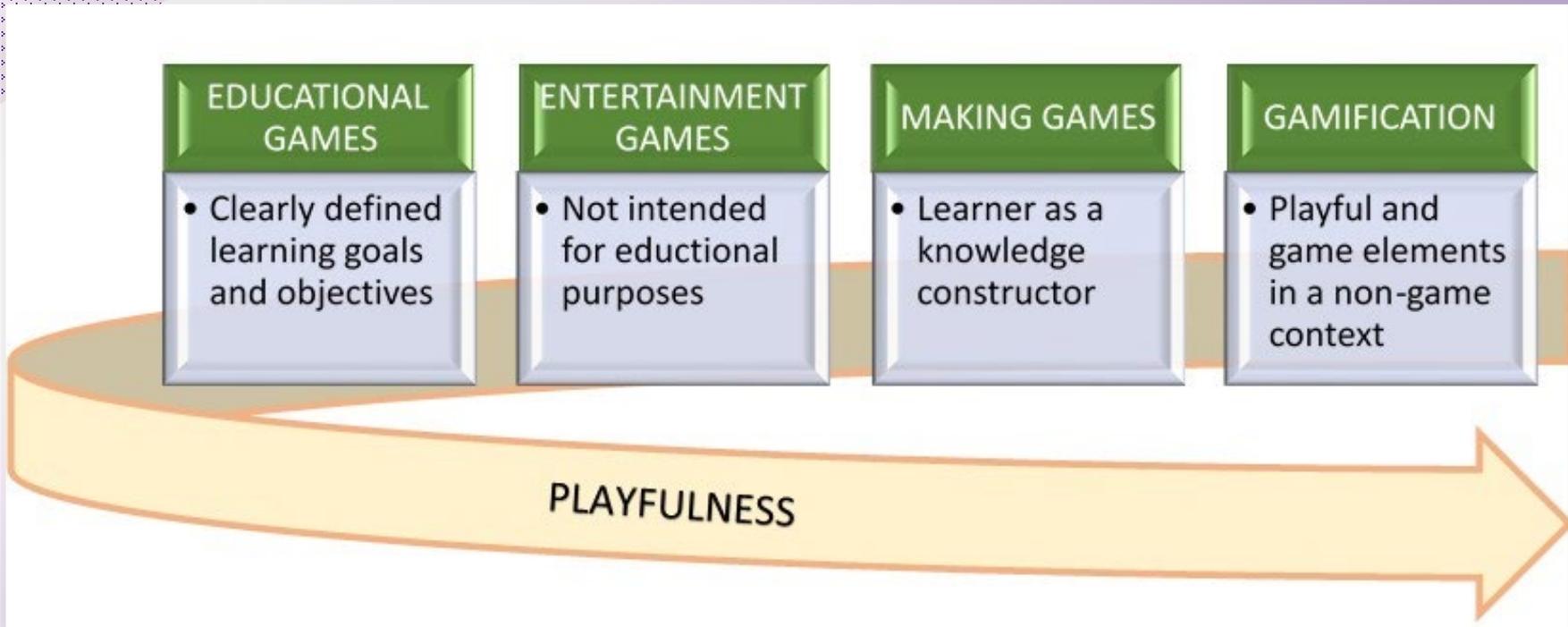


Figure 1: Game-based pedagogical approaches (Nousiainen *et al.*, 2018)

The meaning of neuroscience



Figure 2: Children playing ([this photo](#) by Unknown Author is licensed under [CC BY](#))

What is play-based learning and purposeful teaching?



Figure 3: Photo indicating play-based learning ([this photo](#) by Unknown Author is licensed under [CC BY-NC-ND](#))

Defining games for learning

Table 1: Distinctions between types of teaching and learning using games (Becker, 2021)

© K.Becker 2021	Game	Serious Game	Game for Learning (G4L)	Game-Based Learning (GBL)	Game-Based Pedagogy (GBP)	Gamification
Basic Definition	This term includes BOTH Serious Games AND Games for Learning	A game <i>designed</i> for purposes other than or in addition to pure entertainment.	A game <i>designed</i> specifically with some learning goals in mind.	The process and practice of <i>learning</i> using games. [From the <i>learner's</i> point of view]	The process and practice of <i>teaching</i> using games. [From the <i>teacher's</i> point of view]	The use of game elements in a non-game context.
Purpose	Can be for any purpose.	Change in behaviour, attitude, health, understanding, knowledge.	Normally connected with some educational goals.	Not a game - this is an approach to learning.	Not a game - this is an approach to teaching.	Often used to drive motivation, but can also be used to make something more playful and game like.
Primary Driver (why used)	Can be either play or rewards (or both).	To get the message of the game.	To learn something.	To improve learning. To increase learning effectiveness. <i>*Note GBP & GPL are related, but not the same.</i>	To improve teaching practice & effectiveness. <i>*Note GBP & GPL are related. They are like two sides of a single coin.</i>	Depending on how it's implemented, it can tap into extrinsic or intrinsic rewards (or both)
Key Question	Is it fun?	Is the message being received?	Is it effective?	Am I learning what I am supposed / need to be learning?	Is it effective?	Business: Does it improve profits? Education: Is it effective?
Focus	Player Experience (<i>how</i>)	Content / Message (<i>what</i>)	Content / Message (<i>what</i>)	Learning Objectives (<i>what & how</i>)	Learning Objectives (<i>what & how</i>)	User Experience (<i>how</i>)
Budgets	Next to nothing to 100's of millions.	Next to nothing to 100's of thousands.	Next to nothing to 100's of thousands.	Usually part of an institutional budget. Largely irrelevant to the user.	Usually part of an institutional budget. Largely irrelevant to the user.	Next to nothing to 10's of thousands.
Business Model	User Pays	Producer Pays	Varies	Institution Pays	Institution Pays	Producer Pays
Concept Catalyst	Core Amusement.	Message.	Performance or Knowledge Gap	Game is the lesson or is used as a part of the lesson.	Game is the lesson or is used as a part of the lesson.	When used in learning it usually impacts HOW things are taught and administered rather than WHAT is taught.
Fidelity	Self-consistent, otherwise irrelevant	Faithfulness to message essential	Faithfulness to message essential	Faithfulness to message essential	Faithfulness to message essential	Not Applicable. If a narrative exists, it need have nothing to do with what's being gamified.

Benefits of games for adults



Figure 4: Diagram illustrating adults playing games on cellphones ([this photo](#) by Unknown Author is licensed under [CC BY](#))

Competencies expected from teachers

The teacher has four roles to play when implementing games for learning, namely:

- instructor (planning and communication),
- playmaker (communicating tasks, roles, goals, and game dynamics),
- guide (support students during play), and
- evaluator (understands, explores, and provides response to the gameplay experience) (Nousiainen et al., 2018).

Competencies expected from teachers

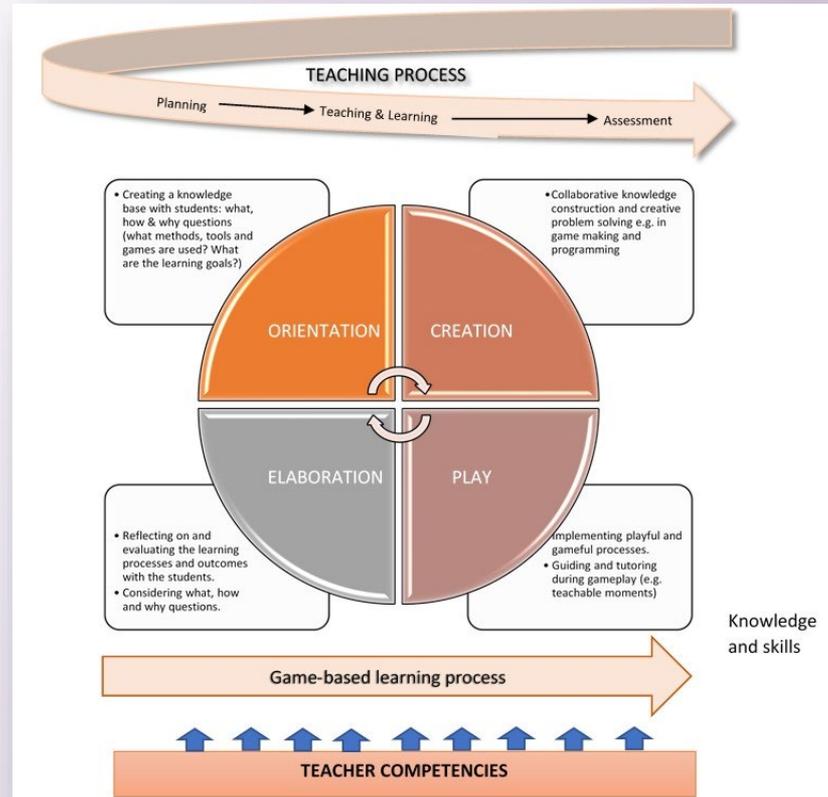


Figure 5: Pedagogical framework for game-based learning (adapted from Nousiainen *et al.*, 2018)

Relationship between games and learning



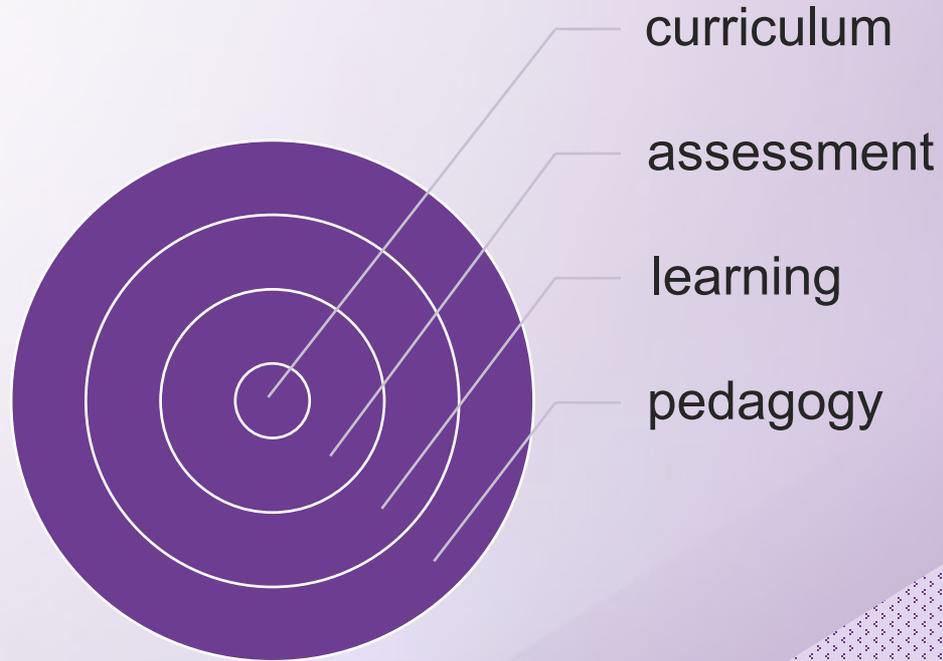
Figure 6: Games and learning ([this photo](#) by Unknown Author is licensed under [CC BY-SA](#))

Relationship between games and learning

Table 2: Relationship between learning techniques, learning activities (adapted from Silva 2020)

Learning techniques	Learning activities
Practice & feedback	Questions, memorization, association, imitation
Learning by doing	Interaction, practice, drill, imitation
Learning from mistake	Feedback, problem, reflection
Discovery learning	Feedback, problem, creative play
Task-based learning	Understand principle, graduated tasks
Question-led learning	Question, problem
Situated learning	Immersion
Role playing	Imitation, practice, coaching
Constructivist learning	Experimentation, questioning
Learning object	Logic, questioning
Coaching	Coaching, feedback, questioning
Intelligent tutors	Feedback, reflection, problem, continuous practice

Designing a pedagogic game



Designing a pedagogic game (continued...)

This can be executed in the following way:

- Use of fantasy and narrative;
- Visual and aural stimulation ;
- Having clear and meaningful goals
- Challenging and increasing level difficulty;
- Incorporating timely feedback mechanisms;
- Students make decisions that influence the learning experience;
- Encouraging social interaction through opportunities for collaboration, discussion, and reflection.

Adaptive game difficulty

socially and developmentally appropriate content

curriculum-alignment

expense and/or licensing issues

capacity to play the game over short periods of time in class

suitability of the game for the institution's digital platform

level of student engagement



For the past 4 years you have been an employee at Food for All. You saw the company go from being a 5-star establishment to bankrupt and no matter how much you tried to warn the manager, he just wouldn't listen to you.

Now jobless and with bills looming large, you know you have to do something! Convinced that you can establish and operate a successful food service unit, you are at the bank asking for a loan to do just that...

Figure 7: Demonstration of ExMan-3D: management through example

Narrative and creation



Figure 8: Choosing different paths ([this photo](#) by Unknown Author is licensed under [CC BY-SA-NC](#))

Narrative and creation

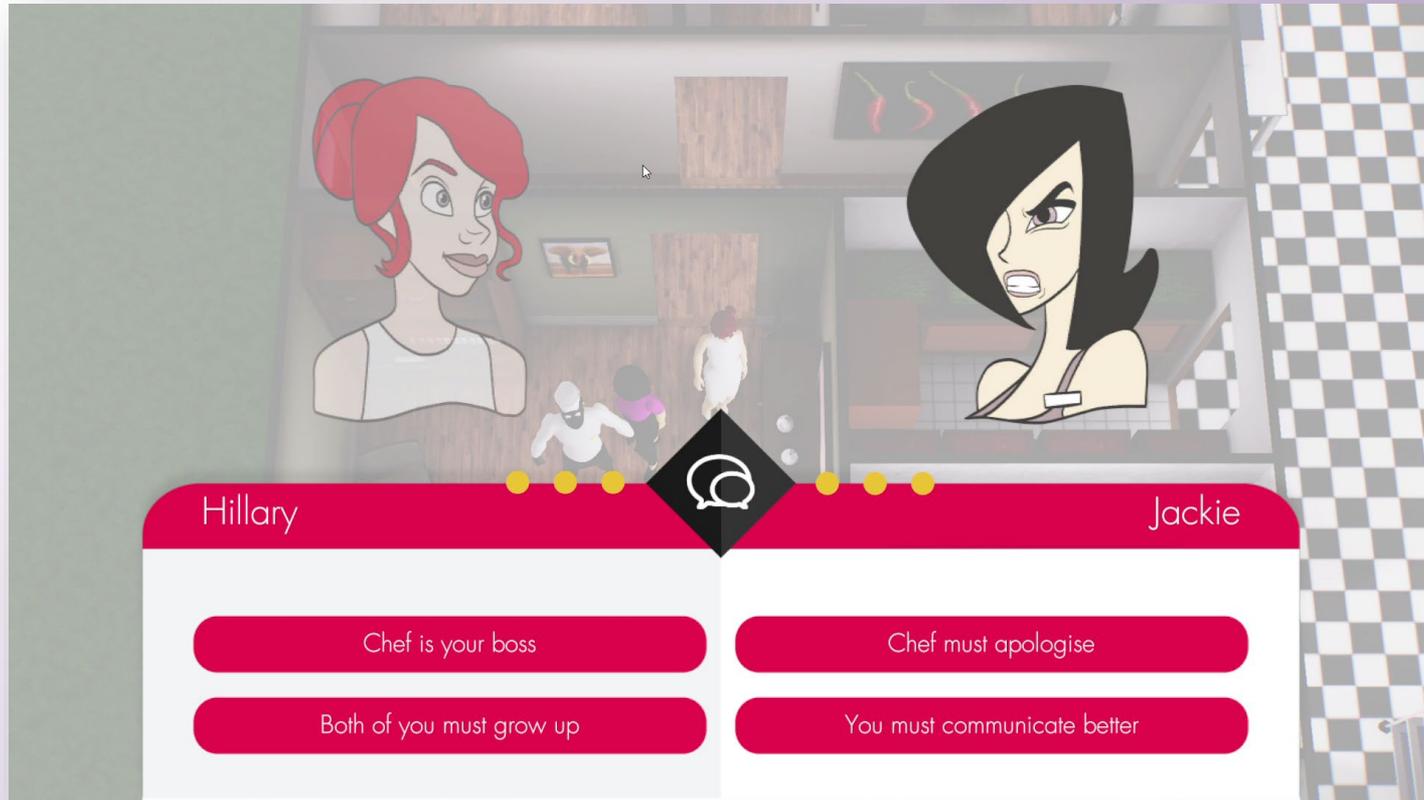


Figure 9: Demonstration of ExMan-3D: management through example

Narrative and creation

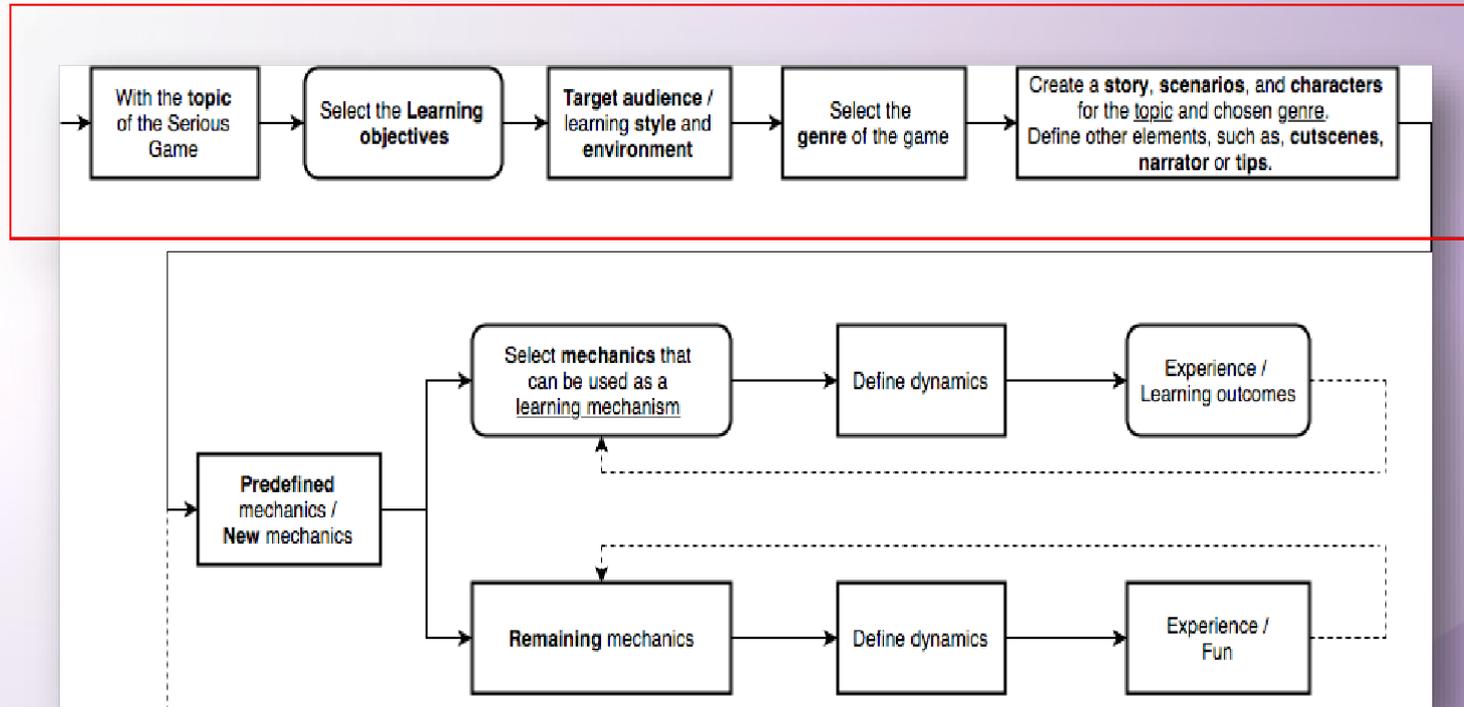


Figure 10: Steps defining game development (adapted from Frutuoso G.M. Silva 2019)

Developing the game

General features

- 3D game world
- Serious Game tied to the coursework done in the Dietetics program
- Recorded Dialogue to give a more authentic feel
- Contextual experience for players with some background in the food services industry

Gameplay

- Isometric game view to allow player to see not only their character, but also how it interacts with the world.
- Mouse control to allow users to interact with the game with minimal movement (for use in classroom situation).
- Movement through the game world, with Dialogue based interactions to track knowledge gained from course.

Management in the food service unit



Figure 11: Cartoon illustrating that management involves multiple aspects ([this photo](#) by Unknown Author is licensed under [CC BY-SA-NC](#))

The game world

Key locations:

- **Office:** when notifications are triggered, the desk is where the player needs to travel to in order to loop at their laptop or answer the phone for example. This is the “start” section for whatever the event is that is in progress.
- **Front door:** Exiting the front door will allow the player to exit for the day and move the in-game clock a day forward.

World layout:

- **World layout:** this layout reflects the fact that all the game play will take place within the FSU that the player is attempting to manage.

Example storyboard

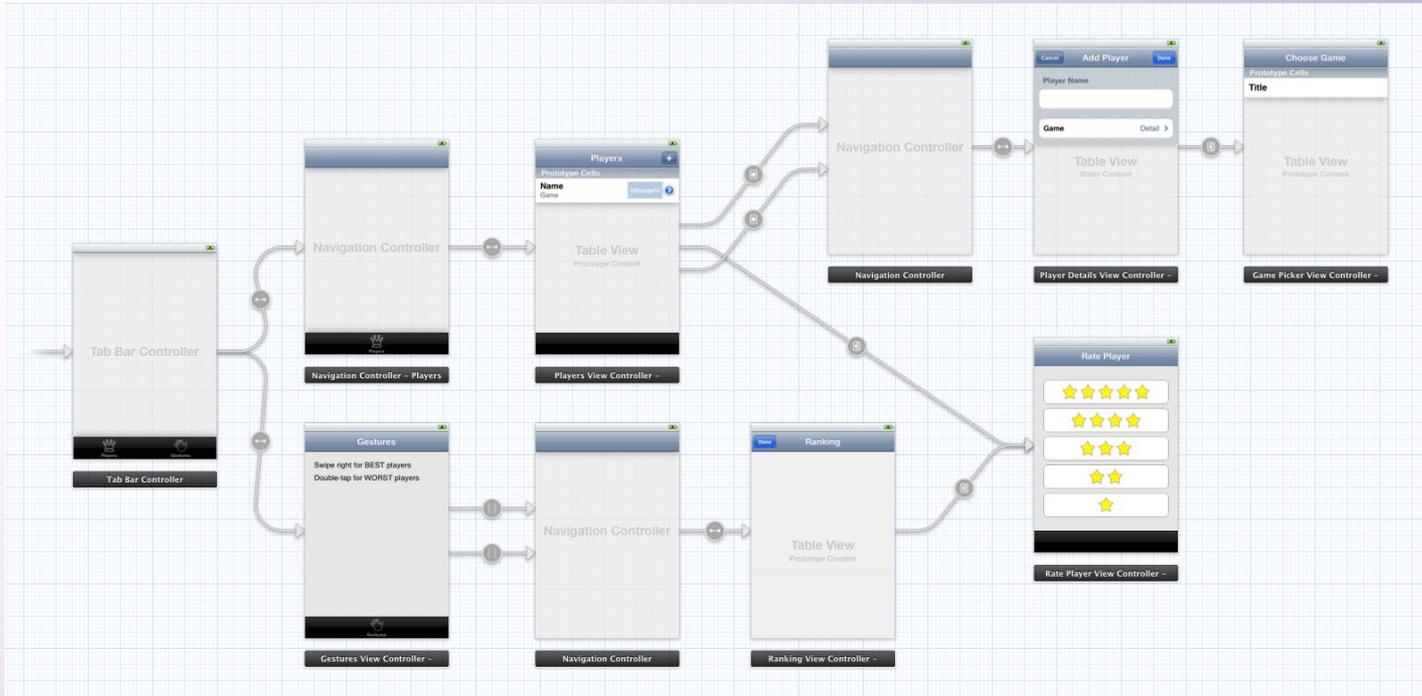


Figure 12: Example of a storyboard ([this photo](#) by Unknown Author is licensed under [CC BY-SA](#))

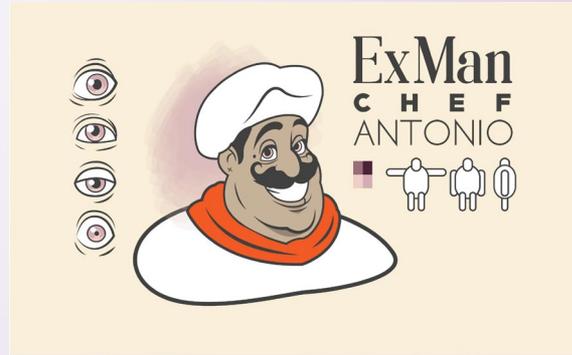
Five main characters of the game



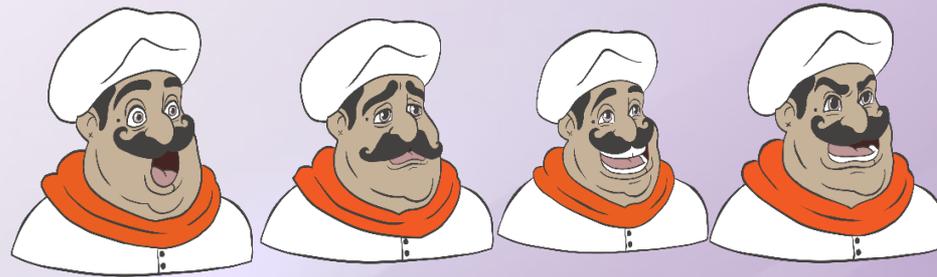
Hilary: surprised, sad, happy, and angry



Five main characters of the game



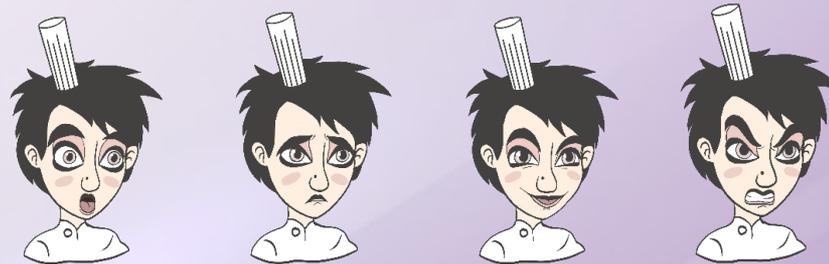
Antonio: surprised, sad, happy, and angry



Five main characters of the game



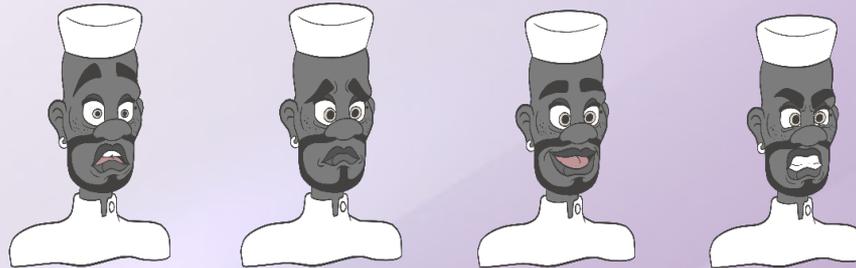
Gina: surprised, sad, happy, and angry



Five main characters of the game



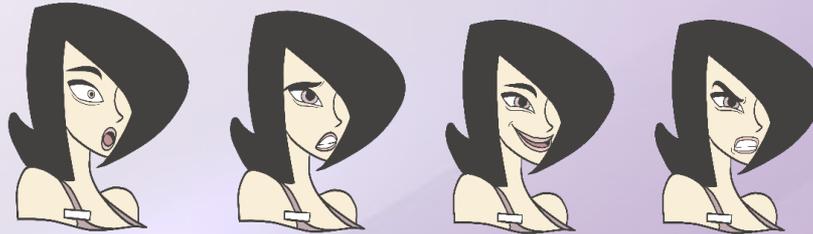
Thabang: surprised, sad, happy, and angry



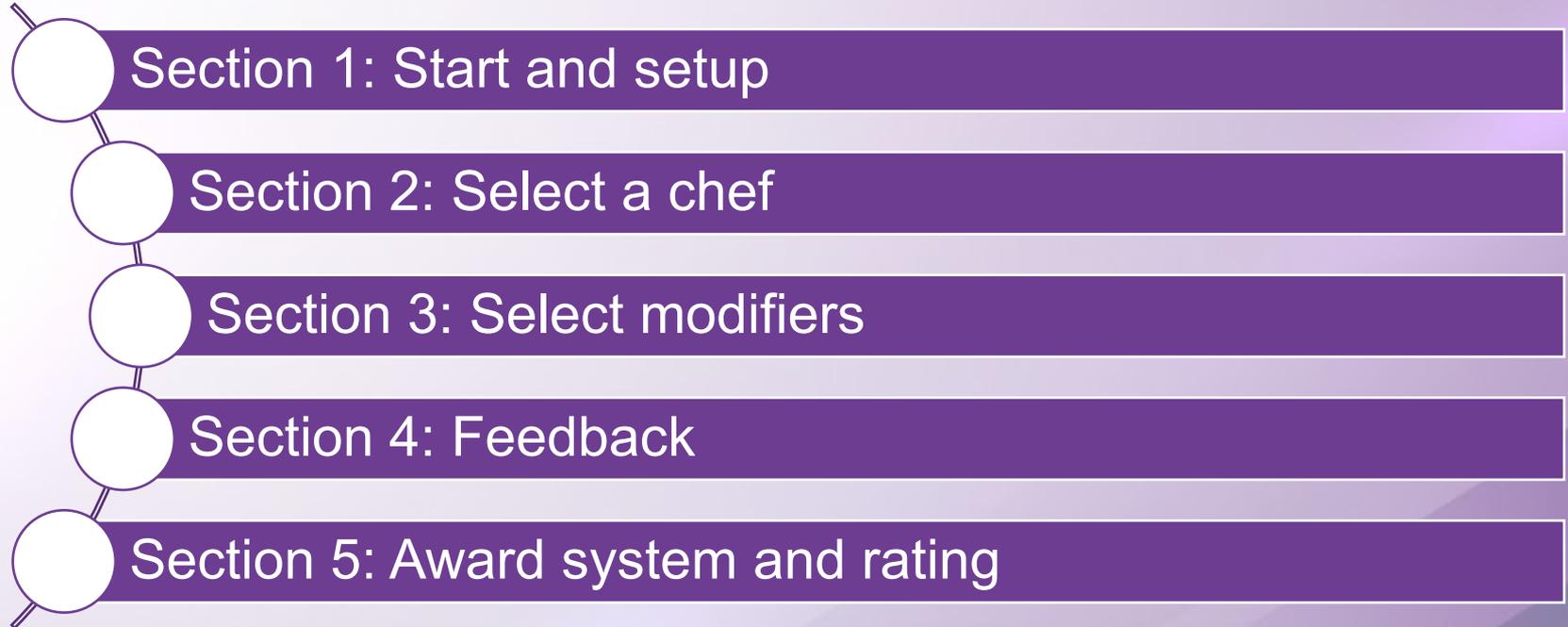
Five main characters of the game



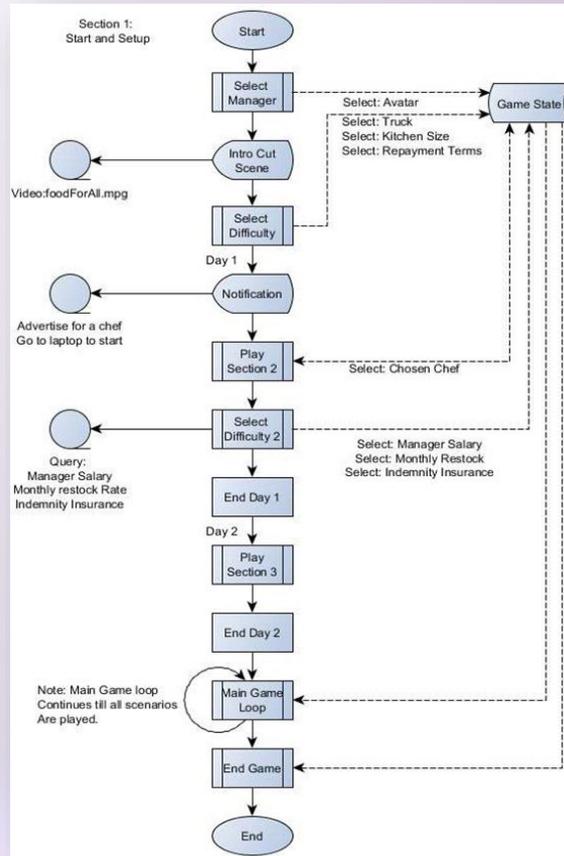
Jackie: surprised, sad, happy, and angry



Game flow

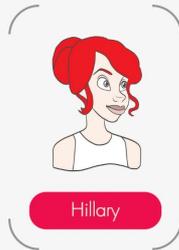


Section 1: Start and setup



Section 1: Start and setup

Select Manager



Once you make a decision it cannot be reversed or changed during your playthrough.
Be careful and think about your choice!



Create Company

Company name here...

Kitchen
Size



Initial Cost: R150k
Monthly Cost: R18k



Initial Cost: R350k
Monthly Cost: R29k



Initial Cost: R600k
Monthly Cost: R49k

Delivery
Vehicle



Initial Cost: R270k
Cost/km: R0,98



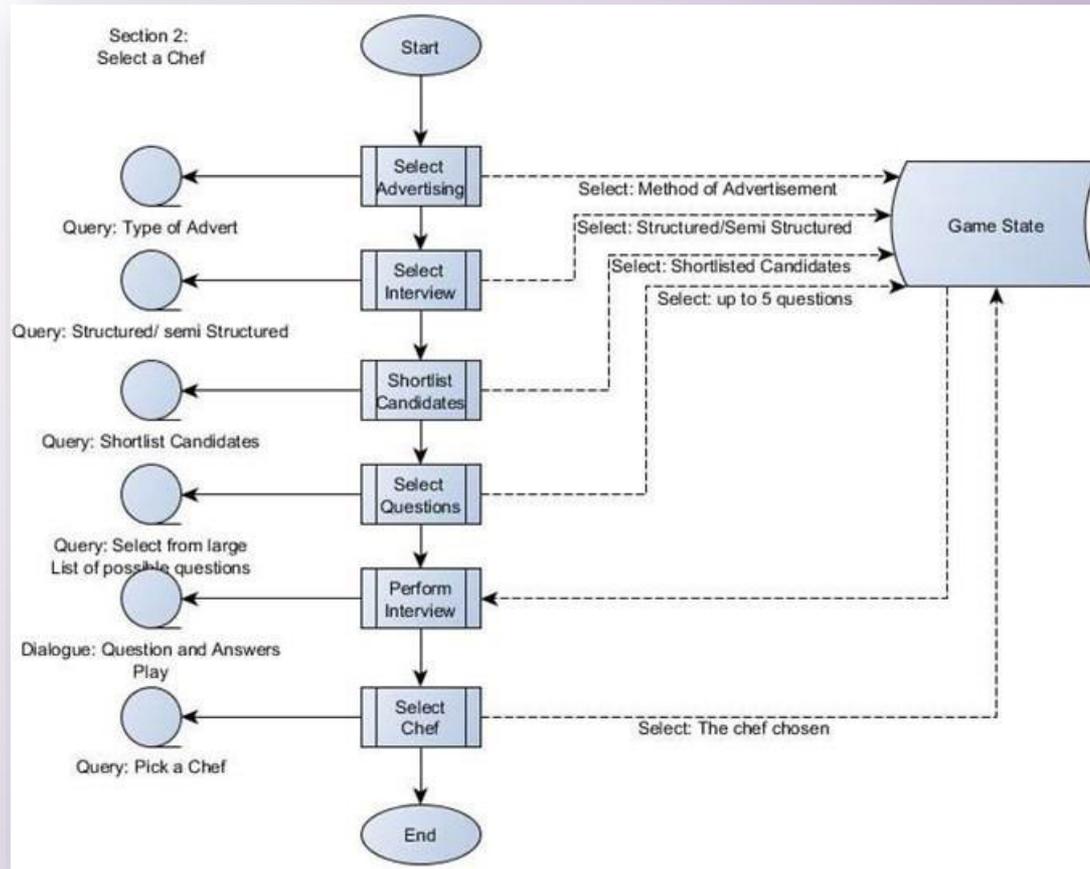
Initial Cost: R560k
Cost/km: R1,6



Initial Cost: R785k
Cost/km: R2,11



Section 2: Select a chef



Section 2: Select a chef

Hire a Chef



Antonio
Salary: R22k



Thabang
Salary: R14k



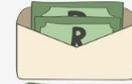
Section 3: Select modifiers

Company Settings

Manager Salary



R8k



R20k



R32k

Monthly Restock



R8k



R12k



R20k

Indemnity Insurance



None



R1k



R3k

Once you make a decision it cannot be reversed or changed during your playthrough.
Be careful and think about your choice!



Section 4: Feedback

Feedback

Client said: Hello, this is Abigail speaking. I'm at the venue and your staff has just arrived with the food. I went to check on the order and noticed that there is Parma ham in the soup! Did you forget that this is a Jewish wedding?! This is just unacceptable!!! You have to fix this!

You said: I really do apologise. I don't know how this could have happened! Please just give me a few minutes and I'll call you back with a possible solution.

This had following effects:

+10 Customer Satisfaction

Reason: Angry customers are best handled with a clear solution and you should always ask for some time to come up with one: The customer has calmed down and is willing to wait for your response.

0 Staff Satisfaction



Section 5: Award system and rating

Month: 2
Day: 1

R5k

Dialogue Summary

Customer satisfaction: -10
Staff satisfaction: -288
Revenue: R77k

Changes caused in Detailed problem solving

Customer satisfaction: -20
Staff satisfaction: 15
Revenue: R-25k

Ok

Pay company wages X

Monthly wages and expenses are not paid. Make sure to pay them at your office.

The screenshot shows a game interface with a top status bar displaying 'Month: 2' and 'Day: 1' on the left, and a currency indicator 'R5k' and two character icons with progress bars on the right. A central white dialog box with a red header titled 'Dialogue Summary' contains performance metrics: 'Customer satisfaction: -10', 'Staff satisfaction: -288', and 'Revenue: R77k'. Below this, it lists 'Changes caused in Detailed problem solving' with 'Customer satisfaction: -20', 'Staff satisfaction: 15', and 'Revenue: R-25k'. A green 'Ok' button is at the bottom of the dialog. In the bottom right corner, a red notification box with a white border says 'Pay company wages X' and 'Monthly wages and expenses are not paid. Make sure to pay them at your office.' The background shows a 3D-rendered office environment with a desk, chair, and a world map on the wall. At the bottom of the screen, there is a row of five red circular icons: a close button (X), a magnifying glass, a speech bubble, a document, and a wallet.

Realism/fidelity

- Identifies how close a game replicates/resembles real life
- Realism = physical + functional + psychological dimensions of fidelity
- Core design based on mirroring situations typical of food service management units
- Teach students higher order thinking skills and techniques
- Comments from students:
 - ‘We don’t know what actually happens daily in a food service unit and this helps you to better understand all the underlying factors’
 - ‘I like the fact that you lose money and clients when you do something wrong, it makes it more real’

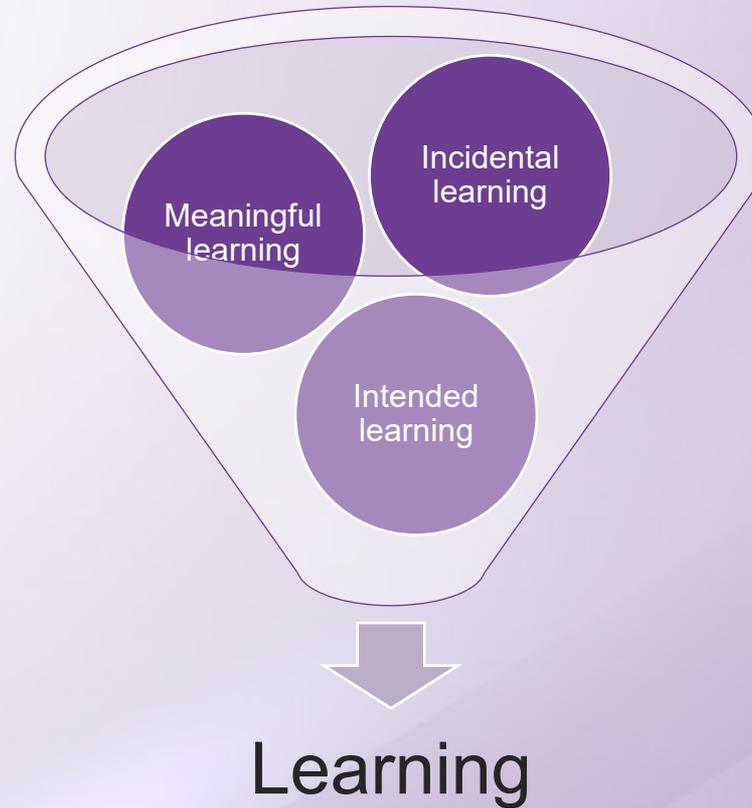
Realism/fidelity

- Meeting staff before the game starts
- Interaction with clients – sensitive towards dealing with diversity
- Immersion and curiosity
- Unexpected outcomes – *'I lost my company!'*
- Improvements made after beta-testing
- Increased engagement leads to an increase in the transfer of learning

Interaction/engagement

- Element of interactivity
- Simple game interface with useful feedback after gameplay
- Simulated real life situations relating to a food service unit
- Results of this study were modelled on the theory that illustrates that fidelity increases engagement, which influences the transfer of learning

What learning took place in the end?



Artificial intelligence (AI) and adaptability

The main sections of note in the game engine are:

- AI – this mainly controls the selection of events and the calculation of the score that the player will gain from the way they interact with the dialogue options.
- Dialogue – the dialogue system will show the player's portrait alongside the character they are interacting with and will play the audio files that correspond to the correct point in the conversation for each of the characters.
- Video – the game has a built-in video player that will play cutscenes that have been pre-rendered at the appropriate times.
- Player input control – is done almost exclusively with the mouse.

Results: qualitative walk-through methodology

Emerging themes from walk-through evaluations:

- diminished propensity for reading
- need for audio and visual stimulation
- need for more options and choices
- more challenging

Feedback and debriefing

- Feedback system:
 - client satisfaction,
 - staff satisfaction, and
 - revenue
- Debriefing provides students the opportunity to process and consolidate their learning experience
- Generated reports on choices and implications

THE ROLE OF THE TEACHER IN IMPLEMENTATION OF EXMAN ®

- Objectives set for the implementation of the game:
 - learning from mistakes
 - social and emotional interaction
 - active use of experiences available in the class
 - re-thinking and restructuring of teaching/learning materials
 - active student involvement
 - decision making
 - sharing of ideas and opinions

THE ROLE OF THE TEACHER IN IMPLEMENTATION OF EXMAN ®

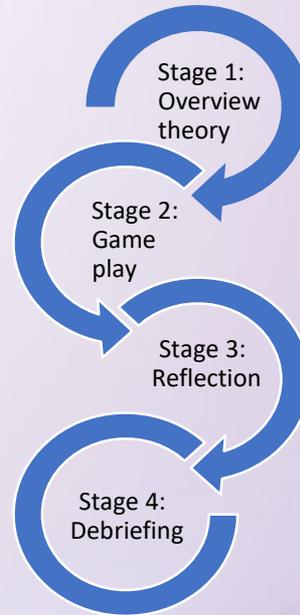


Figure 14: Overview of the game implementation process

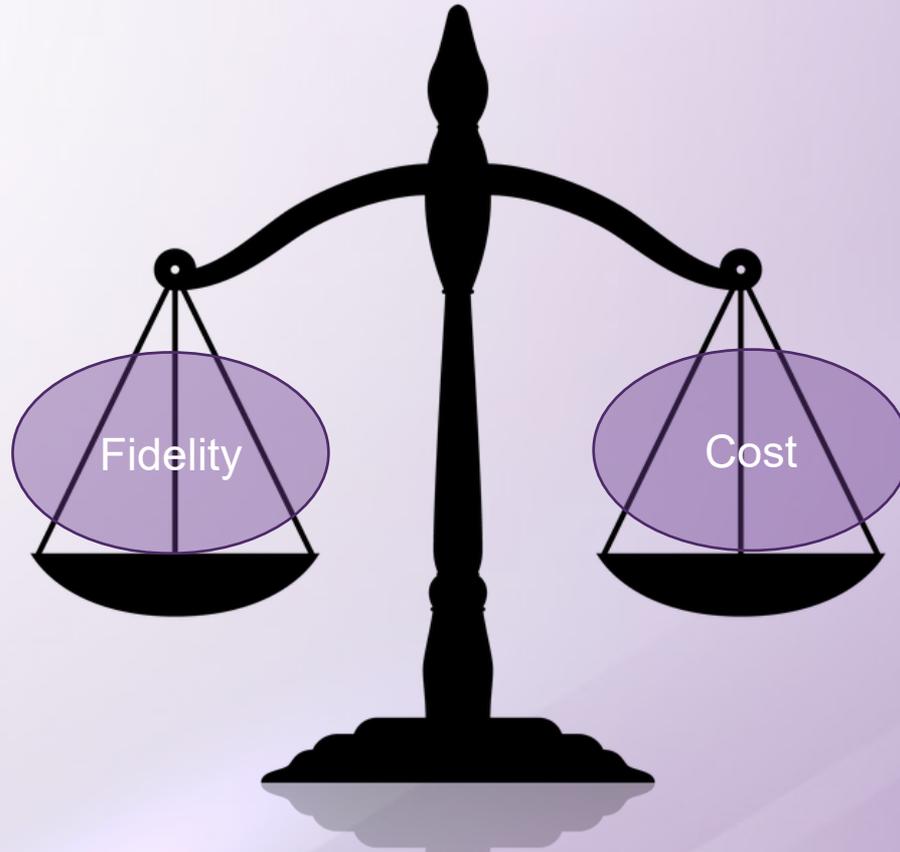
Lesson planning

- For best practice, assignments should be linked to the game for example:
 - Students start their own food service unit – FSU (restaurant, coffee shop, etc.)
 - They set the vision and mission and do a SWOT analyses (part of assignment)
- They then start playing the first level of the game where they must choose the size of their kitchen linked to the amount of investment which will determine their repayment.

Does playing games elicit learning?

- Learning from serious games – enhanced through other instructional and contextual features of the learning situation
 - use of supplementary teaching methods,
 - multiple training sessions, and
 - group work
- Distinguish between *learning directly from playing the game* versus *learning from teacher-led activities associated with the game*

Recommendations for improvement





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Acknowledgements



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Presentation of certificate & congratulations

by

Prof. Robert Balfour



National Anthem

Nkosi sikelel' iAfrika
Maluphakanyisw' uphondo lwayo,
Yizwa imithandazo yethu,
Nkosi sikelela, thina lusapho lwayo.

Morena boloka setjhaba sa heso, O fedise dintwa
le matshwenyeho,
O se boloke, O se boloke setjhaba sa heso,
Setjhaba sa South Afrika – South Afrika.

Uit die blou van onse hemel,
Uit die diepte van ons see,
Oor ons ewige gebergtes,
Waar die kranse antwoord gee,

Sounds the call to come together, And united we
shall stand, Let us live and strive for freedom,
In South Africa our land.