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THE USE OF SERIOUS GAMING IN THE TRAINING
OF DECIDERS IN AGRONOMIC SCIENCES

農学部での意思決定訓練におけるシリアスゲームの活用

Presented on March 18, 2019

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PROMOTION VAHINALA
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*«The difference
between the novice
and the master is
that the master
has failed more
times than the
novice has tried»*



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ABSTRACT

Video games are often perceived negatively as being responsible for certain social behaviors. Serious games, however, have become more popular in educational tools. They are not the only unconventional tools that can contribute in the transmission of knowledge, but will be largely taken into account throughout the present work. Within the Agronomic framework in Madagascar, serious gaming is practically non-existent. Then the question arises: in what way do methods involving entertainment really constitute an aid to education in the agricultural sciences? The training of agronomists could use serious games to develop the creativity of engineering students and thus allow them to open up to a more advanced and expanded field of thought. So what evidence could support the fact that serious gaming is an effective tool for transmitting knowledge? Why does-it not be used in Madagascar? With goal of having this method be accepted within the ESSA, especially the Agro Management Department, it will first be necessary to draw attention to the importance of serious games in the professional and educational environments, but also to demonstrate their relevance, as an information transmission tool. The hypotheses retained are that serious games can broaden the field of reflection and that they are effective in their role of transmitting knowledge. From there, it will be seen that the use of such games in the pedagogical environment is relevant and that they are accepted in the conventional education system, in the mechanism of transmission of knowledge.

Keywords: hobbies, education, tool, agro-management, serious game

概要

ビデオゲームは、しばしば社会的活動で責任を持つという点で否定的にとらえられる。しかし、シリアスゲームは教育でのツールとしては、よく見られるようになった。これらは、伝統的なツールではないが、知識の伝達で貢献するという点で本論文を通して積極的に取り入れられている。マダガスカルでの農業での枠組みでは、シリアスゲームは、現状存在しない。そこで、以下のような疑問が生ずる：エンターテインメントを含むどのような方法が、本当に農業教育での支援となるのか。農学部の訓練では、シリアスゲームを使って技術を専門とする学生の創造性を開発し、より先進的で拡張した領域の考えに広げることができた。知識の伝達のためのシリアスゲームが効果的なツールであったという事実を示す証拠は何なのか。この方法の目標については ESSA、特に農業経営課程により受託された。まず、専門的・教育的環境でシリアスゲームの重要性について注意が払われることが必要であろう、そして同時に情報伝達ツールとしての妥当性を示す必要がある。シリアスゲームが内省の領域を広げることができ、知識伝達の役割で効果的であるという仮説が設定できた。そこから、教育環境でそのようなゲームを使うことは妥当で、それらは、知識伝達の仕組みとして、伝統的な教育システムでも受け入れられたことを確認する。

キーワード：趣味，教育，ツール，農業経営，シリアスゲーム

SUMMARY

ACKNOWLEDGMENTS

ABSTRACT

SUMMARY

LIST OF TABLES

ACRONYMES

LIST OF APPENDIX

GLOSSARY

1 Introduction

2 Materials and Methods

1.1 Concepts and state of the art

1.2 Materials

1.3 Methods

1.4 Study Limitations

Results

1.5 Relevance of the use of serious games in the educational field

1.6 *Serious games in conventional education and information transmission system*

Discussions and recommendations

1.7 Discussions

1.8 Recommendations

Conclusion

Citations

Webography

Appendix 1 : Games on the protection of the environment

Appendix 2 : Games on economics

Appendix 3 : Factorial Correspondence Analysis

Appendix 4 : Research work having been carried out with TROPES

Appendix 5 : Symposium on Biogas

Appendix 6 : Survey questionnaire

Appendix 7 : Data base

Appendix 8 : Discours

Appendix 9: General typology

Appendix 10 : FCA sectors with gaps (Main coordinates)

Appendix 11 : FCA Trends toward ga (Main coordinates)

Appendix 12 : FCA Trends toward serious games – Madagascar (Main coordinates)

Appendix 13 : FCA Trends toward serious games (English) (Main coordinates)

Appendix 14 : FCA games and recommendations (Main coordinates)

Appendix 15 : FCA justification of recommendations (Main coordinates)

Appendix 16 : FCA justification of recommendations (English) (Main coordinates)

Table of contents

LIST OF TABLES

Table 1: ICT in Madagascar	7
Table 2: Evaluation of the ITC Development Index 2017	8
Table 3: Factors Influencing ICT Adoption	13
Table 4: Summary table of the surveyed population.....	21
Table 5: Variables introduced into the typology according to the perception of key development sectors	22
Table 6: Variables about the point of view of video game.....	22
Table 7: Topics considered as interesting.....	24
Table 8: Game proposal variable.....	25
Table 9: Database of games.....	II
Table 10: Contingency table format	V

LISTE OF FIGURES

Figure 1: <i>Serious gaming</i>	4
Figure 2: Difference between <i>gamification</i> and <i>serious games</i>	5
Figure 3: Areas requiring more attention	26
Figure 4: Sector Relationship	27
Figure 5: References for sector choices.....	28
Figure 6: Quality of current key development areas	29
Figure 7: Rating of the decision-making system.....	29
Figure 8: Trends in gaming	30
Figure 9: Subject of educational games.....	31
Figure 10: Relationship of actors around the game.....	32
Figure 11: Trends with the Serious Games of French-speaking interviewees	32
Figure 12: Foreign trend towards serious games.....	33
Figure 13: The most played games on agriculture	34
Figure 14: Classification of individuals according to games played and recommendations	35
Figure 15: Distribution of French-speakers according to their opinions on the recommendations.....	36
Figure 16: Distribution of English-speaking individuals based on their opinions on recommendations.....	37
Figure 17: Scoring of game criteria.....	38
Figure 18: Invitation to the symposium.....	XIV
Figure 19: General typology.....	XLIX

ACRONYMES

3G : 3^{ème} Génération

4G : 4^{ème} Génération

AFC : Analyse Factorielle de Correspondance

AVU : *African Virtual University*

BCE : Banque Centrale Européenne

CAPTICE : Cellule d'Appui Pédagogique – TIC pour l'Enseignement

CIDST : Centre d'Information et de Documentation Scientifique et Technique

Ed Tech: *Educational Technology* (Technologie Educative)

EPIC : Etablissement Public à caractère Industriel et Commercial

ESSA : Ecole Supérieure des Sciences Agronomiques

FAO: *Food and Agriculture Organization of the United Nations*

FOFIFA: *Foibem-pirenena momba ny Fikarohana ampiarina amin'ny Fampanandrosoana
ny eny Ambanivohitra*

ICT: *Information & Communication Technology*

IDI: *ICT Development Index*

IICD : Institut International de Communication et de Développement

INASP: *International Network for the Availability of Scientific Publications*

ISPM : Institut Supérieur Polytechnique de Madagascar

IST-D : Institut Supérieur de Technologies d'Antsiranana (Diégo)

LMD: Licence – Master – Doctorat

LSD: *Learning Sustainable Development*

MAM : Mention Agro-Management

MENRS : Ministère de l'Éducation Nationale et de la Recherche Scientifique

NPAD: *New Partnership for Africa's Development*

NRI : *Networked Readiness Index*

ODD : Objectif de Développement Durable

ODeL: Ouvert, Distant, e-learning

ONG : Organisation Non Gouvernementale

PMA : Pays les Moins Avancés

PME : Petites et Moyennes Entreprises

PNUD : Projet des Nations Unies pour le Développement

RPG : *Role Playing Game*

SEBC : Système Européen de Banques Centrales

STEP: *Support Technology for Educator and Parents*

TIC: Technologies de l'Information et de la Communication

TICE : Technologies de l'Information et de la Communication pour l'Éducation

UNESCO: *United Nations Educational, Scientific and Cultural Organization*

UNPPA: *UnPublic-Private Alliance for Rural Development*

USAID: *United States Agency for International Development*

Wi-Fi: *Wireless Fidelity*

LIST OF APPENDIX

<u>Appendix 1 : Games on the protection of the environment</u>	II
<u>Appendix 2 : Games on economics</u>	IV
<u>Appendix 3 : Factorial Correspondence Analysis</u>	V
<u>Appendix 4 : Research work having been carried out with TROPES</u>	VII
<u>Appendix 5 : Symposium on Biogas</u>	XIV
<u>Appendix 6 : Survey questionnaire</u>	XV
<u>Appendix 7 : Data base</u>	XIX
<u>Appendix 8 : Discours</u>	XXXVII
<u>Appendix 9: General typology</u>	XLIX
<u>Appendix 10 : FCA sectors with gaps (Main coordinates)</u>	LII
<u>Appendix 11 : FCA Trends toward ga (Main coordinates)</u>	LIV
<u>Appendix 12 : FCA Trends toward serious games – Madagascar (Main coordinates)</u>	LVI
<u>Appendix 13 : FCA Trends toward serious games (English) (Main coordinates)</u>	LX
<u>Appendix 14 : FCA games and recommendations (Main coordinates)</u>	LXI
<u>Appendix 15 : FCA justification of recommendations (Main coordinates)</u>	LXII
<u>Appendix 16 : FCA justification of recommendations (English) (Main coordinates)</u> ...	LXIII

GLOSSARY

Source: Perron, 2012

Addiction to video games: State of psychological dependence resulting from an excessive video-game practice, which is characterized by an irresistible and obsessive need to play a video game, and which, through isolation and the withdrawal into oneself which it entails, disturbs the emotional, intellectual and social life of the player.

Advergame: Interactive video game created specifically around a brand or its products, and which is intended to promote and capture the attention of consumers.

Video game design (game design): Theoretical conception of a video game where we define, from a scenario, the principles of the game, its universe, the narrative architecture, the rules of the game, the atmosphere and interaction mechanisms, prior to its development.

Game console: A computer-based, computer-like, stand-alone, stand-alone computer that plugs directly into the TV and is designed for video games.

Emulator: Program to simulate on a computer the operation of another computer, a game console or an arcade, and thus to run video games originally designed for these other platforms.

Gameplay: Set of elements related to the interaction between the player and the game, including the rules and the possibilities of actions, which are defined and integrated into the game during the creation of a video game, and which contribute to the pleasure of play, arising from the interactivity, felt during the game.

Action game: A video game whose gameplay is based on real-time actions and which uses the ability and reflexes of the player.

Arcade game: Simple and repetitive action game, based on reflexes, the scenario is rudimentary, and played on a charging arcade that is found in public places.

Simulation game: A video game that simulates reality, virtually represents a human activity or the operation of a machine, and in which the player feels physically involved in the activity presented on the screen.

Educational game: A video game used as a learning tool, which aims to educate and transmit knowledge and skills through the game.

Strategy video game: Video game in which the player must build a game an army, an empire or a civilization, arming itself, directing its troops, accumulating and managing its resources, establishing the best strategy to defeat the adversary and thus increase his domination of the territory.

Game platform: Hardware support of a computer or electronic system on which it is possible to play a video game.

Puzzle game (*puzzle-like game*): A game in which the player must place in a certain way or in a specific order, and as quickly as possible, pieces or objects of different or identical shapes and colours.

RPG: *Role playing Games*. A video game in which the player embodies one or more characters in a scripted story, and whose level increases and the characteristics evolve during the adventure, according to the experience gained.

Series (*Video game series*): Set of video games designed as a sequel, composed of several autonomous episodes that, title by title, share some basic features, including the main characters and the fictional universe.

Videoludic (*Video-ludic*): (1) Area of activity including the design, development, publishing, promotion, distribution and practice of video games. Note: in French, words formed with the video prefix are always written in one word, without a hyphen; *videoludique* is also used as an adjective (eg the video game heritage) and as a name (eg between cinema and *videoludic*); (2) Related to the video game.

Introduction

Games are often invoked to explain or justify certain social behaviors, in particular from a negative point of view for their detractors or idealistic for their defenders. Indeed, the proliferation of players and the increase in video-game practices have pushed the social sciences to examine the effects of video games on the practices of today's society or the consequences of their prolonged use. Towards the seventies and eighties came the "*Game Studies*". It is an application that allows the use of fun springs to transmit information, very popular currently *ine-learning organizations*. (Bréant, 2014)

Serious *games* have grown in popularity as a tool adding entertainment to education and training. They allow users to live situations that would be impossible in real life, for reasons of security, cost, time, etc. They engage the player in a pedagogical journey that would have a good impact for the development of the user on different points such as his analytical abilities, visual attention (*attention selective*), etc., and they also allow to develop the taking awareness of problem recognition and problem solving, decision-making, improvement of short and long memory, improvement of social skills, especially with regard to collaboration, negotiation and shared decision-making (Katsaliaki & Mustafee, 2012). Towards the 80s, the motivational aspect of the games begins to be exploited, although the approach has already been adopted in Italy since the fifteenth century, with the oxymoron "*Serio Ludere*", treat a serious subject in a fun way (Andrianafetra, 2017).

However, video-game practices are not the only practices capable of ensuring that information remains etched in the memory; any method inducing the person to feel concerned by the subject (identification, interest, etc.) helps to help this transmission of knowledge.

In the case of agronomy, it is about *serious games* of all kinds. They can help develop the creativity of engineering students and also broaden their horizons in a specific area. In Madagascar, the introduction of play methods is still very little developed in the education system, at all levels, despite the many advantages they offer in terms of documentation.

The problematic of this study can be summed up in the following question: in what way do the methods involving the entertainment really constitute an aid to education in the agricultural sciences? The research questions that follow are:

- What evidence can be brought to support the fact that *serious games* offer an effective tool in the transmission of information?
- Why didn't they apply in Madagascar?

The overall objective is to conduct a feasibility study on play practices in the education system, in this case at the Graduate School of Agricultural Sciences, within the Mention Agro Management to facilitate the decision-making process for future decision makers in agronomy. Thus, the specific objectives related to this study are:

- To draw attention to the importance of *serious games* in the professional and academic environment;
- Have serious games recognized as relevant means of transmitting information.

The hypotheses adopted to carry out this project of memory are:

- The introduction of the means video-games in the educational course and the professional field widens the field of reflection; and
- Serious games are recognized as effective methods in the transmission of knowledge.

The expected results are then:

- The use of *serious games* in the educational field will prove relevant; and
- Serious games will be used as information transmission tools.

This work will be as follows: first, in the material and method part, the different concepts will be advanced, as well as the state of the art relating to what has already been undertaken on the subject of study, followed by a presentation of the methods used in this work. Then the results will be presented. Finally, these will be discussed and will contribute to the formulation of various recommendations before concluding.

1 Materials and Methods

1.1 Concepts and state of the art

1.1.1 Concepts

1.1.1.1 E-learning

E-learning is, by definition, "the use of new multimedia technologies of the Internet to improve the quality of learning by facilitating the one hand, access to resources and services, and exchange and remote collaboration "(HAS, 2014, p.1). It is part of the Information and Communication Technologies for Education (ICT) and allows non-face-to-face activities. This is most often the use of computers or mobile devices (*smart phones*, tablets, etc.) connected to the internet.

E-learning is especially suitable for developing cognitive skills, with specific methods, and interpersonal skills. The training *e-learning* can be done in self-learning (digital learning tutorial) or be led by a facilitator (HAS, 2014).

1.1.1.2 Serious Games

Serious *Games* are defined as a digital device or not with the primary objective to combine consistency with the utilitarian aspects, serious, such as teaching, learning, communication or information with playfulness from games, video-games or not (PortalEduc, 2019). They encompass all aspects of education: teaching, training and information; and are available at any age. They can be used in a wide field of application: public policies, defense, business management, health, etc. (Katsaliaki & Mustafee, 2012).

Playing games can be both intrinsically and extrinsically motivating. This motivating factor can be used to better focus attention on a given subject. Motivation is strongly linked to factors such as depth of teaching, awareness of the general idea, development and coherence of ideas (Gale, 2011)

. *Serious games* are not just for children but also target a very large population, and even the general public. They must be entertaining so that the player is more receptive to learning. Some employers even opt for these types of games to promote and provide training in their company instead of finding a real trainer, which employees see as more modern and fun (Andrianafetra, 2017).

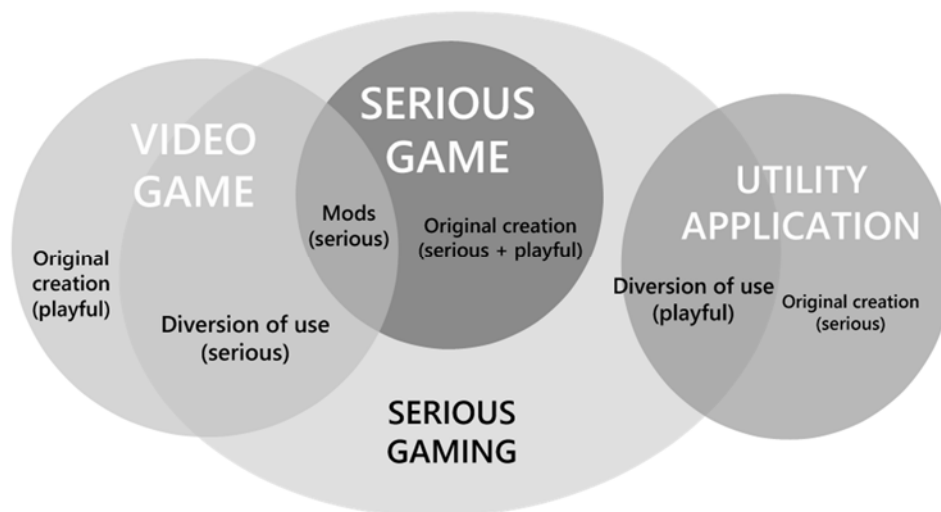


Figure 1: *Serious gaming*

Source: PortailEduc, 2019, p. 7

It can also be considered that *serious gaming* is naturally associated with the process of diverting a traditional game for teaching purposes in two ways: diverting the game through uses without modifying the artifact ("*serious entertaining*")) and diversion by modification of the device ("*serious modding*") in terms of its design and operation (PortailEduc, 2019).

1.1.1.3 Gamification

For a number of years, higher education has been involved in the questioning of the pedagogical relevance of digital games, but faces the time, complexity and cost of development involved in creating narrative, immersive environments. and simulation (Le Maire et al., 2018). An alternative proposal to "*serious games immersive*", called "*gamification* ", consists in applying elements and mechanisms of the game to situations and non-playful contexts in order to generate in the student-player different benefits attributed to playful pedagogy. . The same authors maintain that the application of so-called "*elements gamification* "to training activities makes it possible, in particular, to design mini-games centered on a concept to be mastered. In contrast to serious,

gamification consists of associating a game or game mechanics with contexts or objects that are originally lacking (PortalEduc, 2019).

1.1.1.4 Difference between gamification and serious gaming

In contrast to *serious gaming*, *gamification* is not aimed at personal development. It is a form of play with a productive purpose. It tends to finalize an objective outside oneself. The purpose of *serious games* is utilitarian and "serious", while *gamification* tends to try to make a subject as distracting as possible to avoid the monotony (Andro & Saleh, 2015).

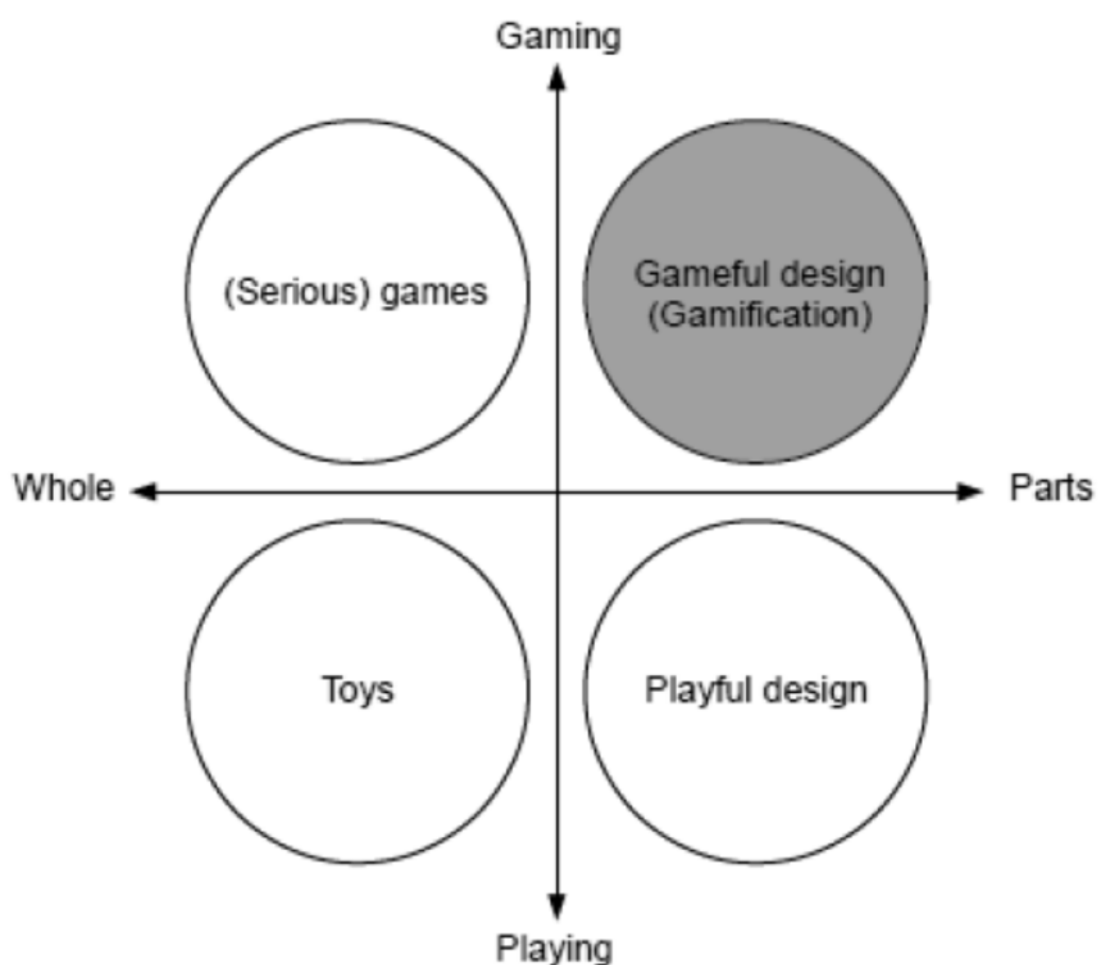


Figure 2: Difference between *gamification* and *serious games*

Source : Andro & Saleh, 2015, p. 10

1.1.1.5 Playful pedagogy

Playful pedagogy is a form of pedagogy that allows the learner to learn by any means possible at his or her own pace. She asks the person who applies it to have a perfect

mastery of what he tries to convey, without losing sight of the main purpose of the method. Learning through play can become a kind of mixture of laxity and not pedagogy if the objectives are not well defined. On the other hand, if it is well applied, it will allow the teacher to have a constant follow-up of the player, to see his progression and to bring him permanent help, to correct him, and to support him. It would help the learner and not to pre-empt him, respecting the latency phase between the learned and the acquired. Playful pedagogy is born of the principles that imply the majority of pedagogies except that it focuses more on the learner and its rhythm. However, it is not an absolute means of teaching but is one of many tools in the hands of the teacher. (PortalEduc, 2019)

Like any form of pedagogy, playfulness presents its strengths and its weaknesses. It can be accepted by some and refused by others. It can help to understand more easily some concepts and concepts as other pedagogies can do but it must follow two main axes (PortalEduc, 2019):

- The involvement of a pedagogue able to master the subject perfectly without get lost in the method, and who understands very well the stakes of the playful pedagogy and the stakes of this type of learning. The play method will therefore always be present in all its interventions; and
- playful pedagogy proceeds by detour: the learner does not become aware of the goal. Throughout the game, the learner will "discover" everything that the teacher has put in place, or more, since the knowledge is not so measurable. The cognitive knowledge of the learner will marry those he receives, which will offer him a wider range of knowledge.

1.1.2 State of the art

1. *Situation of Madagascar in the use of new technologies*

Madagascar has started to promote the use of new technologies with the adoption of two policies: i) the national policy on Information and Communication Technologies (ICT) in 2004, and ii) the social development policy, Madagascar Action Plan 2007-2012, which was supposed to proliferate infrastructures with new technology and “ICT centers” in schools. The country does not have a National Strategy for Information and Communication Technologies in Education (ICTE), and the level of access to new technologies involving connectivity is relatively low. Madagascar cannot yet be classified, the case of Mozambique, near the Big Island, shows that it is ranked 102th out of 115

according to the *networked readiness index* (NRI), which measures the degree of preparation of a nation or a community to participate and benefit from the benefits of ICT development (Isaacs, 2007).

Table 1: ICT in Madagascar

Indicators	Values (%)
Phone coverage	78.0
rate3G coverage	63.0
rateMobile phone penetration	39.8
rate4G coverage	23.1
rateInternet penetration rate	6.30

Source : MPTDN, 2017

This table shows the good figures to know about the use of the digital tool in Madagascar. It was provided by the Ministry of Posts, Telecommunications and Digital Development in 2017.

One can also consider the ICT Development Index (IDI), an indicator used by the International Telecommunication Union to measure the evolution of the telecommunications sector ICTs in every country in the world. The IDIs of Madagascar between 2015 and 2017 are listed in Table 2:

Table 2: Evaluation of the ITC Development Index 2017

TITLE OF THE INDICATOR	Value for Madagascar in 2015	Value for Madagascar in 2016	Value for Madagascar in 2017	Reference value
Access ICT	1.67	2.39 (LDC 2015 = 2.65)	2.29	
• Fixed telephone subscription per 100 population (%)	1.06	1.04	0.60	60
• Mobile phone subscription per 100 population (%)	38.2	46.0	41.8	120
• International bandwidth Internet per user (bits / s)	267	12420.19	14258.05	962216
• Percentage of households with a computer (%)	4.52	5.34	6.16	100
• Percentage of households with internet access (%)	4.68	5.79	9.97	100
ICT use	0.33	0.44 (2015 LDC = 0.71)	0.51	
• Percentage of individuals using the Internet (%)	3.7	4.17	4.71	100
• Fixed (wired) broadband Internet subscriptions per 100 population (%)	0.1	0.07	0.06	60
• Active broadband mobile subscriptions (wireless) per 100 inhabitants (%)	6.09	9.01	10.52	100
ICT skills	3.57	2.77 (2015 LDC = 3.89)	2.80	
• Adult literacy rate (%)	64.7	6,05	6.10	100
• Gross enrollment ratio in secondary education (%)	38.4	38.4	38.4	100
• Gross enrollment ratio in tertiary education (%)	4.09	4.25	4,78	100

Source : MPTDN, 2017

It can be seen that indicators are generally rising. There is also a comparison with the Least Developed Countries (LDCs).

a. National ICT policy

This policy was developed in 2004 by the Ministry of Posts and Telecommunications, in partnership with the United Nations Development Project (UNDP). Madagascar's integration into the globalization process was one of the Government's priorities. This policy aims to ensure that Madagascar becomes a leader in providing good quality ICT services that accelerate the country's economy, social and cultural development. Its strategic points concern infrastructure development, capacity building and the review of the institutions' framework. This policy considers the health and education sectors as the

key sectors. These sectors require by far the training of ICT specialists and the adjustment of the education system so that it adapts better to the needs of the new generations using the new technologies. This policy also proposes to introduce ICT in all aspects of education and different training. The overall objective in the education sector is to set up an education system that is able to accommodate new technologies and also to innovate pedagogy. This system would facilitate the integration of new generations of ICT into the information society. In addition, the policy proposes linking ICTs to the national curriculum and emphasizes the concept of ICT training as an educational tool for all levels. Referring to the vision of the Sustainable Development Goals (SDG-4: Towards inclusive and equitable quality education and lifelong learning for all), the Ministry of National Education launched the National ICT Policy , for a gradual integration of Educational Technologies (Ed Tech), into the education system in Madagascar, by 2018.¹

b. Initiatives and projects related to ICT

African Virtual University (AVU) Teacher Education Project

AVU has set up an ambitious teacher training project involving 10 African countries in partnership with the African Development Bank and the New Partnership for Africa's Development (NPAD) in 2006. Madagascar was one of the 10 country. This program focuses on teaching mathematics and natural sciences as well as integrating ICT into the curriculum of both subjects; The goal is to train qualified teachers through the use of flexible, Open, Remote, and e-Learning (ODeL) methods at affordable cost for high school, university and postgraduate levels. The specific objectives of the project are (i) to improve the skills of teachers in the use of new technologies in mathematics and science, (ii) to develop their capacity to offer ICT as a subject of instruction and (iii) to increase the number of mathematics and science teachers by increasing access to training through ODeL methods. The project planned to implement 56 ODeL modules by early 2007. The content of the modules was planned to be available in Portuguese, French and English. The authors of the modules came from 12 institutions in the 10 countries concerned covered by the funds of the United Nations Development Project (UNDP). The University of Antananarivo is one of these 12 institutions.²

¹ In <http://www.education.gov.mg/education-et-technologie-madagascar-lance-sa-politique-nationale-dintegration-des-tic-dans-le-systeme-educatif/>, consulté le 26 février 2019 (MEN, 2016)

² In <http://www.avu.org/avuwweb/en/faculty/teacher-education/>, consulté le 26 février 2019 (AVU, 2019)

Centre d'Information et de Documentation Scientifique et Technique (CIDST)

The CIDST is a national research center in Madagascar that works with various government institutions to facilitate information exchange at the sectoral level. It is a Public Institution Industrial and Commercial (EPIC). It is under the supervision of the Ministry of Higher Education and Scientific Research and the Ministry of Finance and Budget. Its mission is to contribute to the development and implementation of policy on information and knowledge dissemination, to proliferate the results of national and international research to support development actors, to ensure the authenticity and the security of information circulating, ensuring training cycles for better information management and professional capacity building.

The CIDST also has a very large database of articles and publications on the agricultural world. Most texts are available in virtual libraries. The "Research for Development" series is also published. During the last ten years, 607 publications of agents of the National Research Center for Rural Development (Foibem-pirenena momba ny Fikarohana ampinny Fampanandrosoana ny eny Ambanivohitra or FOFIFA).³

ICT Village

The ICT village is an attempt to develop an ICT integration model for sustainable development and for the eradication of poverty. It implements international organizations such as the Food and Agriculture Organization of the United Nations (FAO), UNDP, the United Nations Educational, Scientific and Cultural Organization (UNESCO), the World Bank, etc. The model envisions the use of new technologies to produce a non-polluting energy source and clean water. The first ICT village in Madagascar was developed in Sambaina. After two UNDP missions in November 2005 and June 2006, a digital classroom for more than 600 students was inaugurated. In order to accelerate the digital literacy of the local community and create jobs, a new community zone has been made accessible to all and a renovated health center to facilitate access for pregnant women and newborns. Partners in this project include the United Nations Public-Private Alliance for Rural Development (UNPPA) and representatives of the different sectors of activity: universities (University of Oklahoma, Politecnico di Milano, Università Cattolica del Sacro Cuore), companies (Microsoft, Siemens, Telespazio, Pianeta, Water B2B, etc.), civil societies (almost all the population of

³ In <http://www.agro-oi.com/fr/7/467/cidst-centre-d-Information-et-de-documentation-Scientifique-et-technique.html#.XHTOYlwzZac>, consulté de 26 février 2019. (AGRO-OI, 2019)

Sambaina who participated actively during all procedures) and the Government of Madagascar. The next steps for the Center are to gain connectivity through the acquisition of broadband satellite signals that can be received and redistributed, Wi-Fi for the entire territory, and teleconferencing equipment. Also, there is a "coaching training" program that would act as an incubator for economic activities. (Razafindralambo, 2013).

International Network for the Availability of Scientific Publications (INASP)⁴

INASP is an international network that encourages the creation and production of information. It promotes sustainable and equitable access to information and strengthens the capacity to manage and use knowledge and information. Their activities include: (i) improving access to scientific and academic information, (ii) ensuring the catalytic and supportive role of publications and information exchange, (iii) strengthening management and use of knowledge and information, (iv) national, regional, and international adaptation of cooperation and networking, and finally (v) the provider of advice to local organizations and financial support to help achieve development goals (INASP, 2018).

Jacaranda

The Jacaranda network includes a number of institutions that share bibliographic reports, exchange documents, conduct workshops, and sensitize decision-makers about the importance of information. The network is also responsible for publishing catalogs that cover specific topics (Isaacs, 2007).

Private companies

Several private companies are also responsible for ICT training: Institut Supérieur de Technologies of Antsirananana (Diégo) (IST-D) which offers training in computer science and computer maintenance, the Higher Institute of Polytechnic of Madagascar (ISPM) which has an engineering degree, and an Infocentre that offers a 3-year training course in computer science. SchoolNet Association of Madagascar

This association was launched in Madagascar in 2005. Since then, it has been related to activities supported by the International Institute of Communication and Development (IICD) Global Teenager Project which encourages the adoption of a teaching program in line with young people from all over the world. SchoolNet Madagascar has also already

⁴ in: www.inasp.info, consulté le 12 janvier 2019

trained 220 learners and teachers in the Mtandao Afrika Program supported by the Microsoft Unlimited Potential Program. This encourages learners and teachers throughout Africa to create educational websites through contests.⁵

Support Technology for Educator and Parents (STEP)

The United States Agency for International Development (USAID) supported a pilot project known as the "STEP Program" in three provinces of Madagascar: (i) Toliara, (ii) Fianarantsoa and (iii) Tamatave, between 2006 and 2008. STEP works with the Ministry of Higher Education and Scientific Research (MENRS) to build the capacity of its staff to provide good quality training and help teachers and schools that are expanding. Activities fall into three distinct but interrelated areas: (i) strengthening teachers in service, (ii) increasing community support to local primary schools, and (iii) reforming a schedule for teacher professional development. STEP allows MENRS, USAID and other Non Governmental Organizations (NGOs) to test its technology-based education methods that could add value, nationally, to education that maintains a good level. The program uses an interactive technology system via contextualized radio, programs on community radio channels and digital applications that simultaneously act as catalysts for the capacity building plan for MENRS staff at the central and decentralized levels (Isaacs, 2007).

Universities

The Faculty of Sciences of the University of Antananarivo has a department specialized in mathematics and computer sciences. As part of the promotion of ICT, a unit called PSCICTE or Pedagogical Support Cell - ICT for Education was set up by the University of Antananarivo. The objective of CAPTICE is to reform and encourage the teaching of teachers, to acquire the basics of the teaching profession, as well as to contribute to the personal development of teachers.⁶

Implantation of ICTs in education

The following Table 3 summarizes the stage of ICT use in education in Madagascar, focusing on strengths and constraints. It is established according to various factors related to the use of new technologies.

⁵ in <http://196.1.95.39/schoolnet/french/index.htm>, consulté le 26 février 2019 (SchoolNetAfrica, 2007)

⁶ In <http://www.univ-antananarivo.mg/Universite-Virtuelle-d>, consulté le 26 février 2019 (Université d'Antananarivo, 2013)

Table 3: Factors Influencing ICT Adoption

Factors	Enabling features	Constraining features
Policy framework and implementation	Madagascar has a national ICT policy and an overall economic and social development policy with extensive reference to the development of ICT infrastructure in the country, including in schools.	There is no dedicated ICT in education policy and there is limited reference to education and the use of ICTs in the country's existing policies on ICT and economic and social development.
Advocacy leadership	Dedicated government ministries are assigned responsibility for priority projects for ICT infrastructure development.	There is no dedicated leadership around ICTs in education even though there are a few projects, largely civil society trying to take the lead.
Gender equity		There are no explicit references to gender equality and women's empowerment through the use of ICTs in general or in education.
Infrastructure and access		ICT infrastructure remains very limited within education institutions in particular.
Collaborating mechanisms		There appears to be limited collaborative mechanism to promote ICTs in education in particular.
Human resource capacity		There remains a very limited layer of skilled personnel and champions at the national level concentrated around a network of skilled engineers and personnel.
Fiscal resources		There appears to be limited budget for ICTs in education and limited donor funding support.
Learning contents		Local contextually relevant learning content is currently lacking.
Attitudes	Within government leadership at the highest levels have displayed a positive and supportive attitude towards ICTs for development in general.	

Source : Isaacs, 2007, p. 9

1.1.2.1 Analysis of existing serious games in agronomy

a. Harvest Moon Series

Serious games related to agronomy do exist. With the topic of games and agronomy, it is impossible not to mention the Harvest Moon licence and its developer Yoshifumi Hashimoto. The Harvest Moon series currently contains several titles, all of which depict the life of a young farmer to whom we entrust either a farm or a city, in all cases in a deplorable state. The aim is to ensure a flourishing farm and restore stability in the village economy by encouraging exchanges, by exploiting the natural resources made available to it, etc. As the original license has now taken the name Story of Seasons, it remains with developer M. Hashimoto, but the production company has moved from Natsume Inc. Serious Fun at Xseed Games. However, the name Harvest Moon remains with a new developer. (Andrianafetra, 2017)

b. Harvest Moon derivatives

Harvest Moon's derivatives include Run Factory, a game that is based on principle but adds a touch of fantasy to the script. Indeed, the story is richer and more exciting than that of a simple farmer. Apart from that, there is also Innocent Life: A futuristic harvest moon, Hometown story (a game more oriented towards farm management), etc. (Andrianafetra, 2017)

c. Other relevant agronomic games

There are games that have been created to draw development actors' attention to the agricultural sector a little more, especially in poor countries. Two examples of this have been taken into account: African Farmers and Future of farming. (Andrianafetra, 2017)

African Farmers is an online game created by Future Agricultures Consortium, STEPS Centre and the University of Sussex. It was launched to open the eyes to the decisions that small farmers in Sub-Saharan Africa have to face day after day to face their uncertain living situation.

Future of farming is a role play developed by The Danish Ecological Council, in collaboration with scientists from the University of Copenhagen and Aarhus. It targets students in agricultural schools who are future decision-makers in the environment, to give them the opportunity to learn everything about agriculture, the environment and agricultural policies. It encourages thought-provoking players and has been very well

received by agricultural school teachers and sees it as an innovative tool for engaging students on topics relating to Agriculture. (Andrianafetra, 2017)

d. Serious games dealing with environmental protection

Research was conducted on Web of Science® and SciVerse Scopus. These are sources that bring together a large number of published academic journals and offer access to documents that can be dated since 1980 or more. This made it possible to list the games according to key criteria and specific variables such as the words “development” or “environment” (Appendix 1).

1.1.2.2 Serious games in other subjects

a. Economics

A selection of serious games relating to economic sciences brings together subjects dealing with the management of economic resources, whether in terms of production or consumption (Appendix 2; PortailEduc, 2019). Most of them relate to banks, in particular the European Central Bank (ECB), and explain how they operate. Others deal with more diversified topics such as inflation or even agricultural policies and law.

b. History - Geography

Below is a non-exhaustive list of serious games related to history and geography (PortailEduc, 2019):

- History: *Construis ta cité romaine* ; *Vivre au temps des châteaux forts* by the academies of Caen and Rennes; *Violences révolutionnaires* and *Assassin's creed Unity* ; the First World War with *Gueule d'ange* or a digital escape game proposed by the Academy of Lille; *Sauvons le Louvre* on Resistance during the Second World War; a game to tackle the Cold War on a tablet
- Geography : develop a sustainable city with *Écoville* ; *Des territoires une voie sur l'aménagement du territoire* by the education authorities of Lyon, Aix-Marseille and Dijon; *2020 Energy* ; *Halte aux catastrophes* on natural and industrial risks by the Aix-Marseille and Caen academies; tackling refugees through play; a serious localization game and another on water management.

1.1.2.3 Serious games in other areas

Contrary to popular belief, serious games are not only aimed at young people and regular players. They can equally well target occasional players and non-players from all generations. Even older people, for example, are targeted by serious games: abroad, several retirement homes are equipped with Nintendo Wii systems to help people stay fit with serious games (Thevenot, 2010).

1.2 Materials

1.2.1 Study area

1.2.1.1 Choice of the study area

The study was conducted at the international level. Not only Madagascar, but also several other countries were affected when collecting data for this work. In particular, English-speaking countries have been the most targeted due to the fact that the majority of games are not translated into French, but only exist either in the original version or in the English version (for large franchises).

1.2.1.2 Justification for choosing the study area

Educational games are not yet the priority at the local level. Conducting research on the subject would be hard work or almost impossible in Madagascar. This is why the study area has been expanded worldwide where the method is already more common than in Madagascar. In addition, the majority of games that will be mentioned during this work will be games whose production language is the English language, which is why, as previously specified, English-speaking countries have been prioritised.

1.2.2 Justification for choosing the study theme

The principal quality of an engineer is to be ingenious. This is an issue that has never been discussed in the establishment, or perhaps even in Madagascar. Expanding points of view so as not to be limited by the traditional, to innovate the way of thinking, to push the limits of what is possible by taking inspiration from imaginary facts: these are the opportunities offered by this study theme.

In order to open up and defy conservatives' prejudices about games and ludo-education products, particularly in the training of students in agricultural engineering, the topic of

decision-making tools, using modern methods, was chosen. As a result, it opens up an opportunity for new sources of knowledge for engineering students, as well as a wide range of possibilities in the educational world in general in Madagascar.

1.2.3 Tools

1.2.3.1 Data collection tools

Google form

Google form is a tool developed by the Google company to create and manage different types of questionnaires. It allows data to be collected quickly by creating an online form that respondents can complete. All you have to do is share a link accessing the form created for this purpose, and the data are then processed and summarised automatically in the form of descriptive statistics, by graphs, diagrams, etc. The analyst can then export them to a spreadsheet to be able to analyse them in more detail.

1.2.3.2 Data Processing and Text Tools

Google form

As stated above, Google form already allows partial data processing. As soon as it is collected, it offers a statistical summary of the data in the form of graphs and diagrams. The rest of the processing is then done after exporting the data.

Microsoft excel

The Microsoft default spreadsheet that creates spreadsheets for data processing. It was chosen for its ease of access and use.

Microsoft word

The standard text tool. It is used throughout the document when writing.

1.2.3.3 Analysis tools

a. Speech analysis

To complete this study, a series of questions was asked to different categories of people. In order to identify the trends and main ideas in the questionnaire, a speech analysis is essential. To do this, the following steps must be followed:

- - Convert ideas into raw text so that they can be separated more easily into a spreadsheet. This step is to standardize the writing format in which the ideas were written.
- - Move the resulting text into a spreadsheet by separating each word in a box to facilitate sorting. To do this, you must copy the text into a cell of the spreadsheet and then use the "convert" option in the "data" tab. Once this has been done, the word separators must be defined and the steps displayed must be followed to obtain the desired result. In this way, it is possible to separate the text so that each word goes into a cell.
- - Transpose words into cells so that they are presented vertically. This step is used to assign a column and not a line to each text. All ideas will then have to be held in two columns such as what was said by the same person will have the same label, the next idea below will have a new label, etc. The first column is therefore that of the wording, the second column is that of the ideas.
- - Sort the ideas in alphabetical order in the second column. This will make it possible to standardise what has been written; to ensure that the same word is always written in the same way. This step also allows data to be cleaned up and only words with meaning are kept (words such as "this", "the", "it", etc. will then be deleted)
- - Create a dynamic cross-tab. The pivot chart will count how many times a word has been repeated by each person. To do this, the individuals are placed in columns and the words in line, with the number of words in the "value" section. Once this has been done, the table must be moved to a new sheet so that it can be modified and manipulated. All empty values must then be replaced by zero (0).
- - Conduct a Correspondence Factorial Analysis (AFC). This analysis is used to graphically represent proximities between the methods of two qualitative variables, in this case individuals and their words. (Appendix 3)

b. TROPES Text Analyzer

TROPES is a text analysis software that not only lets you dissect a text in detail, but also takes out general ideas, the number of words, the different scenarios followed, etc. It has been used since 1994 in numerous scientific research works (Appendix 4).

The procedure followed when using TROPES is as follows:

- First of all, the authors of the interviewees were taken from the form in order to make it a full text. The latter has been saved in a new text file for processing;
- The new text file created in this way will then be opened in the software, which will then perform instant analysis; and
- Once the analysis has been carried out, it will be necessary to isolate the elements that will be useful for the presentation of the research results present here.

Here, drawing up a graph will make it possible to determine the relationships between the words. Each class of equivalents⁷ is represented as a sphere whose surface area is proportional to the number of words it contains.

The distance between the central class and the other classes is proportional to the number of relationships⁸ that bind them: in other words, when two classes are close, they have a lot of common relationships, and when they are distant, they have little common relationships. To use the planetary system metaphor used for this graph, let us say that around a central planet (equivalent class) gravitate to other planets (equivalent classes that have relationships with the central class) that are more or less close to the centre (frequently

⁷ The classes of equivalents comprise words (common names or own names) that frequently appear in the text and have a similar meaning. For example: "father" and "mother" will be grouped together in the "family" class by the software

⁸ Relationships indicate which classes of equivalents are frequently linked (encountered within a single proposal), in the text under analysis. These relationships are oriented according to the order in which the words that make them appear (generally by going from the actants to the acities, or more simply, in the direction of reading). To display the corresponding text, click the relevant line. The display of relations does not leave much room for chance. Indeed, it is quite unlikely that two classes of equivalents will be found several times, in the same order, in the same text. In this case, it means that these two classes are strongly linked, it shows the concepts that the author of the text insisted on (but not necessarily what he wanted to put in it), but also composite words or trivial associations.

used together) and are more or less large (depending on the number of occurrences of words that they contain).

1.3 Methods

1.3.1 Methods of verification common to the assumptions

1.3.1.1 Preparatory phase

a. Documentation

During the preparation period, bibliographic research was carried out. To this end, different documents have been collected so that they can be used for the present work. During the months of November and December 2018, several sites were consulted to gather relevant works on the subject of serious games and their possible relationship with Agronomy. To do this, various places were visited such as: (i) the ESSA Documentation Centre, (ii) the offices of the Ministry of Posts, Telecommunications and Digital Development, (iii) the offices of AHBROK, etc. AHBROK is a grouping of several organizations. Its main mission is to broach and promote Small and Medium Enterprises (SMEs), whether locally or internationally, particularly in Europe and Asia.

In the same interest, opportunities were presented to discuss with resource persons (university professors, cultural attachés, ambassadors, etc.), whether at the local or international level, in person or via the Internet, videoconferencing, telephone, etc.

b. Seminars and other

On 14 November 2018, a symposium on the use of biogas was held at the Louvre Antaninarenina. During this event, some useful information was gathered, particularly regarding “Satoyama Energy” and the risk-free development initiative for future generations while respecting the environment. This symposium was organised by the Mirai Non-Governmental Organisation (NGO), formed by a Malgacho-Japanese group including Dr. Andriamanohiarisoamanana. The latter explained the fruit of his research on biogas and is in the process of being installed in certain regions of Madagascar in the company of his Japanese colleagues (Appendix 5). Satoyama Energy has launched the promotion of its activities, using mascots in particular, which in itself is a form of gamification. These symbolic characters make it easier to anchor information by using their appearance as a click to remember what is essential.

1.3.1.2 Data Collection

To collect the data used in the present study, a bibliographic research was initially required so as to make a general assessment of the theme of research. Rather than collecting data, it would primarily be a collection of information related to the study subject in order to clarify certain unclear ideas and highlight the research that has already been carried out.

The method used focuses on identifying relevant games by conducting research on educational books and games focused on education and agriculture. The keywords used in this research were: serious games, agronomy, development, education, e-learning, gamification.

During the actual collection, a link to an online form created via the Google Form tool was shared with different groups of people, including people involved in the field of teaching: students, teachers, employees, etc. (Annex 6). Most of the questions asked during the survey are questions that allow qualitative data to be collected. The data on the respondent's personal information will subsequently categorise the type of people affected during collection. The sample considered consists of 61 individuals, 12 of whom are from English-speaking countries. The following Table 4 summarises the population studied.

Table 4: Summary table of the surveyed population

Gender			Age (years old)					Localization							Occupation										
Female	Male	Non spécif	< 10	10 - 15	15 - 20	20 - 25	> 25	Canada	Europa	France	Japan	Madagascar	USA	Brazil	Zealand	New	Unemploy	Employed	Academic	Contractor	High	student	University	Volunteer	Artist
27	31	3	1	1	6	41	12	1	9	1	2	42	4	1	1	2	11	4	1	1	40	1	1	1	

1.3.2 Verification method specific to each assumption

1.3.2.1 Method of verifying Hypothesis 1: “The introduction of video and play resources into the educational and professional curriculum broadens the field of reflection”

Verification of this hypothesis is necessary insofar as it demonstrates the relevance of the gamification in the area concerned. This assumption tends to establish a link between the different sectors and the related strategies.

- a. Verification method and considered variables

Typological analysis

In order to verify this hypothesis, a typology was made using the speech analysis. To this end, the following data were collected from those surveyed: gender, age group, country of origin and employment (Appendix 7). The variables are presented in Table 5.

Table 5: Variables introduced into the typology according to the perception of key development sectors

Variable	Type	Choice
Gender	Nominal	Homme Femme Je ne souhaite pas préciser
Âge	Nominal	- <10years old - 10-15years old - 15-20years old - 20-25years old - >25years old
Localization	Nominal	- - Madagascar - - Africa - - Europe - - USA - - Canada - - Japan - - Other (specify)
Occupation	Nominal	- - Student - - Middle school student - - High school student - - University student - - Academic - - Employee - - Other (specify)
Sector most deserving of attention for country development	Nominal	- - Agriculture - - Crafts - - Education - - Trade
Rating given to the sector's decision-making system	Continuous	Notation (0-5)

Following this, a game study was carried out on the respondent: this time, the latter will face questions on the use of games in general (Appendix 7). The variables presented are qualitative in nature. They are presented in Table 6.

Table 6: Variables about the point of view of video game

Variable	Type	Modality	Expected response
Influence of video games on behaviour	Nominal	1 : Yes 0 : No	1
Likely influence of video games on behaviour	Nominal	1 : Yes 0 : No	0 or 1
No influence of video games on behaviour	Nominal	1 : Yes 0 : No	0
Use of games in the	Nominal	1 : Yes	1

transmission of information		0 : No	
Possibility of using games in the transmission of information	Nominal	1 : Yes 0 : No	0 ou 1
Games cannot be used in the transmission of information	Nominal	1 : Yes 0 : No	0

Speech analysis

A study on the current education system was conducted among the interviewees, asking them for a brief comment on the subject. That being said, the main points are made about the views of the various interviewees.

In addition, the respondent was asked to describe a serious game according to his own perception. This will make it possible to find a range of references analysed on Tropes, the relationships of which will also be identified. The variables taken into account are: necessity, development, education, importance (Appendix 8).

Choice of questions

The different questions were asked and then reconciled the quality of the existing perceived by the different types of individuals affected by the field of education with the corrections that could be applied according to their preconceptions during the survey. Indeed, it is noted that the first series of questions focusing on the respondent also requires his vision of the current situation, while the second probe his tolerance of serious gaming and his judgement on the question. As a result, it can be deduced whether the people who have adopted, not being against the serious gaming method, are prepared to use it to broaden their thinking (Appendix 8).

b. Purposes

The typology was designed first to provide an overview of the current situation at the educational level, and also to draw out the areas deserving of serious games. The discourse analysis will make it possible to determine the different scenarios and universe of references considered by the interviewees by answering the questions. In particular, this will make it possible to identify everyone's point of view on the quality of the development sectors.

1.3.2.2 Method of verifying Assumption 2: «Serious games are recognized as effective methods in the transmission of knowledge.»

The need to verify this hypothesis lies in the fact that it is able to prove that serious games are applicable and deserve to be used. This hypothesis makes it possible to determine the best sector of application of serious games and to give examples of this.

a. Verification methods and considered variables

Survey

The interviewees had the choice of whether or not to answer this question. Having not necessarily already played the games on offer, they are offered a choice of “other” answers, also allowing them to offer a game that they deem appropriate to be considered a serious game. This will also make it possible to discover new horizons as desired by the objective of the study. In addition, the way in which this part of the questionnaire was gleaned so that the interviewees had a precise idea of the issue (Appendix 7).

The question was what kind of game the interviewees would find interesting. Thus, the variables considered in this section are listed in Table 7.

Table 7: Topics considered as interesting

Variable	Type	Modality
Management_game	Nominal	1 : Yes 0 : No
Strategy_gamle	Nominal	1 : Yes 0 : No
Agricultural_game	Nominal	1 : Yes 0 : No
Educational_game	Nominal	1 : Yes 0 : No
Other_game	Nominal	1 : Yes 0 : No

Similarly, the interviewees were asked whether they had already played specific games (Harvest Moon, Story of Seasons, etc.) and also whether this changed their views on Agriculture. The interviewee was asked to propose one of these serious games as relevant and to explain the reasons for his choice. This will serve once again to define the extent to which these games are relevant. A typology related to this question was carried out, as the interviewee was also asked to note the following criteria on the game he proposed: (i)

reliability, (ii) realism, (iii) graphics, (iv) fun, and (v) the acquisition of useful experience. The variables considered in the analysis are shown in Table 8.

Table 8: Game proposal variable

Variable	Type	Modality
Harvest moon, Story of seasons, etc.	Nominal	1 : Yes 0 : No
Practical acquisition (time management, social relations, etc.)	Nominal	1 : Yes 0 : No
Recommendations (Harvest moon, Story of seasons, etc.)	Nominal	1 : Yes 0 : No
Criteria Rating: Reliability, Realism, Graphics, Fun, Experience	Continuous	Notation (1-10)

Speech analysis

In order to verify this hypothesis, the use of Tropes will be of great importance. In addition to identifying the reference universes, the links between each reference used by the interviewees will be discovered. The previous data on the description of serious games will play an essential role in verifying this hypothesis.

Then, in the analysis of the specific serious games, an open question was asked, asking the interviewee: “Briefly comment on your experiences gained”, referring to the question previously asked about what the interviewee has acquired in practical terms (Appendix 8).

b. Purposes

The expected results of the verification of this second hypothesis must lead to a deduction that the teaching of agro-management could benefit from the use of serious games; by referring to the points of view of the interviewees and the apparent needs of the latter. This will also make it possible to offer a list of games deemed relevant to those in charge of Mention in order to complete this teaching.

1.4 Study Limitations

Experimenting on the topics would have been the best way to verify the assumptions. However, given the location of these subjects, it was difficult to approach them and to have them experiment in a short time. Thus, the space-time factor was the most restrictive in this study. On the other hand, the means for implementing such an experiment would have required financial support and special authorisations with regard to the institutions, and this is a study conducted for research purposes and not for action.

2. Results

2.1 Relevance of the use of serious games in the educational field

2.1.1 Identification of lacking sectors

Based on the answers in the survey questionnaire (Appendix 7), individuals can be categorized into four distinct classes according to their age group, occupation, and judgment on the sectors that merit more attention. The gaming sector is in total opposition to that of agriculture, trade and crafts. Moreover, gaming only represents 10% of the consideration of the individuals questioned.

Furthermore, the most relevant responses concern Agriculture, trade, crafts and culture, corresponding to the largest class of individuals (66% of individuals), as well as education and health for the second dominant class (13%) (Appendix 10).

In order to view the data more concretely, a cheese graph was created:

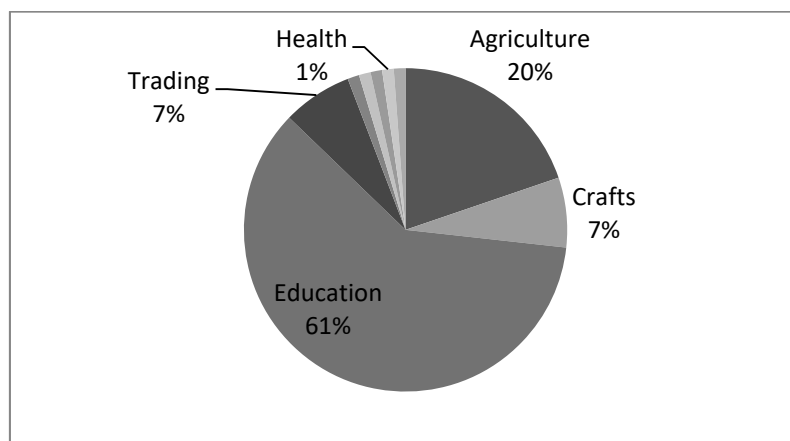


Figure 3: Areas requiring more attention

A simple descriptive statistic has shown that people see education and agriculture as key sectors for a country's development. As for their relationship, we should refer to the symmetrical graph shown in Figure 4.

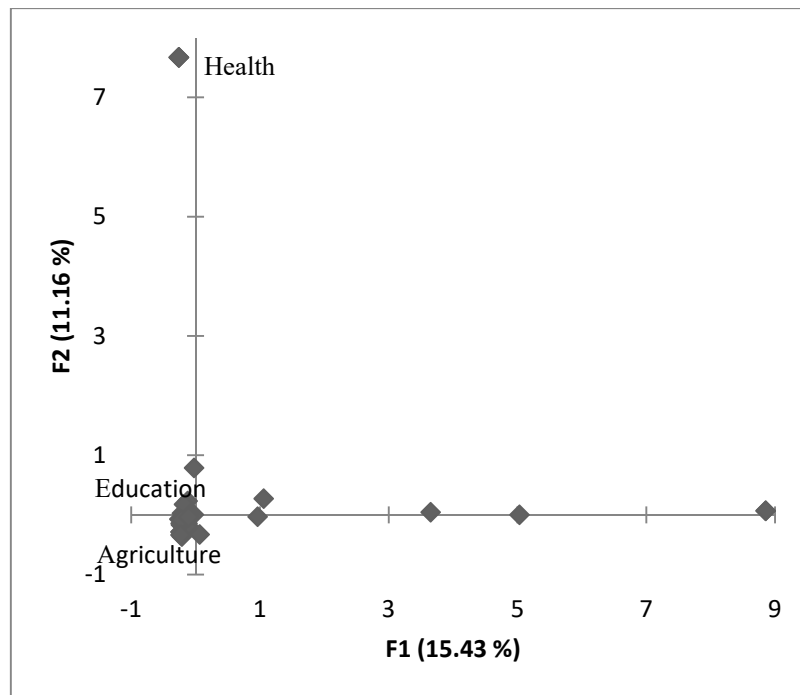


Figure 4: Sector Relationship

The dots represent the characteristics of the individuals surveyed. As presented above, Education and Agriculture are close and in quadrature. They have the same interest in relation to the population surveyed. The healthcare sector stands out significantly. It can therefore be deduced that opinions are much more focused on education and agriculture. By deduction, this is indeed the *raison d'être* of the ESSA establishment; despite the fact that the interviewees are not all of this school. This proves that even people who have no connection with the school have a need for its activities.

2.1.2 Importance of the stated sectors

During the study, those surveyed were asked to give a brief comment on the reason for choosing the sector of activity. The results of the analysis are presented in Figure 5.

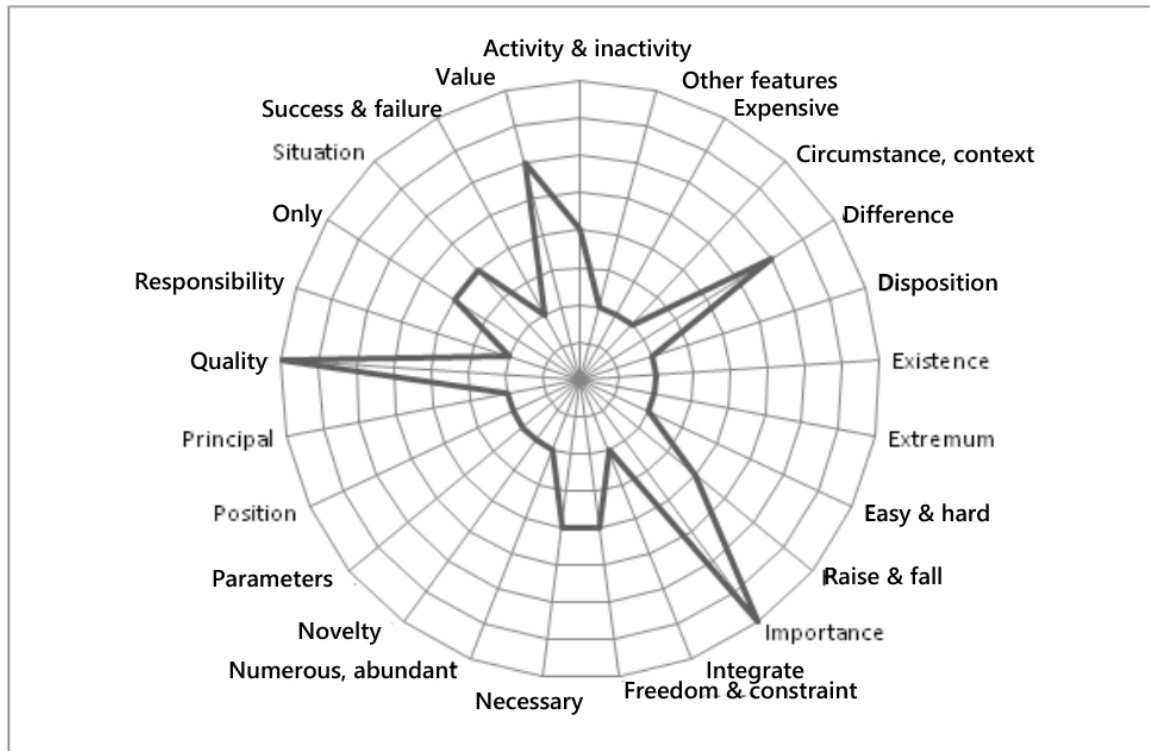


Figure 5: References for sector choices

The terms “importance” and “quality” stand out the most in the various responses. Education and Agriculture are key issues of value to the individuals concerned. This clearly demonstrates that everyone is aware of the importance of education activities, but also that these, once directed towards agriculture, could lead to a radical change in development.

Taking into account the results based on English-speaking responses, one can explain that agriculture, by way of education, is one of the sources of development. This does not contradict what has been said so far.

2.1.3 Gap in key-development sectors

As identified previously, there are key sectors which, according to the population, could contribute to the development of their country. However, this is not yet the case. Their quality is still being called into question. The following Figure 6 shows the qualifiers used for the current key development sectors.

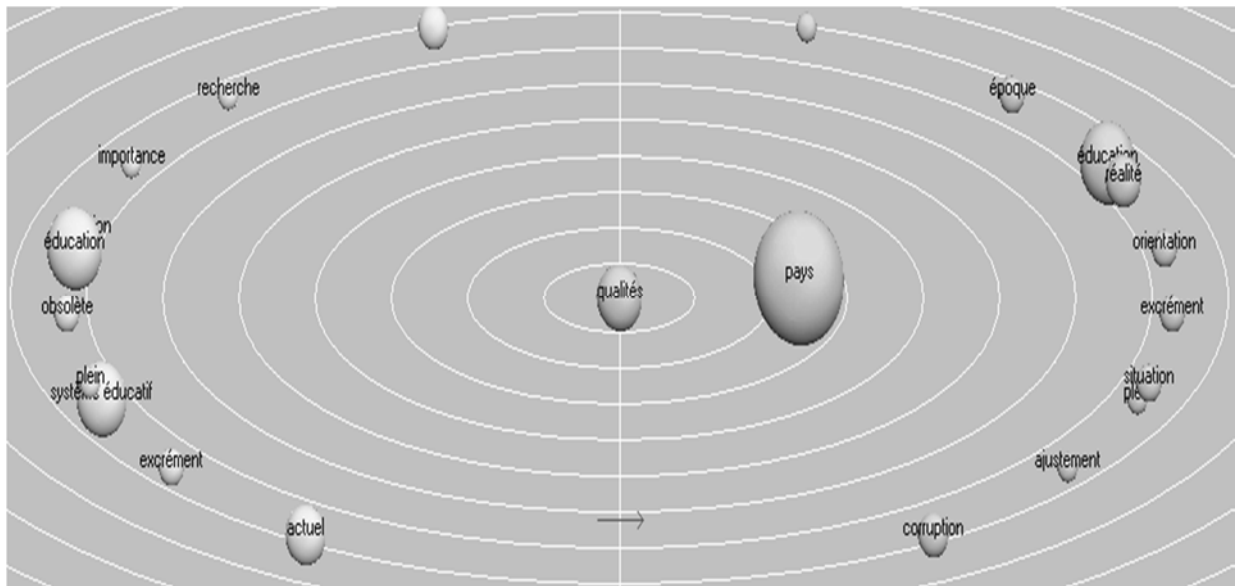


Figure 6: Quality of current key development areas

The term "quality" has a resounding ring to the question of education, the education system, etc. Similarly, it has been found that what people perceive about the current education system is only pejorative. Although education is still at stake, its quality is deplorable, obsolete, corrupt, etc. Moreover, the average score assigned to the decision-making system in the area concerned does not exceed two (2) on a scale of 0 to 5 (Figure 7).

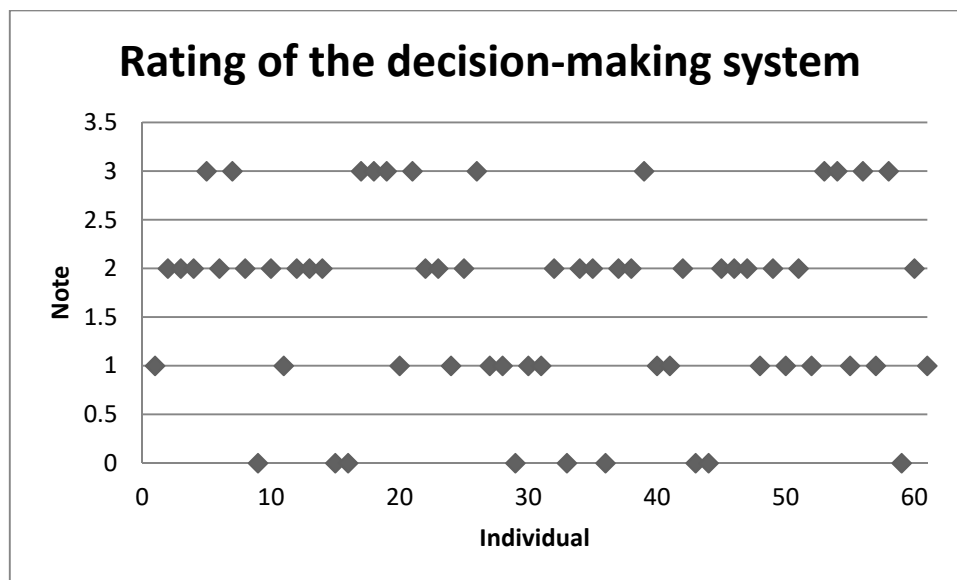


Figure 7: Rating of the decision-making system

The average score obtained in this way is only 1.64 out of 5. This shows a relatively low score given the role of decision-making in the life of a country.

2.1.4 Use of serious gaming in said sectors

As agriculture and education are the sectors that require the most attention, the study on the acceptance of serious games in these sectors was carried out. The following figure shows the concentration of individuals according to whether they adopt serious gaming, whether they want to try it or not, on the types of games that interest them and also on what makes a game interesting according to them.

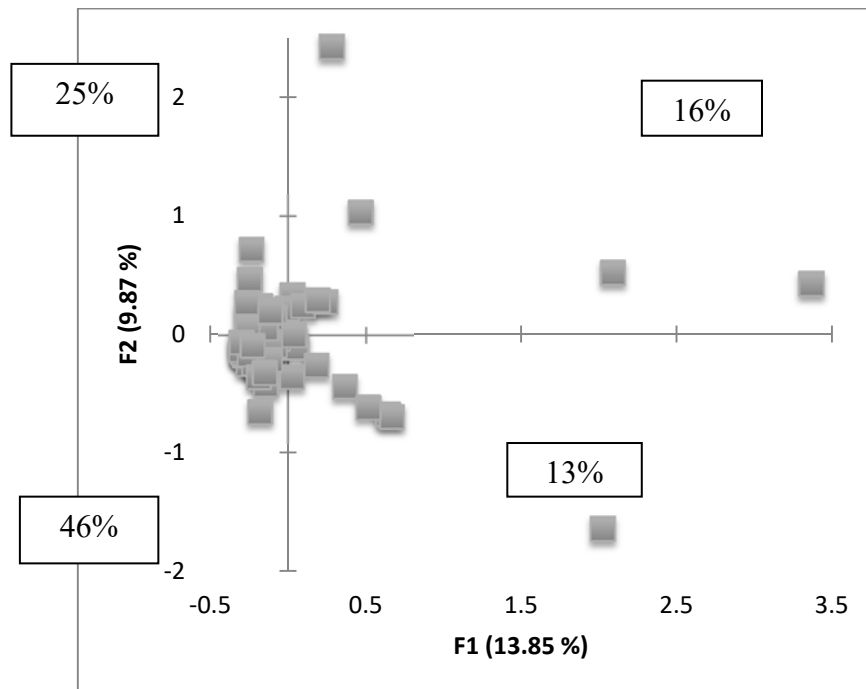


Figure 8: Trends in gaming

In this figure, it is difficult not to notice that the majority of individuals are concentrated close to the centre. Below are the more specific characteristics (Appendix 11):

- Representing 25% of individuals, there are those who would like to have serious games on the following subjects: Agriculture, management, strategy and education. These individuals are focused on simulation games and attracted by the information that is conveyed by them. Similarly, they do not shrink from the difficulties of the games in question;
- In conjunction with these comments, 46% of individuals say they have already tried serious games and describe the points that draw them into a game, namely: coherence, realism, scenario, etc. ;

- About 16% of individuals are hesitant: their answers are vague and they do not know whether or not they have already played serious games. These individuals are scattered; and
- Finally, 13% of individuals gave responses categorised as “other” but are nevertheless open to proposals.

Thus, the results of the survey on the types of games deemed to be potentially beneficial are visible in Figure 9.

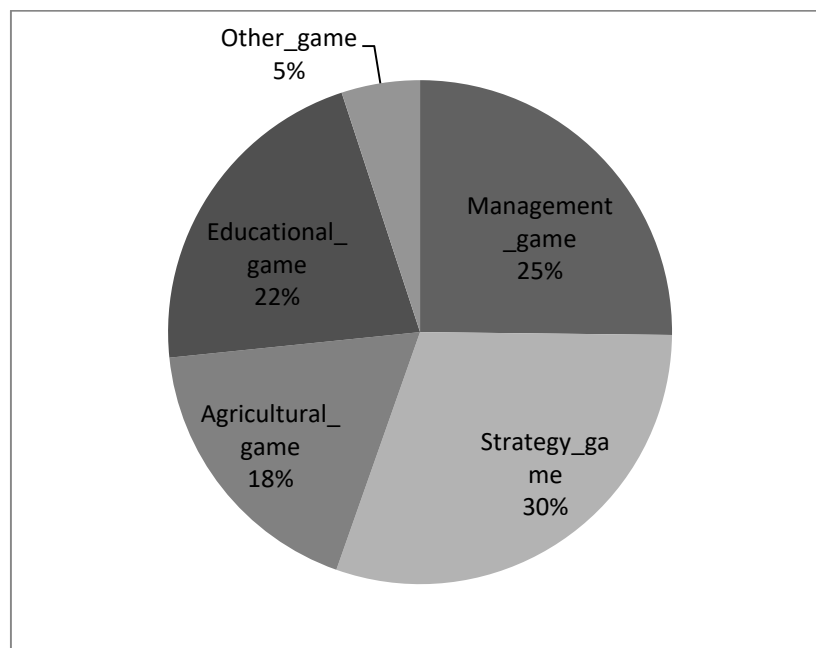


Figure 9: Subject of educational games

The combination of these characteristics (management, agriculture, strategy, education) is oriented towards what the Mention Agro-Management offers. It remains to be applied in a gamification vision.

2.2 Serious games in conventional education and information transmission system

2.2.1 Point of view on serious games

When it comes to serious games, two reference universes appear:

- The first reference universe includes the terms “leisure”, “education” and “cognition”; and
- The second reference universe contains: “game”, “game console” and “teaching”.

The stakeholder and subject relationship can be summarized in the following figure:

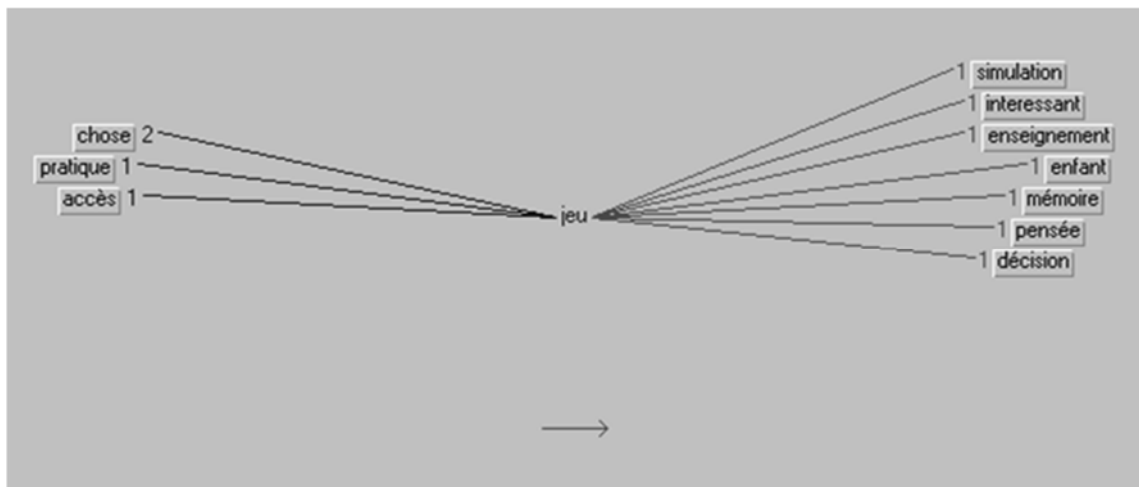


Figure 10: Relationship of actors around the game

The analyzed term (game) is linked to predecessors (to the left of the arrow) who pass the game with successors (to the right of the arrow). The figures displayed represent the number of relationships between the term studied, predecessors and successors.

By classifying the data, the result obtained shows a majority of the same opinion, particularly for the case of Madagascar, as shown in Figure 11 (Annex 12):

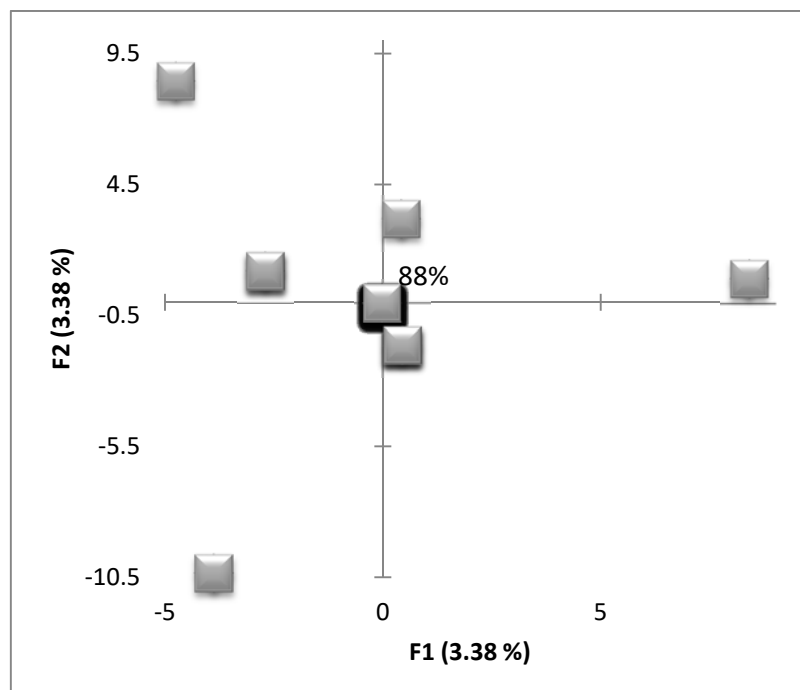


Figure 11: Trends with the Serious Games of French-speaking interviewees

Approximately 88% of individuals are concentrated exactly in the middle of the axis. These individuals particularly have a very positive opinion on serious games. The rest is distributed as follows:

- 4% have no specific idea on the subject;
- 4% gave fairly ambiguous answers (“a healthy mind resides in a healthy body”);
- 2% find that serious games are not attractive; and
- 2% associate them with words: action, objectives, perfection, realism and awareness.

The results of the survey with English speakers are presented in Figure 12 (Appendix 13):

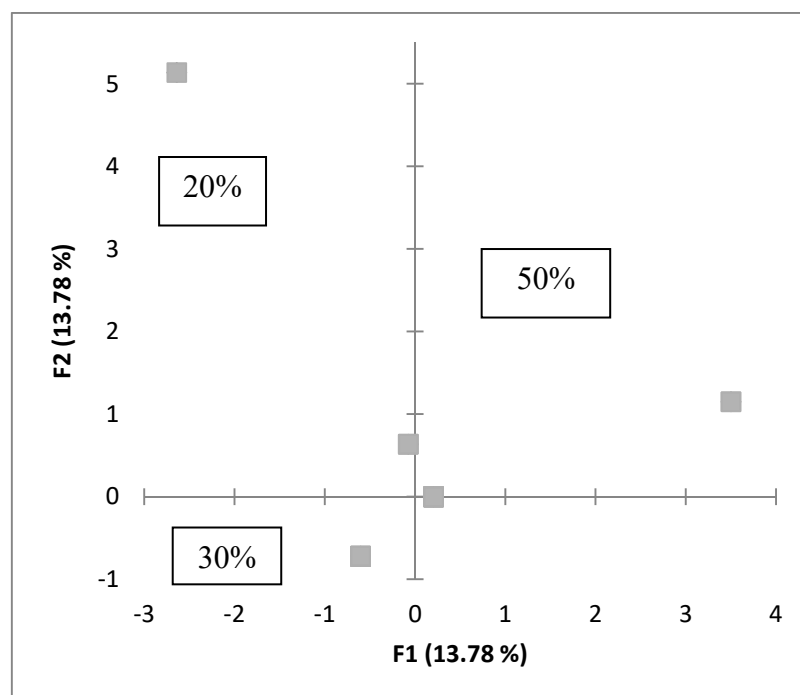


Figure 12: Foreign trend towards serious games

- - Around 50% of the answers obtained speak of the fun aspect of serious games, particularly because they are realistic and invasive;
- - The 30% who are in opposition demonstrate the conflict between seriousness and play, because this group of individuals largely spells out the practical and educational aspect of serious games. They do, however, show the fun aspect of the method; and
- - The remaining 20% have a negative point of view on serious gaming. In particular, they do not see it as a game and find serious gaming unattractive.

2.2.2 Serious games recommendation usable in agronomic training

Agronomy-related games do exist, as already stated in the document. A brief summary of the most played agricultural games according to the survey results is shown in Figure 13.

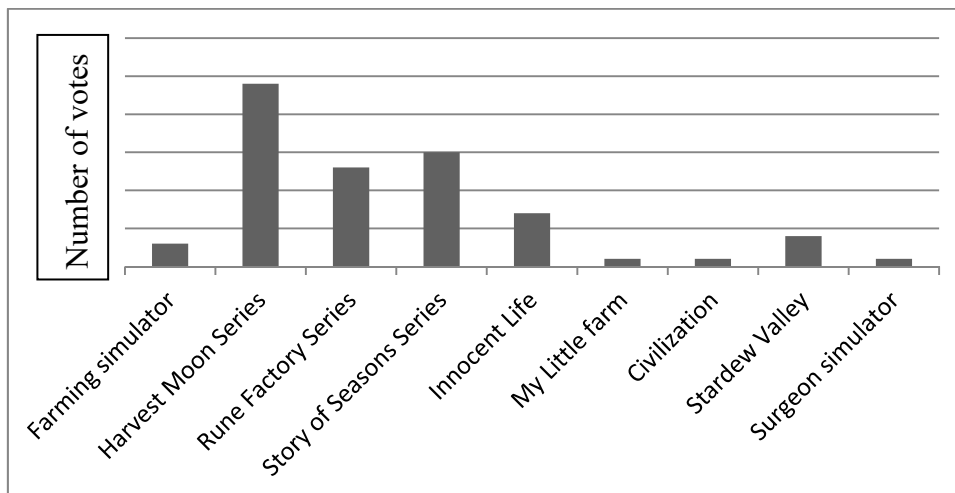


Figure 13: The most played games on agriculture

The Harvest Moon series is the most played, followed by Story of Seasons, then Rune Factory and Innocent Life. The reason might be that these games are all produced by the same designer. Story of Seasons is gaining increasing popularity. This is because it is the most recent title in the series of agronomic games.

By asking for a recommendation on what could be used in teaching, it is possible to classify individuals into four categories, as shown in Figure 14 (Appendix 14).

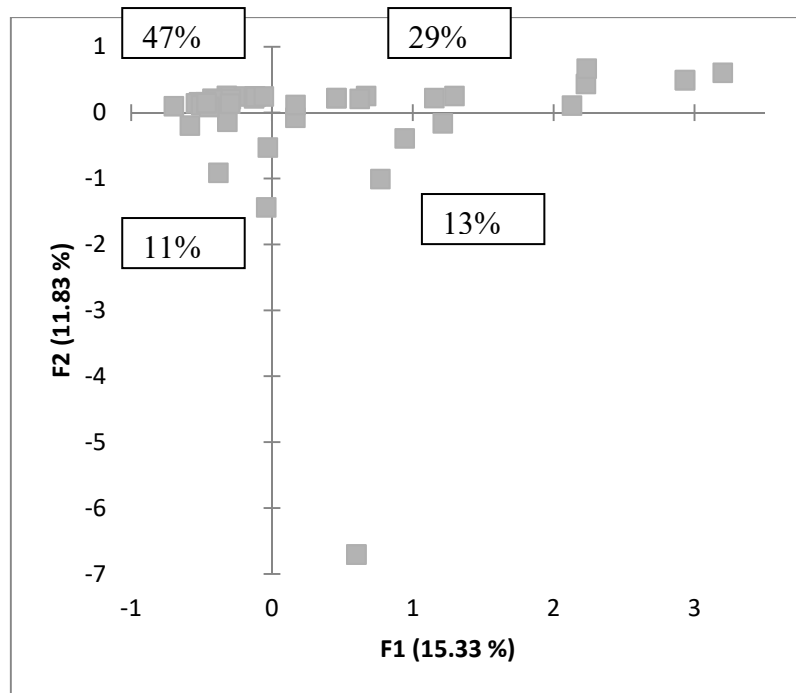


Figure 14: Classification of individuals according to games played and recommendations

Points represent individuals. We can see a large conurbation representing 47% of individuals who share the same opinion. These individuals have the following characteristics: the games they played are Story of Seasons, Farming simulator, Stardew valley, Innocent life, and My little farm. They also claim that their vision of Agriculture has changed by playing these games. The practical advantages they have gained from these games are particularly focused on the management issue, namely: energy management, management of different resources, management of economic revenues, etc. It should be noted that in these games, it is a question of knowing how to best manage what is available to perfect an operation. Time and energy resources are the most important as they allow players to prioritise important activities. Similarly, players learned the importance of choice of seasons and social interactions: harvests are much better in the right season, and having good relationships greatly facilitates exchanges. These individuals also agree that it is possible to raise awareness about environmental issues through these games. Harvest moon is the game these individuals recommend.

Approximately 29% of the interviewees are grouped with the following characteristics: they played Harvest Moon but do not think they had gained much in practice. Moreover, they are rather confused about their vision of Agriculture because either it has not changed at all, or the individual is not sure if it has changed or not. Moreover, they have no recommendations to make regarding serious games.

Approximately 13% of the interviewees share the following characteristics: having played in Surgeon simulator, they recommend Run factory and other games. It should be noted that Rune factory, although categorized in agronomic games, does not entirely focus on farm activities. Indeed, the fantasy side of this game makes it difficult to exploit from a practical point of view. Rather, it is classed as an RPG whose scenario is more popular than operating activities.

Finally, 11% of those surveyed played in Rune factory and recommended Farming simulator, Story of seasons, Stardew valley and Innocent life. This result can be interpreted as playing a game with few benefits, leading to recommendations for one that offers practical benefits.

2.2.3 Basis for serious games recommendations usable in agronomic training

Most of the reasons are that the games on offer are serious and complete. As Harvest moon is the most popular and offered, it offers players the opportunity to discover new horizons that they didn't think they had reached before. The results of the speech analyses show that French speakers can be classified into four categories as indicated in the following figure (Appendix 15):

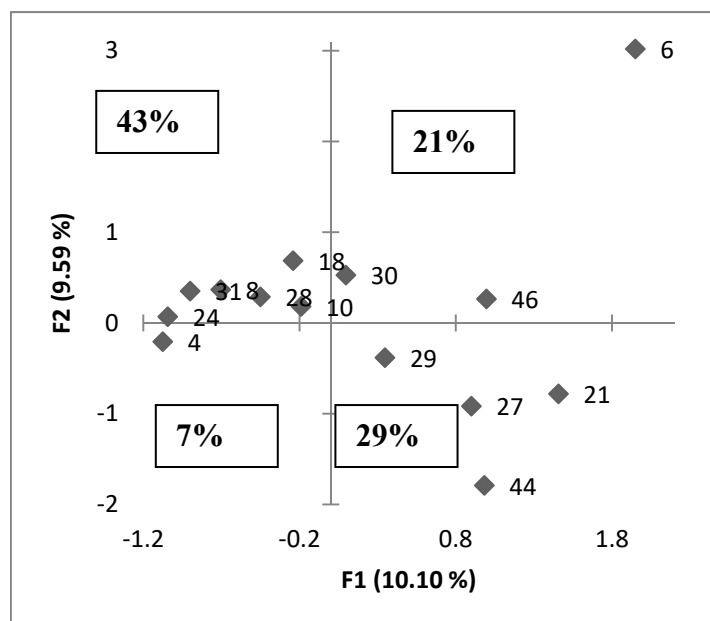


Figure 15: Distribution of French-speakers according to their opinions on the recommendations

The dominant class (43% of individuals) is focused on the simplicity/difficulty of the game and the realism of the scenario. The simplicity of its handling and intelligible instructions, the difficulty of its realistic logic. The games offered are all very accessible for all ages,

and there is both fun and realism. The players who did it were easy to do it. Graphics played a very important role in determining which game to recommend.

Approximately 29% of respondents are based on the fact that they were able to learn new things during their game sessions. Until now, they were completely ignorant of everything to do with agriculture, but these games served as a veritable encyclopaedia on the subject.

About 21% of the individuals who responded to the questionnaire focused on the educational aspect of the game. They highlight the enrichment and management strategies for their use as well as the purposes for which they are aiming during the game.

Finally, the remaining 7% is concentrated on the equipment used for the game, namely the use of computers, emulation, etc. This 7% also affects a few words on a more technical aspect such as the level of achievement, the game development budget, etc.

From the point of view of the English-speaking interviewees, the following figure represents their distribution according to the opinions received (Appendix 16):

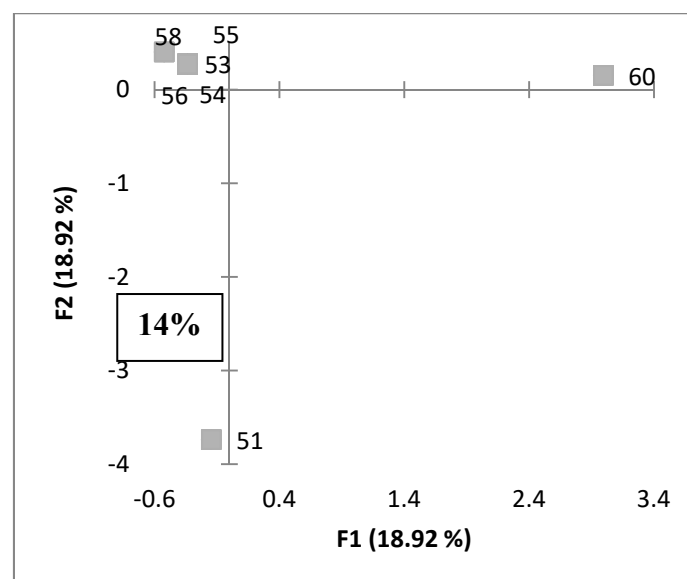


Figure 16: Distribution of English-speaking individuals based on their opinions on recommendations

Among those who responded, 71% had the following points as their arguments: visual beauty (graphics), the educational side and the acquisition of experiences, the relevance of the scenario and the challenges that follow it. They take into account the variety of actions that can be taken and the importance of the time factor.

14% of respondents highlighted the importance of social interactions that teach the basis of exchanges. Through exchanges, it is as much a question of cultural as of economic

exchanges. Finally, 14% of the interviewees raised realism, particularly at the level of the trees.

2.2.4 Criteria for selecting serious games in Agriculture

The criteria of reliability, realism and experience are mainly on the educational side; while the criteria of graphics and fun are on the fun side. The study showed that the games offered are mainly considered reliable. The following graph shows the average scores assigned to each criterion by the respondents.

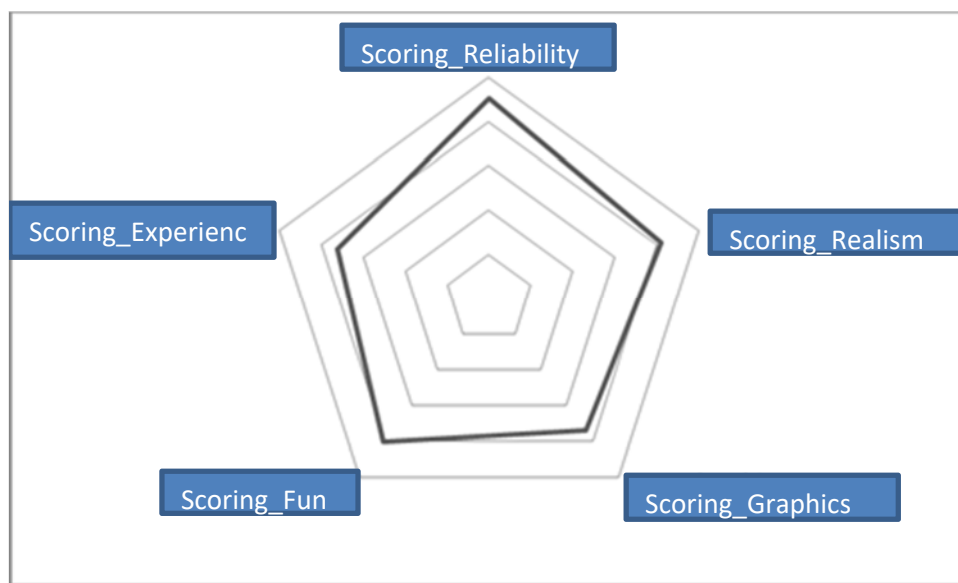


Figure 17: Scoring of game criteria

You can see that, besides reliability, the games on offer are as fun as they are realistic. It would therefore be an ingenious idea to use them for the purpose of transmitting knowledge from an agronomic point of view. It is quite possible to take them as a reference to imagine new scenarios, new tactics and strategies to be applied in the practical life of farmers. And it is the duty of an engineer to implement these action plans for development purposes.

3. Discussions and recommendations

3.1 Discussions

3.1.1 Growth sectors: education or agriculture

It is true that agriculture has always been said to be the sector that would undeniably lead to development, but it was seen during the study that education has not been left behind. Indeed, the most effective weapon is education: it makes it possible to change mentalities, influence the way we act and decide (Mandela, 2007)⁹. That is why it is seen as a key area of development. By properly educating those responsible for primary production, at the level of farmers, for example, it is possible to make them aware of what is at stake in their actions, whether on the environment or on their way of life.

3.1.2 Serious games and vocations

Serious games are games with an explicit and meticulous goal in education, and are not initially played for entertainment (Wein & Labiosa, 2013). This contradicts the very principle of the game. In fact, according to Michaut (2008), "the vocation of a serious game is to invite the user to interact with an IT application whose intention is to combine aspects of teaching, learning, training, communication or information, with the playful springs from the video game. The purpose of such an association is to provide material content (serious) with a playful video approach (game). The designer of a serious game therefore relies on the enthusiasm generated by video games among users to capture their attention for a purpose that differs from mere entertainment. To make this connection between the utility aspect and the video game, the designer will relate two types of scenarios: the first will be of a utility nature, the second will be of a purely fun nature. This connection must be made consistently. Thus, the objectives of the two types of scenarios must converge so that users can simultaneously appreciate the fun video experience and the utility dimension. Otherwise, if both scenarios are simply placed in parallel without any real link, the application will most likely present an imbalance that will lead one of the two scenarios to take precedence over the other." (Thevenot, 2010, p. 12)

It is therefore inconceivable that the game should be considered first and foremost as a study material. It is not uncommon to know that some people much prefer the fact that what they have in their hands is not something like school material. A tool that has only one purpose becomes monotonous and very quickly tiring.

⁹ Declaration during a visit to Mexico City

For example, for the Nintendo DS handheld console, in addition to being a game console, it offers various functions such as a web browser, a pedometer (case of the latest generation consoles), etc. and also offers a wide range of Serious games in its list of games already available for sale.

3.1.3 Divergence of points of view

As stated in the results obtained (notably Result 1, on the relevance of serious games in the educational field), the points of view are quite different: although it is only a minority, there is a class that is not attracted by serious gaming. These are players who consider that the only purpose of the game is fun (Hacking Social, 2015). These people find it difficult to accept the use of video games for educational purposes. However, this would greatly facilitate the transmission of knowledge.

3.1.4 Problems with serious gaming application

Almost all of the problems that have been mentioned concern the level of awareness of everyone, especially on the issue of addiction (Appendix 8). However, as Djaouti states (2016), logistical issues should also be taken into account. These problems go beyond the responsibility of the teacher: availability of consoles or computers capable of running the games, authorisation from the establishment for the purchase of hardware and/or software, etc. (Djaouti, 2016).

3.1.5 Conflict between the games played and the game recommendations

It can be seen that the trend of recommendations does not match that of the games that were played (e.g. people recommending Harvest moon played much more Story of seasons), and also that the comments received are quite different (a majority recommending Harvest moon, yet comments that say they didn't get much out of the game, etc.). One possible reason is that, apart from the fact that Story of seasons is the most recent game, it is also the most difficult and the most elaborate. As the latest series by its producer, it accumulates all its expertise in the creation of games of this type. It is therefore normal that for people starting out, it is recommended to start with Harvest moon, and those who recommend it are surely aware of this.

When it comes to conflicting comments, one should not underestimate the minority playing just for fun. On the other hand, there was the fact that originally only Harvest moon, the producer, Hashimoto later left Natsume Inc. (with Harvest moon title) to move

to Story of seasons with Xseed games (Andrianafetra, 2017). But the Harvest moon name still persists alongside Story of seasons, but it is no longer Mr Hashimoto who is responsible. The gameplay change can be seen right away in new titles such as Harvest moon: Skytree village. Moreover, it can be seen that the majority of the recommendations, especially for the Harvest moon share, focus on those that were produced with Mr Hashimoto (Appendix 8).

3.2 Recommendations

3.2.1 Promote the training of decision-makers in Agronomy

Looking at the evidence on the education and agriculture sectors, it is suggested that training in these areas should be better initiated and promoted. To do this, raising awareness among learners from their young age to take an interest in the environment would be a good idea (even before their entry into university). If the population were to do so as early as their childhood, it would greatly enhance their critical thinking as they grow up. We would then have a generation that was able to make the right decisions properly after careful consideration.

3.2.2 Improving understanding of serious gaming

In order to avoid prejudices (whether from the point of view of players or teachers), it would be better to distinguish between gamification of teaching and serious gaming. Indeed, games considered repetitive and boring are generally those in which learners are aware that they are only learning. In this case, it is gamification. On the other hand, those who offer training without player awareness are serious games. In addition, teachers should also accept this practice as being not merely amusement, but indeed a diversion of knowledge. To do this, it is suggested that both parties (players and teachers) try out the game recommendations described in this work.

3.2.3 Use of emulators

Almost all current facilities have at least one IT tool at their disposal. Since the purchase of new equipment (individual consoles and others) would lead to additional investment for schools, and also to the possibility of overuse, it is suggested that computers be equipped with emulators that can virtually imitate a game console. This would also enable the teacher to keep track of each person's development. Of course, the possession of individual consoles is not to be prohibited.

3.2.4 Conditions of application

Applying fun teaching requires a perfect grasp of the subject, as previously stipulated in this document. Applying a ludoeducation policy requires at least that the material and personal conditions allow it: (i) on the one hand, it is necessary to set up infrastructures that can easily accommodate a ludoeducation system (taking into account emulators, brackets as far as possible, etc.); (ii) on the other hand, it would be necessary for those who apply it to be consenting to their use (taking into account that it is a tool like so many others and not a tax) and accustomed to doing so. Indeed, if the teacher is neither master nor keen to use the fun method but feels forced, the latter is very likely to slip. Ludoeducation must not therefore be applied in an imposed manner; those who use it must first be convinced of its relevance and be able to exploit it with ease.

3.2.5 Personal opinions

Given the conflict in recommendations, it can be said that comments on knowledge acquisition are all valid (Appendix 8). However, to start, it is better to start with the old titles. Moreover, they are much less demanding in terms of the performance of the machine that will have to launch them. Securities such as Story of seasons, for example, require the possession of recent consoles and their emulator is fairly selective. It is personally advisable to try Harvest moon: tale of two towns, a game that can present you with a problem of isolation and social conflict.

Conclusion

Serious gaming is an area that is really underused or not at all exploited in Madagascar. In terms of education, it is almost not known at all, and in terms of players it is also poorly seen. The distinction between a simple game, a serious game and gamification is still very narrow, especially for teachers who remain firmly rooted in traditional practice.

The introduction of video-play resources in the educational and professional fields has been accepted by developed countries, and the case of Madagascar is not an exception since the results show rather positive feedback. In addition, it has been confirmed that this is a fine method that can be used to pass on information and also to infuse new ideas into everyone's minds. Trying out this practice at MAM level would therefore not be a bad idea either. It must already be noted that the ideas converge towards the Mention training programme, with the ideas of education, management and Agriculture.

Enabling application and promoting serious gaming to students would be a first in the history of Mention, or even ESSA, and their use would open the way to new ideas, the emergence of unexpected strategies that could reverse problem situations and the modernisation of the teaching system while taking advantage of the rush of new technologies. Applying this would enable the School to attract more people, if only for innovation and initiative.

Since a good educational basis is the guarantee of good development, enabling educational video-play practices could, in the long term, lead to general development. Starting from a young age, we would find a promising rising generation aware of the challenges and consequences of the decisions it takes. But until then, emergency solutions have yet to be found: the means for implementing such an initiative are not necessarily within reach. Why not consider improving the current awareness system, such as entertaining advertisements already put in place with short sketches by local actors?

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APPENDIX

Appendix 1 : Games on the protection of the environment

Table 9: Database of games

Year	Game	Source/Game reference
1990	SimEarth	www.abandonia.com/en/games/185
1999	Build a Prairie	www.bellmuseum.umn.edu/games/prairie/build/sb1.html#
2000	Learning Sustainable Development (LSD)	Torres and Macedo (2006) ¹⁰
2004	Balance of the Planet	www.cdosabandonware.com/std_games_details.php?gameid=1639
2005	AtollGame	Dray et al. (2005) ¹¹
	MHP	Guizol and Purnomo (2005) ¹²
2006	SHRUB BATTLE	Michelin (2006) ¹³
	3rd World Farmer	www.3rdworldfarmer.com/
	Climate Challenge	www.bbc.co.uk/sn/hottopics/climatechange/climate_challenge/
2007	Stop Disasters!	www.stopdisastersgame.org
	Energyville	www.energyville.com/energyville/
	EnCon CITY	www.enconcity.com/
2008	World Without Oil	www.worldwithoutoil.org/
	Environment Game	www.mysusthouse.org
	Building Game	www.mysusthouse.org
	ElectroCity	www.electrocity.co.nz/
	The Great Green Web	http://go.ucsusa.org/game/
	SymbioCity	www.symbiocity.org
	LogiCity	www.logicity.co.uk/
	Catchment Detox	www.catchmentdetox.net.au/
	Millennium Village	http://mvsim.ccnmtl.columbia.edu/accounts/login/
	Oiligarchy	www.molleindustria.org/en/oiligarchy
	Clim'way	http://climway.cap-sciences.net/us/index.php

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¹² Guizol, P. and H. Purnomo. 2005. "A Game to Level the Playing Field: The case of Community-Company Partnership in Forest Plantations." In *Proceedings of the 2005 International Congress on Modelling and Simulation*, 38-44. Canberra: Modelling and Simulation Society of Australia and New Zealand.

¹³ Michelin, M. 2006. "Can a Game Put Engineering Students in an Active Learning Mode? A First Experiment In Sustainable Agriculture Teaching." In *Advances in Computer, Information, and Systems Sciences, and Engineering*, Edited by K. Elleithy et al., 343-350. Springer

Year	Game	Source/Game reference
2009	THE SIMS adapted	Tragazikis and Meimaris (2009) ¹⁴
	Shortfall	www.coe.neu.edu/Groups/shortfall/
	Green City	Shivshankar and Thirumavalavan (2009) ¹⁵
	Power explorer	Gustafsson, Bång, and Svahn (2009) ¹⁶
	PowerUp	www.powerupthegame.org/
2010	EnerCities	www.enercities.eu/
	Fate of the World: Tipping Point	www.fateoftheworld.net/
	Precipice	www.precipice.altereddreams.net/
	CityOne	www-01.ibm.com/software/solutions/soa/innov8/cityone/
2011	SOS 21	www.sos-21.com/Enter-the-game.html
	EnergyLife	Gamberini et al. (2011) ¹⁷
	Ludwig	www.playludwig.com/en/

Source : Katsaliaki & Mustafee, 2012 ; p.4

¹⁴ Tragazikis, P. and M. Meimaris. 2009. "Engaging Kids with the Concept of Sustainability Using a Commercial Video Game—A Case Study." In *Transactions on Edutainment III*, Edited by Z. Pan et al., 1-12. Springer-Verlag.

¹⁵ Shivshankar, P. G., and V. Thirumavalavan. 2009. "Green City - A Cognitive Game". In *Proceedings of the 14th International Conference on Computer Aided Architectural Design Research in Asia*, Yunlin, Taiwan, 2125-134.

¹⁶ Gustafsson, A., M. Bång, and M. Svahn. 2009. "Power Explorer: A Casual Game Style for Encouraging Long Term Behavior Change Among Teenagers". ACM International Conference Proceeding Series (422), 182-189. ACM New York, NY, USA.

¹⁷ Gamberini, L., G. Jacuccu, A. Spagnolli, N. Corradi, et al. 2011. "Saving is Fun: Designing a Persuasive Game for Power Conservation". In *Proceedings of the 8th International Conference on Advances in Computer Entertainment Technology*. ACM, New York, USA.

Appendix 2 : Games on economics

- **Mission Knut** : simulation game where the student plays the role of a European Commissioner facing a maritime disaster. The interest of the game is to discover the functioning of the European institutions.
- **€conomia** : the game on monetary policy. Proposed by the European Central Bank (ECB) for a long time now. The goal is to keep the rate of inflation below 2%.
- **Top Floor**, on the way to the summit! The mission is to gather seven briefing notes for the Board of Governors at the Top Floor. It is an educational game that explains the functioning of the ECB, the Euro-system and the European System of Central Banks (ESCB).
- **Inflation Island**, how inflation affects the economy: we can observe the characters' reactions to inflation and deflation and changes in the scenery. One can also test one's knowledge and try to detect the various scenarios relating to inflation.
- **Cap Odyssey**: simulation game of a farm: interesting to discover the Panafrican Congress (PAC) from 1950 to date. It also allows to discuss the concepts of production costs, productivity ...
- **2020 Energy**: the objective of the game is to reduce energy consumption, increase energy efficiency and choose the most suitable renewable energies. Ecological footprint calculator: simulation tool that calculates its ecological footprint
- **Clim'City** : management game inspired by Simcity, but here devoted to sustainable development
- **Le jeu de l'oie d'une loi** : a game of The goose to understand the different stages of voting a law

Appendix 3 : Factorial Correspondence Analysis

AFC is a method for studying the association between two qualitative variables. The work of Benzécri started in the early 60's allowed the emergence of the method. His disciples then allowed different evolutions. These include the contributions of Greenacre (1984), which made it possible to generalize the approach and disseminate it in the Anglo-Saxon world, and the work of C. Lauro, who notably developed a non-symmetrical variant of the method.

The measurement of the association between two qualitative variables is a complex subject which requires a prior transformation of the data: in fact, it is not possible to calculate a correlation coefficient by directly using the data, as one could do with two quantitative variables.

The first transformation consists of a recoding of the two qualitative variables V_1 and V_2 into two disjunctive arrays Z_1 and Z_2 . For each modality of the variable V_j , a column is created in Z_j . Whenever a modality m of the variable V_j corresponds to an individual i , we assign 1 to $X_1(i, m)$. The other values of Z_1 and Z_2 are zero. The generalization of this idea to more than two variables corresponds to the Multiple Correspondence Analysis. When there are only two variables, it is sufficient to study the contingency table of the variables, which is none other than the product $Z_1'Z_2$ (where 'corresponds to the transposition of a matrix).

A contingency table has the following structure:

Table 10: Contingency table format

$V_1 \setminus V_2$	Modality 1	...	Modality j	...	Modality m2
Modality 1	$n(1,1)$		$n(1,j)$	...	$n(1,m2)$
...
Modality i	$n(i,1)$	...	$n(i,j)$	...	$n(i,m2)$
...
Modality m1	$n(m1,1)$	...	$n(m1,j)$	...	$n(m1,m2)$

where $n(i, j)$ is the frequency of the observations having both the characteristic i for the variable $V1$, and the characteristic j for the variable $V2$.

The χ^2 distance has been proposed to measure the distance between the Modalities. The sum of these distances for all the cells in the table gives the χ^2 statistic that follows asymptotically a χ^2 law at $(m1-1)(m2-1)$ degrees of freedom. This statistic makes it possible to test the hypothesis of independence between the rows and the columns of the contingency table.

The notion of inertia inspired by physics is used in Factorial Analysis of Matches. The inertia of a scatter plot is the weighted average of the squares of the distances to the center of gravity. In the case of the AFC, the total inertia of the Modality's cloud is given by:

$$\varphi = \frac{\chi^2}{n} = \sum_{i=1}^{m1} \sum_{j=1}^{m2} \frac{\left(\frac{n_{ij}}{n} - \frac{n_i n_j}{n^2}\right)}{\frac{n_i n_j}{n^2}}, \text{ with } n_i = \sum_{j=1}^{m2} n_{ij} \text{ et } n_j = \sum_{i=1}^{m1} n_{ij}$$

and where n is the sum of the frequencies of the contingency table. We see here that the total inertia is proportional to the Pearson χ^2 statistic measured on the contingency table.

The goal of the AFC is to represent a maximum of the total inertia on the first factorial axis, a maximum of the residual inertia on the second axis, and so on until the last dimension. We show that the number of dimensions of the representation space is less than or equal to $\min(m1, m2) - 1$.

Appendix 4 : Research work having been carried out with TROPES

Non-exhaustive list of research work carried out with TROPES in alphabetical order:

Babayou Patrick. Traitement des questions ouvertes : Comparaison d'une postcodification et de méthodes lexicométrique et d'analyse du discours. Paris, Cahier de recherche Crédoc numéro 101, 1997.

Brezillon Patrick Représentation de pratiques dans le formalisme des graphes contextuels. In J.M.C. Bastien (eds), actes des 2èmes Journées d'Étude en Psychologie Ergonomique, pp. 3--14, INRIA. 2003 <http://www.lip6.fr/lip6/reports/2003/lip6.2003.013.pdf>

Burguet Annette. Contrat de communication et analyse de la restitution du discours de la presse. Thèse de Doctorat de Psychologie sociale. Université Paris 8. 1997

Borges Martha Kashny. Les usages des Technologies d'Information et de Communication par des enseignants dans un dispositif de formation tutorée en langues vivantes étrangères. Une approche ergonomique. Thèse de Doctorat. Université Pierre Mendès France Grenoble 3. 2001 Cf. http://toiltheque.org/Alsic_volume_1-7/Num8/demaiziere/alsic_n08-liv3.htm

Brodin Élisabeth. Interactions entre innovation, technologies de l'information et de la communication et apprentissage institutionnel des langues : l'exemple d'une recherche-action dans des lycées. Thèse de Doctorat. Université du Maine. 2002. Cf. http://toiltheque.org/Alsic_volume_1-7/Num8/demaiziere/alsic_n08-liv3.htm

Brugidou Mathieu, Le Queau Pierre. Les "rafales", une méthode pour identifier les différents épisodes d'un récit : contribution au traitement et à l'interprétation des entretiens non-directifs de recherche. Bulletin de méthodologie sociologique, numéro 64. Paris, Octobre 1999 Cf. <http://cat.inist.fr/?aModele=afficheN&cpsid=1548054>

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Courbet Didier, Marie-Pierre Fourquet-Courbet Modèles et mesures de l'influence de la communication : nouvelles perspectives ouvertes par la psychologie sociale. Market Management, Marketing & Communication - La Communication Persuasive - Vol.1, N°1, Juin 2005, pp.7-26.

Cf. http://www.cairn.info/resume.php?ID_ARTICLE=MAMA_021_0007

- # Fernandez-Bonet Dominique. Conflit et coopération dans le canal de la distribution. L'analyse du discours des acteurs comme révélateur des comportements stratégiques. Thèse de Doctorat en Sciences de Gestion. Université d'Aix-Marseille. 1999.
- # Fourquet-Courbet Marie-Pierre. Approche psycho-socio-cognitive de l'influence : le cas de la communication politique télévisée. Thèse de Doctorat en Psychologie sociale. Université de Nancy. 2000
- # Fourquet-Courbet Marie-Pierre, Didier Courbet. Nouvelle méthode d'Etude des Cognitions en Réception (ECER) et application expérimentale à la communication politique. Revue internationale de psychologie sociale. 2004, vol. 17, no3, pp. 27-75
Cf. <http://cat.inist.fr/?aModele=afficheN&cpsidt=16260473>
- # Frigout Sophie. Référenciation aux savoirs antérieurs et gestion des implicites en situation d'interlocution. Thèse de Doctorat. Université Paris 8. 1999
- # Garric Nathalie, Leglise Isabelle Quelques caractéristiques du discours patronal français. Revue Mots. La ville, entre dire et faire, n° 72, juillet 2003
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- # Ghiglione Rodolphe et Blanchet Alain. Analyse de contenu et contenus d'analyses. Paris, Dunod, 1991.
- # Ghiglione Rodolphe Je vous ai compris ou l'analyse des discours politiques. Paris, Armand Colin, 1989.
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- # Ghiglione Rodolphe Analyse propositionnelle et modèles argumentatifs. Revue Connexions. N°38, pp. 89-106, 1982.
- # Ghiglione Rodolphe et Beauvois Jean-Léon Le langage est un objet. Bulletin de Psychologie, vol. 33, no347, pp. 895-900, Paris, 1979.
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- # Hlady-Rispal Martine. La méthode des cas. Application à la recherche en gestion. De Boeck. 2002. Cf. <http://universite.deboeck.com/livre/?GCOI=28011100225310>
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- # Marchand, P., Monnoyer, L. Les discours de "politique générale" français : La fin des clivages politiques ? Mots, 62, 13-30, Paris. 2000. <http://www.cavi.univ-paris3.fr/lexicometrica/thema/theme3-mots62/spec3-texte2.htm>
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- # Marchand Pascal, Molette Pierre. Convergences et spécificités de la statistique lexicale et de l'indexation syntaxico-sémantique automatique. Communication aux 4ème JADT. Nice, 1998

- # Masse Laurence. La communication verbale et non verbale en situation d'entretien psychothérapeutique. Thèse de Doctorat. Université Paris 8. 1999
- # Mirabel-Sarron Christine. Les marqueurs langagiers de la dépression. Thèse de Doctorat de Psychologie clinique. Université Paris 8. 1995
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- # Sales-Wuillemain Edith. L'implicite : co-construction dans l'interaction. Thèse de Doctorat de Psychologie sociale. Université Paris 8. 1991
- # Seignour Amélie. Marketing interne et communication interne. Légitimité et pratiques. Thèse de Doctorat à l'Institut supérieur de l'Entreprise de Montpellier 2. 1998
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- # Seignour Amélie. Traversée des frontières entre méthodes de recherche qualitatives et quantitatives. Communication au Congrès ISEOR/Academy of Management. Vol. 2, pp 345-366. Lyon, 2004
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Cf. <http://mots.revues.org/index573.html>
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Wolff, M., Pilar Gattegno, M., Adrien, J.-L. Un modèle des accompagnants de personnes avec autisme : pour la valorisation de la profession. In Revue de Sciences Humaines et Sociales – Handicap – N° 105-106, pp. 51-69, 2005 Cf. <http://cat.inist.fr/?aModele=afficheN&cpsidt=16942636>

Wolff, M., & Visser, W. Méthodes et outils pour l'analyse des verbalisations : une contribution à l'analyse du modèle de l'interlocuteur dans la description d'itinéraires. @ctivités (Revue électronique), Vol. 2 - No 1 <http://www.activites.org/v2n1/html/Wolff.html>

Appendix 5 : Symposium on Biogas





Vous invitent au

SYMPOSIUM

portant sur le thème

« Biogaz, une solution durable pour les ménages ruraux à Madagascar »

**qui se tiendra le 14 novembre 2018 à 14h
à l'Hôtel du Louvre Antaninarenina**

Programme

14:00-14:30	Explication sur le Projet de Satoyama Energy <i>Par M. Masakatsu Ohwada</i> <i>President du Satoyama Energy</i>	
14:30-15:00	Biogaz pour les ménages des éleveurs Malagasy <i>Par Dr. Fetra Andriamanohiarisoamanana</i> <i>Directeur du Projet Satoyama Energy et Chercheur à l'Université d'Obilhiro, Japon</i>	
15:00-15:30	L'impact de l'utilisation du Biogaz sur la vie des agriculteurs en Thaïlande <i>Par Prof. Dr. Suchon Tangtaweewipat</i> <i>Directeur du Projet Biogaz chez Royal Project Foundation et Enseignant chercheur à l'Université de Chiang Mai, Thaïlande</i>	
15:30-16:00	Explication des activités et objectifs de l'ONG Madagasikara Mirai <i>Par M. Herdmane Harisona</i> <i>Ingénieur Forestier, Technicien de l'ONG Madagasikara Mirai</i>	
16:00-17:00	Cocktail	

Merci de bien vouloir nous confirmer votre présence avant le 9 novembre 2018 à l'adresse e-mail mdservis@blueline.mg ou au 020 24 900 08 H.B (Mme Sylviane)

Figure 18: Invitation to the symposium

Appendix 6 : Survey questionnaire

About the respondant	
Gender :	
	<ul style="list-style-type: none"> - Male - Female - I do not want to specify
Age :	
	<ul style="list-style-type: none"> - <10yo - 10-15yo - 15-20yo - 20-25yo - >25yo
Localization :	
	<ul style="list-style-type: none"> - Madagascar - Africa - Europa - USA - Canada - Japan - Other (specify)
Occupation :	
	<ul style="list-style-type: none"> - Student - Middle school student - High school student - College student - Teacher - Employee - Other (specify)
Study	
In your opinion, which sector (s) deserve (s) most attention for the development of a country?:	
	<ul style="list-style-type: none"> - Agriculture - Crafts

- Education
- Trades

In the specified domain (s), how do you find the decision-making system?)

- (Rate from 0 to 5)

What do you think of the current education system?

- (Brief answer)

Game studies

Do you think video games can influence behavior?

- No
- Maybe
- Yes

Do you think we can exploit the influence of video games to transmit information?

- No
- Maybe
- Yes

Which category (ies) of games are you most interested in?

- RPG
- Simulation
- Action
- Arcade
- Platform

What do you especially prefer in a game?

- Action
- Story
- Realism
- Graphics
- Fluidity

Have you ever tried serious games?

- I don't know
- Yes
- No

Describe educational games / Serious games in 5 words; according to your own perceptions.

<ul style="list-style-type: none"> - . - . - . - . - .

Which area (s) could be interesting as an educational game subject?

- Agriculture
- Education
- Management
- Strategy

To the players

In the Agriculture category, to which of these games did you play?

- Harvest moon series
- Story of seasons series
- Rune factory
- Innocent life
- Other (specify)

Did playing these games change your point of view on Agronomy / Agriculture?

- No
- Maybe
- Yes

What did you learn (practically)

- Nothing at all
- Time management
- Energy management
- Financial management
- Importance of financial interactions
- Importance of the choice of seasons
- Other (specify)

Briefly comment on your previous answer

- (redaction)

Which of these games would you recommend as a serious game?

- Harvest moon

- Story of seasons
- Innocent life
- Rune factory
- Other (specify)
- None

Why?

- (Redaction)

Please rate the following criteria in relation to your choice of answer on the previous question:

- Reliability
- Realism
- Graphics
- Fun
- Usefulness

Appendix 7 : Data base

Individus	Gender		Age				Localization						Occupation											
	Je ne souhaite pas le préciser	Homme	Femme	Moins de 10 ans	10 - 15 ans	15 - 20 ans	20 - 25 ans	Plus de 25 ans	Canada	Europe	France	Japon	Madagascar	USA	Brazil	New Zealand	chômeur	Employé	Enseignant	Entrepreneur	Lycéen	Universitaire	Bénévole	Artiste
1	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
2	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
3	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
4	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
5	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
6	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
7	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
8	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
9	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
10	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
11	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
12	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
13	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
14	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
15	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
16	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
17	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
18	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
19	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
20	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0

Individus	Sexe		Je ne souhaite pas le préciser	Âge				Localisation							Occupation									
	Homme	Femme		Moins de 10 ans	10 - 15 ans	15 - 20 ans	20 - 25 ans	Plus de 25 ans	Canada	Europe	France	Japon	Madagascar	USA	Brazil	New Zealand	chômeur	Employé	Enseignant	Entrepreneur	Lycéen	Universitaire	Bénévole	Artiste
21	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
22	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
23	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
24	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
25	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
26	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
27	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
28	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
29	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
30	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
31	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
32	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
33	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
34	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
35	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
36	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
37	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
38	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
39	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
40	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
41	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
42	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
43	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
44	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0

Individus	Sexe		Je ne souhaite pas le préciser	Âge				Localisation							Occupation									
	Femme	Homme		Moins de 10 ans	10 - 15 ans	15 - 20 ans	20 - 25 ans	Plus de 25 ans	Canada	Europe	France	Japon	Madagascar	USA	Brazil	New Zealand	chômeur	Employé	Enseignant	Entrepreneur	Lycéen	Universitaire	Bénévole	Artiste
45	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
46	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
47	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
48	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
49	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
50	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
51	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
52	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0
53	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
54	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
55	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
56	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
57	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
58	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
59	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
60	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
61	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
Total	27	31	3	1	1	6	41	12	1	9	1	2	42	4	1	2	11	4	1	1	40	1	1	

Individus	Secteurs méritant le plus d'attention pour le développement d'un pays									Note système de prise de décision
	Agriculture	Artisanat	Education	Commerce	Informatique	Culture	Gaming	Santé	On ne peut pas donner de réponse générale	
1	1	0	1	0	0	0	0	0	0	1
2	1	0	1	1	0	0	0	0	0	2
3	0	0	1	0	0	0	0	0	0	2
4	0	0	1	0	0	0	0	0	0	2
5	0	0	0	1	0	0	0	0	0	3
6	0	0	1	0	0	0	0	0	0	2
7	1	0	1	0	0	0	0	0	0	3
8	0	0	1	0	0	0	0	0	0	2
9	1	0	0	0	0	0	0	0	0	0
10	0	0	1	0	0	0	0	0	0	2
11	0	0	1	0	0	0	0	0	0	1
12	0	0	1	0	0	0	0	0	0	2
13	1	0	1	0	0	0	0	0	0	2
14	0	0	1	0	0	0	0	0	0	2
15	0	0	1	0	0	0	0	0	0	0
16	0	0	0	0	0	0	1	0	0	0
17	0	0	0	0	0	1	0	0	0	3
18	0	0	1	0	0	0	0	0	0	3
19	0	0	0	0	0	0	0	0	1	3
20	0	0	1	0	0	0	0	0	0	1
21	0	0	1	0	0	0	0	0	0	3
22	0	0	1	0	0	0	0	0	0	2
23	0	0	1	0	0	0	0	0	0	2
24	0	0	1	0	0	0	0	0	0	1
25	1	0	0	0	0	0	0	0	0	2
26	0	0	1	0	0	0	0	0	0	3
27	0	0	1	0	0	0	0	0	0	1
28	0	0	1	0	0	0	0	0	0	1
29	1	0	1	1	0	0	0	0	0	0
30	0	0	1	0	0	0	0	0	0	1
31	0	0	1	0	0	0	0	0	0	1
32	1	0	1	0	0	0	0	0	0	2
33	1	1	1	1	0	0	0	0	0	0
34	1	1	1	0	0	0	0	0	0	2
35	0	1	0	0	1	0	0	0	0	2
36	0	0	1	0	0	0	0	0	0	0
37	0	0	1	0	0	0	0	0	0	2
38	1	1	1	0	0	0	0	0	0	2
39	0	0	1	0	0	0	0	0	0	3
40	1	0	1	0	0	0	0	0	0	1
41	1	0	1	0	0	0	0	0	0	1
42	1	0	1	0	0	0	0	0	0	2
43	1	1	1	0	0	0	0	0	0	0
44	0	0	1	0	0	0	0	0	0	0
45	0	0	1	0	0	0	0	0	0	2
46	0	0	1	0	0	0	0	0	0	2
47	0	0	1	0	0	0	0	0	0	2
48	0	0	1	0	0	0	0	0	0	1
49	0	0	0	1	0	0	0	0	0	2

Individus	Pensez-vous que les jeux vidéos peuvent influencer le comportement?	Exploitation des jeux dans la transmission d'informations				Catégories de jeux qui sont le plus joués							Ce que vous préférez dans un jeu												
	Influence des jeux vidéos sur le comportement	Influence probable des jeux vidéos sur le comportement	Informations des informations	Utiliser les jeux pour transmettre des informations	Possibilité d'utiliser les jeux pour transmettre des informations	On ne peut pas exploiter les jeux pour transmettre des informations	RPG	Arcade	Plate-forme	Simulation	Action	Reflexion	Visual Novel	Autre	Autre avec les gens.	Fluidité interaction	Cohérence	Action	Difficulté	Graphisme	Réalisme	Information	Scénario	Autre	
18		1	0	1	0	0	1	1	1	1	1	0	0	0	0	0	0	1	0	1	1	1	1	0	
19		1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	
20		1	0	0	1	0	1	0	0	1	1	0	0	0	0	1	0	0	1	0	1	0	1	0	
21		1	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	
22		1	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	
23		1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	
24		1	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	0	1	0	
25		1	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0	0	1	1	0	1	1	0	
26		0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
27		0	1	1	0	0	1	1	1	1	1	1	0	0	0	1	0	0	1	1	1	1	1	0	
28		0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	
29		1	0	1	0	0	1	1	1	1	1	0	0	0	0	1	0	1	1	1	0	1	1	0	
30		1	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	
31		0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
32		1	0	1	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	0	1	1	0	
33		1	0	1	0	0	1	0	1	1	0	0	0	0	0	1	0	0	0	1	0	0	1	0	

Individus	Pensez-vous que les jeux vidéos peuvent influencer le comportement?		Exploitation des jeux dans la transmission d'informations				Catégories de jeux qui sont le plus joués							Ce que vous préférez dans un jeu											
	Influence des jeux vidéos sur le comportement	Influence probable des jeux vidéos sur le comportement	Informations des informations	Utiliser les jeux pour transmettre des informations	Possibilité d'utiliser les jeux pour transmettre des informations	On ne peut pas exploiter les jeux pour transmettre des informations	RPG	Arcade	Plate-forme	Simulation	Action	Reflexion	Visual Novel	Autre	Autre	Scénario	Information	Réalisme	Graphisme	Difficulté	Action	Cohérence	Fluidité interaction avec les gens.		
34	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	
35	1	0	1	0	0	0	0	1	0	1	0	0	0	1	0	1	1	1	1	1	1	1	1	0	
36	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	
37	1	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	1	0	
38	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	
39	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	
40	1	0	1	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	1	1	1	1	0	0	
41	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	
42	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
43	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	
44	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	1	0	0	0	
45	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
46	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
47	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
48	0	1	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	1	1	1	1	0	
49	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0

Individus	Jeux éducatifs?			Essayer des jeux éducatifs			Sujet de jeu éducatif				
	Déjà essayé des jeux éducatifs	Je ne sais pas si c'était un jeu éducatif	Jamais essayé de jeu éducatif	Je veux essayer les jeux éducatifs	J'essaierai peut-être des jeux éducatifs	Je ne veux pas essayer de jeux éducatifs	Jeu_gestion	Jeu_stratégie	Jeu_agriculture	Jeu_éducation	Jeu_Autre
1	1	0	0	1	0	0	1	1	1	1	0
2	0	0	1	0	0	1	1	1	1	0	0
3	1	0	0	1	0	0	0	0	0	0	1
4	0	1	0	0	0	1	0	1	0	0	0
5	1	0	0	1	0	0	0	1	0	0	0
6	1	0	0	1	0	0	0	0	1	0	0
7	1	0	0	0	1	0	0	0	0	1	0
8	1	0	0	1	0	0	0	1	1	1	0
9	1	0	0	0	1	0	0	1	1	1	0
10	1	0	0	0	1	0	0	1	1	1	0
11	1	0	0	0	1	0	0	0	1	1	0
12	1	0	0	1	0	0	0	1	0	1	0
13	0	0	1	1	0	0	0	0	1	0	0
14	0	1	0	0	1	0	0	1	0	1	0
15	0	0	1	1	0	0	0	0	0	0	1
16	1	0	0	1	0	0	0	1	1	1	0
17	1	0	0	1	0	0	0	0	0	0	0
18	0	1	0	0	1	0	0	1	1	0	0
19	1	0	0	1	0	0	0	1	1	1	0
20	0	0	1	0	1	0	0	1	1	0	0
21	0	1	0	0	1	0	0	1	1	0	0
22	1	0	0	0	1	0	0	0	0	0	0
23	0	0	1	1	0	0	0	0	1	0	0
23	0	0	1	1	0	0	0	0	0	0	1

Individus	Jeux éducatifs?			Essayer des jeux éducatifs			Sujet de jeu éducatif				
	Déjà essayé des jeux éducatifs	Je ne sais pas si c'était un jeu éducatif	Jamais essayé de jeu éducatif	Je veux essayer les jeux éducatifs	J'essaierai peut-être des jeux éducatifs	Je ne veux pas essayer de jeux éducatifs	Jeu_gestion	Jeu_stratégie	Jeu_agriculture	Jeu_éducation	Jeu_Autre
24	1	0	0	1	0	0	0	1	0	0	0
25	0	0	1	1	0	0	1	1	1	0	0
26	1	0	0	0	1	0	0	1	0	0	0
27	1	0	0	1	0	0	1	1	1	1	0
28	1	0	0	0	1	0	1	1	0	0	0
29	1	0	0	1	0	0	1	1	1	1	0
30	1	0	0	0	1	0	1	0	0	0	0
31	0	0	1	1	0	0	0	0	0	1	0
32	1	0	0	0	1	0	1	1	1	1	0
33	1	0	0	1	0	0	0	1	0	1	0
34	1	0	0	1	0	0	0	1	1	0	0
35	1	0	0	1	0	0	1	1	0	1	0
36	1	0	0	1	0	0	0	1	0	1	0
37	1	0	0	0	0	1	0	1	0	0	0
38	1	0	0	1	0	0	1	1	1	1	0
39	0	1	0	0	1	0	1	1	0	1	0
40	1	0	0	1	0	0	0	1	0	0	0
41	0	0	1	1	0	0	1	1	1	1	0
42	1	0	0	0	1	0	1	0	0	1	0
43	1	0	0	1	0	0	1	1	0	0	0
44	1	0	0	1	0	0	0	1	0	0	0
45	1	0	0	1	0	0	0	0	0	1	0
46	1	0	0	0	1	0	0	1	0	0	0

Individus	Jeux éducatifs?			Essayer des jeux éducatifs			Sujet de jeu éducatif				
	Déjà essayé des jeux éducatifs	Je ne sais pas si c'était un jeu éducatif	Jamais essayé de jeu éducatif	Je veux essayer les jeux éducatifs	J'essaierai peut-être des jeux éducatifs	Je ne veux pas essayer de jeux éducatifs	Jeu_gestion	Jeu_stratégie	Jeu_agriculture	Jeu_éducation	Jeu_Autre
47	0	0	1	1	0	0	0	0	0	1	0
48	1	0	0	0	1	0	1	1	0	0	0
49	1	0	0	1	0	0	1	1	1	1	0
50	0	1	0	0	1	0	1	0	1	0	0
51	1	0	0	1	0	0	0	0	0	1	0
52	0	0	1	1	0	0	0	1	0	1	0
53	1	0	0	1	0	0	1	1	0	1	1
54	1	0	0	1	0	0	1	1	1	1	0
55	1	0	0	0	1	0	1	0	1	1	1
56	1	0	0	0	1	0	0	0	1	1	0
57	0	0	1	0	1	0	1	1	0	0	0
58	1	0	0	1	0	0	1	1	1	0	0
59	0	1	0	0	1	0	1	1	1	1	1
60	0	1	0	1	0	0	0	1	1	0	0
61	1	0	0	1	0	0	1	1	0	1	0
Total	41	8	12	37	22	2	35	42	25	30	7

	Jeux sur l'agriculture										Point de vue sur l'Agriculture			Acquisition pratique										Recommandation de jeu							Notation de critères							
	Individus	Farming simulator	Harvest Moon Series	Rune Factory Series	Story of Seasons Series	Innocent Life	My Little farm	Civilization	Stardew Valley	Surgeon simulator	ça n'a rien changé sur ma vision de l'Agriculture	Ma vision sur l'Agriculture a changé depuis que j'y ai joué	Ma vision sur l'Agriculture a PEUT-ÊTRE changé depuis que j'y ai joué	Gestion du temps	Gestion d'énergie	Gestion financière	Importance du choix des saisons	Importance des interactions sociales	Enjeu environnemental	Gestion des ressources	Revenus économiques	Autres	Rien du tout	R_Farming Simulator	R_Harvest Moon	R_Innocent life	R_Rune Factory	R_Stardew Valley	R_Story of seasons	R_Autres	R_None	Note_Fiabilité	Note_Réalisme	Note_Graphisme	Note_Fun	Note_Expérience		
1		0	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	4	4	3	3
2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
3		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4		0	0	1	0	0	0	0	1	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	3	4	4	4		
5		0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	3	3	3	3	3		
6		0	1	1	1	0	0	0	0	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	4	4	3	4	4		
7		0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	3	3	3	3	3			
8		0	1	1	0	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	2	2	2	2		
9		0	1	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0			
10		0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0			
11		0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	3	3	3	4		
		0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	2	3	0	3		

	Jeux sur l'agriculture										Point de vue sur l'Agriculture					Acquisition pratique										Recommandation de jeu							Notation de critères					
	Individus	Farming simulator	Harvest Moon Series	Rune Factory Series	Story of Seasons Series	Innocent Life	My Little farm	Civilization	Stardew Valley	Surgeon simulator	ça n'a rien changé sur ma vision de l'Agriculture	Ma vision sur l'Agriculture a changé depuis que j'y ai joué	Ma vision sur l'Agriculture a PEUT-ÊTRE changé depuis que j'y ai joué	Gestion du temps	Gestion d'énergie	Gestion financière	Importance du choix des saisons	Importance des interactions sociales	Enjeu environnemental	Gestion des ressources	Revenus économiques	Autres	Rien du tout	R_Farming Simulator	R_Harvest Moon	R_Innocent life	R_Rune Factory	R_Stardew Valley	R_Story of seasons	R_Autres	R_None	Note_Fiabilité	Note_Réalisme	Note_Graphisme	Note_Fun	Note_Expérience		
45		0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	3	4	3	3
46		0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
47		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
48		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
49		0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	
50		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
51		0	1	1	1	1	0	0	0	0	1	0	1	0	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	2	3	3	3		
52		0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	2	2	2			
53		0	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	3	3	2	1	2			
54		0	1	1	1	0	0	0	1	0	1	0	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	3	2	3	3	3		
55		0	1	1	1	1	0	0	1	0	1	0	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	4	4	3	5	5		

	Jeux sur l'agriculture										Point de vue sur l'Agriculture					Acquisition pratique										Recommandation de jeu										Notation de critères								
	Individus	Farming simulator	Harvest Moon Series	Rune Factory Series	Story of Seasons Series	Innocent Life	My Little farm	Civilization	Stardew Valley	Surgeon simulator	ça n'a rien changé sur ma vision de l'Agriculture	Ma vision sur l'Agriculture a changé depuis que j'y ai joué	Ma vision sur l'Agriculture a PEUT-ÊTRE changé depuis que j'y ai joué	Gestion du temps	Gestion d'énergie	Gestion financière	Importance du choix des saisons	Importance des interactions sociales	Enjeu environnemental	Gestion des ressources	Revenus économiques	Autres	Rien du tout	R_Farming Simulator	R_Harvest Moon	R_Innocent life	R_Rune Factory	R_Stardew Valley	R_Story of seasons	R_Autres	R_None	Note_Fiabilité	Note_Réalisme	Note_Graphisme	Note_Fun	Note_Expérience								
56		0	1	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	2	2	3	3		
57		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
58		0	1	1	1	1	0	0	1	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	3	2	2	
59		0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	5	5	5	5	5	
60		0	1	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	5	4	5	5	5
61		1	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	4	4	4
Total	3	24	13	15	7	1	1	4	1	14	12	16	23	15	18	19	11	2	1	1	3	9	2	17	5	5	2	8	4	5	10	2	92	84	91	81								

Appendix 8 : Discours

Pourriez-vous donner une brève explication sur le secteur important selon votre point de vue?

2	Le niveau d'éducation de l'ensemble d'une communauté influe sur la qualité de sa prise de décision contribuant à son développement
3	The more educated people there, the more people can work on how to develop the country.
4	"Si vous voulez détruire un pays, inutile de faire une guerre sanglante qui pourrait durer des décennies et coûter cher en vies humaines. Il suffit de détruire son système d'éducation et d'y généraliser la corruption. Ensuite, il faut attendre 20 ans et vous aurez un pays constitué d'ignorants et dirigé par des voleurs. Il vous sera facile de les vaincre."
5	pas vraiment
6	Il faut que les gens soient responsables pour pouvoir se concerter et développer des idées. Et l'éducation est la clé
7	c'est le cœur de l'indépendance
11	Le secteur économique peut évoluer mais les évolutions dépendent de l'éducation du peuple
14	Car l'éducation permet le changement de mentalité
15	L'éducation permet aux jeunes d'étendre leur connaissance dans différents domaines, ce qui entraîne un développement des autres secteurs.
16	Parce que les jeux vidéo sont fun
17	Cela forge l'identité d'un pays et peut être à la fois un levier économique et social important
18	Tout est dans l'éducation
19	par exemple, pour la cas des pays en Afrique où on constate qu'en général 60% de la population vie dans le monde rural, les secteurs porteurs se situent dans l'agriculture, l'élevage et les autres activités de promotion de la ruralité. Mais cela diffère si on prend des pays en Europe où l'économie est plus industrialisée. Cependant, il existe des secteurs que l'on pourrait considérer comme ayant une importance prioritaire peu importe le pays, comme l'éducation, la santé ou la sécurité
20	La population a besoin de savoir
21	Selon différents paramètres tels que les ressources du pays, cette réponse devrait varier.
22	SI on a des personnes bien éduqué dans plusieurs domaines, le développement des autres domaines se fera plus naturellement
23	l'éducation est l'arme la plus puissante pour changer le monde
24	Plus d'intellectuels visionnaires, moins de personnes éduquées pour n'être que des pigeons
25	Les produits de l'agriculture sont nombreux et méritent d'être exploités ou valorisés, ceci afin de fournir des avantages appréciables pour tous les acteurs œuvrant pour le développement agricole
27	Selon moi, il n'y a pas qu'un seul secteur qui permette de développer un pays, autant que le choix du (des) secteur(s) primordial (aux) doit dépendre impérativement de la situation du pays, il y a forcément question de contextualisation et d'adaptation. Mais je pense que l'on pourrait dire de l'éducation que c'est un déterminant commun à toute société pour son essor, en ce sens que : d'une part, dans un contexte politico-socio-économique, un citoyen éduqué pourra mettre les connaissances acquises au service de la société ; et d'autre part, sur le plan moral, il aura intégré des valeurs importantes pour un développement inclusif et durable, telles que le respect mutuel ou la cohésion sociale.
28	L'éducation est la base de toutes civilisations

29	Le développement d'un pays dépend du développement de son économie et de sa technologie
30	L'éducation permettra d'améliorer la mentalité des gens, les rendre plus enclin à s'adapter et à trouver des solutions novatrices pour différents types de problème.
31	parce que le savoir c'est le pouvoir
32	L'éducation pour avoir des personnes ayant les compétences pour nécessaires et l'agriculture pour diminuer les importations et permettre l'autosuffisance.
33	parce rien n'est développé ici
34	tout commence par l'éducation, pour exploiter l'agriculture et l'artisanat (surtout dans le cas de Mcar)
35	Parce que nous possédons de bons talents et un potentiel. C'est aussi un secteur évoluant extrêmement vite et ou les principale ressources sont les idées.
36	Il s'agit d'un secteur clé car elle permet la formation, l'information, valorise les compétences
37	C'est la base de tout, si une personne est illettré de nos jours ils peuvent rien faire
38	L'éducation est essentielle car elle est la base, ce qui tue un peuple c'est le manque de connaissance... la connaissance tire vers le haut et non le sens contraire, la haine... elle produit des fruits. Ainsi les gens peuvent se servir de ces connaissances pour utiliser leurs talents, moyens (agriculture, artisanat...) pour contribuer au développement de leur pays.
40	L'éducation est la base de tout développement, à travers laquelle on pourra avoir les minimums nécessaire pour être autonome et ne pas dépendre des autres. Pour l'agriculture, tout le monde doit manger pour survivre et du coup, l'autosuffisance alimentaire doit avant tout être la priorité
41	le secteur primaire est le pilier du développement économique d'un pays. C'est ce secteur qui touche directement la vie de population et qui est la base de tous secteurs d'activités. Et un pays ne peut pas développer si son peuple n'est pas éduqué. le développement ne va pas sans éducation.
42	Parce qu'une bonne éducation est la base de chacun des autres secteurs et l'agriculture est la première source de produits consommables d'un pays
44	Comme Mandela l'a dit : " L'éducation est l'arme la plus puissante que l'on ait à disposition pour changer le monde"
45	L'éducation accompagne le savoir vivre, le savoir vivre engendre l'honnêteté et sans honnêteté, l'individualisme règne mais que pour qu'un pays puisse se développer il est important de penser dans l'intérêt de tous.
46	l'éducation est la clé de tout succès
47	Pour moi, l'éducation est la seule clé du développement
48	Un homme bien éduquer peut se surpasser
49	Avec le commerce on peut booster l'économie d'un pays même s'il n'a pas de ressources naturelles
50	Par éducation, je parle non seulement ici d'éducation au niveau intellectuel mais aussi au niveau morale. Il est donc évident pour moi que le développement d'un pays réside dans le fait que son peuple aie une bonne base intellectuelle et aie de bons principes moraux.
51	Good education is very important
52	Because with good education, people can think, act wisely and are not disturbing with any bad influences.
53	Education is the root of everything, without knowledge nothing would work - so the better the knowledge, the better p.e. trade, craft, agriculture
57	Education is the fundation of self development and development of the community
58	Education opens up to a world of possibilities.
59	The smarter a person is, the better ALL areas will improve.

60	Everything is important
61	Because giving a good education is the best way to save the next generation.

Que pensez-vous du système éducatif actuel?

2	peu satisfaisant
3	It needs to be revised. It should be more student centered than teacher centered since this allows creativity.
4	trop linéaire et favorisant plus l'exécution que l'apprentissage et la découverte
5	perfectible
6	Paralysé dans le passé
7	à déplorer car trop corrompu
9	inapproprié
10	Standard
11	Beaucoup trop compétitif et moins éducatif
13	Progrès à fournir
14	Médiocre
15	Manque d'accompagnement du gouvernement, des parents, de différentes associations.
16	bien
17	Non adapté pour le réel épanouissement de chaque individu
19	Ici encore, il aurait fallu spécifier de quel pays parle-t-on, mais si nous nous focalisons sur le cas malgache, le système éducatif doit être repensé. par exemple, prenons la problématique de la langue d'enseignement à Madagascar. il est le malgache dans les classes élémentaires et puis le français dans les niveaux supérieurs. Cela doit être repensé, dans la mesure où la maîtrise du français est encore l'exclusivité d'une minorité urbaine dans le pays. le Système éducatif ne favorise donc pas une égalité devant l'enseignement car pénalise largement la majorité rurale (80% de la population)
20	C'est vieux
21	À Madagascar, il souffre de nombreux problèmes tels l'accessibilité mais aussi d'un programme ayant besoin d'être actualisé et adapté à la situation de l'île.
22	Pas assez ouvert aux besoins de chaque personne.
23	Mauvaise
24	Peux mieux faire
25	inadéquat aux besoins de développement du pays
27	Tout comme le domaine à prioriser pour le développement d'un pays, le système éducatif diffère également. S'il s'agit du cas de Madagascar, nombreux seront d'accord qu'il est bancal et obsolète. En effet, les lois y afférents autant que le programme national datent et ne tiennent plus compte du contexte actuel, ce qui entraîne un gap quant au niveau des étudiants malgaches et étrangers, ainsi qu'entre les étudiants et leurs professeurs. Ce qui pénalisera grandement les malgaches non seulement dans les écoles étrangères mais aussi dans le monde professionnel. Par exemple, l'histoire apprise à l'école primaire est différente de la réalité et des nouvelles découvertes des

	chercheurs ; l'accompagnement et le suivi des élèves pour leur orientation de carrière est quasi-inexistante ; les questions civiques et technologiques sont peu abordées avant la spécialisation universitaire. Par ailleurs, le système est probablement aussi défectueux que corrompu. Pour illustration, l'octroi des agréments aux écoles et universités privées semble automatique, ceux-ci poussent comme des champignons à travers le pays, et particulièrement vite dans la capitale.
28	Malgache? Encore très lacustres, une très grande partie de la population est analphabète
29	c'est n'importe quoi, juste un lavage de cerveau
30	Le problème se situe, à mon humble avis, dans le fait que l'éducation en général n'est pas faite pour apprendre à penser par soi-même mais plutôt à suivre des formules toutes faites
31	bourratif
32	Inadapté à la réalité du pays
33	inexistant, obsolète
34	il n'est pas adapté à ce pays
35	Nécessite un ajustement par rapport aux orientations et le développement personnel.
36	C'est de la merde.
37	Nul
38	Injuste, inégale.
40	Besoin de réforme, tendance à trop théorique dans certains pays et ne permet pas aux élèves de connaître la réalité dans la vie. Il faut promouvoir les recherches
41	le système éducatif actuel n'est pas du tout adapté ni à notre époque ni à notre diversité. On n'enseigne pas à l'école les choses dont on a réellement besoin dans la vie quotidienne. on enseigne les élèves pour trouver un emploi, pas pour créer des emplois. et on juge la capacité des gens selon les notes scolaires (Maths, PC, etc..) alors qu'il peut être doué dans un toute autre domaine. comme disait Einstein si on juge un poisson à sa capacité de grimper un arbre, il va penser durant toute sa vie qu'il est stupide. Je suis convaincue que chacun de nous est doué pour quelque chose spécifique, le système éducatif devrait aider les élèves à trouver "cette quelque choses" et l'aider pour réussir dans cela pas mettre tous le monde dans la même moule.
42	Il est encore a revoir : le calendrier n'est pas bien choisi ainsi, et le programme de certaines matières devrait évoluer
44	Le système éducatif malgache actuel vise à former une armée de robots écervelés qui travailleront en obéissant à la conjoncture économique existante. L'école ne tient pas compte des compétences qui nous sont essentielles pour vivre. Par ailleurs, l'éducation de chaque citoyen à être PATRIOTE est inexistante. Cependant, le patriotisme doit être inculqué dès le plus jeune âge pour que l'amour de la patrie naisse en chacun et que chaque citoyen agisse pour le bien du pays.
45	Honnêtement mal maîtrisée et loin d'être efficace
46	plein de corruption
47	On ne donne pas assez d'importance à l'éducation
48	De la *****
49	Ce n'est pas adapté au pays. On copie juste le système français
50	Je pense qu'on est à une époque où chaque individu devrait pouvoir apprendre ce qui l'intéresse vraiment plus tôt dans la vie. Je trouve que le système éducatif actuel propose un programme un peu trop polyvalent dans le but de créer justement des individus polyvalents. Or, on est actuellement dans un monde où la spécialisation est de mise. En somme, je pense que notre système éducatif actuel est archaïque.
51	There are not enough teachers so Kids don't get enough education and have days off

- 52 We need to renew the education system and put more effort on raising our future generation for a better future.
- 53 I come from Germany and as I can say about that system is that it's pretty developed, but when it comes to terms of inclusion, it needs a change
- 55 Horrible for public schools
- 57 Just to show the world children go to school but the quality of what is delivered is obviously low
- 58 In which part of the planet are you referring to?
- 59 Horrible. They focus on the useless, and give very little care to the actual needs of everyday life. Such as learning math terms you'll never use outside of school, but not knowing how to do your own taxes which is required every year.
- 60 Could be better
- 61 Regarding the quality, the materials used, we can tell that the current education is very poor.

Décrivez les jeux éducatifs / Serious games en 5 mots; selon vos propres perceptions.

- 1 utile pratique amusant ludique innovant
- 2 Type de jeu qui aiderait dans renforcerait la réflexion et la prise de décision d'un individu
- 3 It's kinda brain stimulator
- 4 Fun, maniable, intéressant, immersif, satisfaisant (à finir)
- 5 ennuyeux, mal conçu, perfectible, ennuyeux et irréaliste
- 6 Plus efficace que les livres
- 7 un jeu vidéo à titre pédagogique
- 8 Ça apprend beaucoup de choses
- 9 des jeux qui m'apprendront quelque chose de nouveau
- 10 Répétitif et ennuyant
- 11 Très plaisant et utile
- 12 Réalisme, Sensibilisation, Perfection, Action, Objectif
- 13 Didactique, utile, informatif, facile d'accès
- 14 Jeux qui permettent d'améliorer les connaissances
- 15 L'apprentissage via les jeux vidéo.
- 16 Bien, amusant, intéressant, joyeux, fun
- 17 Amusant, enrichissant, lassant, original, intéressant
- 18 Difficilement réaliste
- 19 un jeu qui se veut transmettre des informations, à doter de capacité ou d'aptitude que le joueur pourra exploiter dans la vie quotidienne ou professionnelle
- 20 Donnent un air sérieusement ennuyeux

21	Bonne intention mais équilibre difficile
22	Ca pourrait être bien
23	apprendre quelque chose des jeu
24	Efficace amusant challenging novateur adapté
25	Simulation, éducation, pratique, information
26	Intelligent amusent stimulent agréable enrichissent
27	Logique, pratique, efficace, instructif, amusant.
28	Utile pour les enfants
29	méthode de développement efficace et amusant
30	innovant, intrigant, informatif, rapidement lassant, répétitif
31	stratégie,
32	Enrichissant, parfois frustrant, amusant
33	logique quizz culture fun cerveau
34	faire passer un message avec fun
35	Intéressant, Utile, Peu immersif, Perfectible
36	Utile. Intéressant. Super. Génial.
37	Un jeu pour les enfants
38	Amusant intéressant apprendre mémoire déstressant
39	Éducatif, culturel, avenir, collectif
40	Informatif, stimulant, développe, entraîne, éduque
41	Message, éducation, jouer, apprendre, appliquer
42	Ennuyeux, non-stimulant, court, enfantin, amusant
43	développement du système cognitif, better management
44	Attractifs, captivants, enrichissent la connaissance
45	Un corps sain dans un esprit sain
46	bof bof
47	Efficace, utile, moderne, intéressant, modernisant
48	Ça ne m'attire pas
49	Un jeu éducatif pour moi c'est comme Dora même si ce n'est pas vraiment un jeu
50	Je suppose que vous voulez surtout parler de jeux videos éducatifs. Dans ce cas, comme je l'entends, un jeu vidéo éducatif est un jeu vidéo qui a pour but d'initier le joueur a une certaine pratique. Peut-

	être a de la science ou a l'art par exemple, je ne sais pas.
51	They are games where you can learn something
52	Realistic with a little fairy
53	Interesting, useful, challenging, motivating, knowledge
54	I love puzzles so games like brain age I enjoyed
55	Cognition, funny, playfulness, edutainment,
56	H
57	Educate youth through new technologies
58	Can change how you see
59	Unrealistic, non-thrilling, not-game-like.
60	Fun Helpful Entertaining Practical Educational
61	learning, useful, concept, enjoying

En vous référant à votre choix de réponse, veuillez spécifier un titre de la série (par exemple: Harvest Moon: Friend of mineral town)

1	Harvest Moon: Tale of two towns
5	le tout premier
6	Harvest moon : tales of two town
8	Harvest Moon: Friend of mineral town
18	Growing crops
21	Il n'y a qu'un seul Kingdom Come à ce jour
24	Innocent life
27	Harvest Moon : Back to Nature
28	Euh.. Harvest moon je sais plus
29	Harvest moon: a wonderful life
30	Je ne me souviens pas du titre, mais juste que j'avais joué à la 1ère version sur PSone
43	j en ai pas
44	Je ne pourrais pas répondre parce que je ne connais pas le jeu
45	Tree of tranquility
51	Harvest Moon
52	Aucun

53	Rune factory
54	Story of Seasons
55	Innocent life
56	Harvest Moon
58	Innocent life
59	All of them. Because in order to be here without the option of "I've played none of them", they must be pretty popular.
60	Story of Seasons
61	Story of Seasons

Selon vous, quels pourraient être les problèmes rencontrés dans l'utilisation des jeux éducatifs/serious games?

2	l'implication sérieuse du joueur dans le jeu
3	The person might become addicted!
4	Une grande partie de la "communauté" de joueurs risque de trouver un tel jeu "ennuyeux". Et la perception générale des jeux est encore assez limitée à un simple loisir, donc juste un passe-temps, sans réel enjeu important.
5	l'ennui
6	Sécurité et adaptabilité
7	Non pertinence par rapport à la pédagogie voulue. Mauvais gameplay
8	Monotone
9	ça occupe trop de temps
10	Dépendance aux appareils électroniques au point d'en devenir asocial
11	Comme pour tous domaines du divertissement amenés dans l'éducation, le problème de la gestion du temps et de la mise en compétition
13	Manque de fun et d'implication du joueur
14	l'addiction
15	Le manque d'indication ou d'explication, ce qui peut faire perdre l'utilisateur dans le but du serious game.
16	Pas de fun.
18	L'action répétitive
19	Un jeu est un moyen formidable de véhiculer des informations à l'ère du numérique, à l'image des médias sociaux (facebook, twitter, youtube ...). Mais on se retrouve avec les mêmes problèmes : le contrôle des informations. Un jeu vidéo contient toujours une part de fiction (pour le rendre plus attractif, plus accessible pour un public plus large, ...) et le fait de créer des jeux "éducatifs" nécessite de questionner ce caractère fictionnel. Un serious game ambitionne à transmettre des

	informations "vraies" et à doter les joueurs de capacité qu'ils peuvent exploiter dans la vie quotidienne ou professionnelle. Il y a donc un souci de réalisme. Réalisme et fiction doivent être balancés constamment, ce qui n'est ni facile, ni évident
20	yeux rouges
21	L'adaptation du but éducatif dans le format jeu vidéo. L'accessibilité à tous les apprenants et la formation d'enseignants pouvant créer et exploiter ces outils.
22	l'addiction a la technologie
23	mélanger l'irréel et le réel
24	Certains contenus ne seraient pas suffisamment diversifiés pour répondre aux besoins des différents joueurs
25	Manipulation des matériels, l'âge des participants, manque de concentration
26	Des Addictions
27	A part l'addiction, presque commun à tout jeu, aucun problème ne me vient s'il s'agit de jeux éducatifs.
28	L ennui des joueurs
29	Un système unilatéral d'enseignement
30	Le fait que le fun soit mis de côté (non intentionnellement) au profit de l'information à transmettre, un jeu se doit avant tout d'être fun. Une fois un gameplay fun établi, le joueur sera plus enclin à assimiler toutes informations que vous voudrez leur transmettre. Aussi, l'un des gros problèmes des jeux éducatifs c'est qu'ils sont rapidement lassants, du fait d'une répétitivité mal dosée. Il faudrait répartir les points forts du gameplay tout au long du jeu. En fait, le problème en général c'est que les développeurs ne considèrent pas les jeux éducatifs comme des jeux à part entière, ils doivent respecter certaines règles de développement d'un jeu standard.
31	addiction
32	Inadaptés à la réalité et prend trop de temps
33	c'est ennuyant à la longue et répétitif
34	peut-être ennuyant
35	Comme il s'agit d'un média éducatifs, il faudra prêter une forte attention au message véhiculé. Et ce message pourrait un grand obstacle durant le développement, car il pourrait être déformé pour servir des intérêts (comme tout les produits artistique dont on doit retire certains morceau pour des raisons politiques, commerciale ou autre)
36	On devient vite accro
37	C'est ennuyeux
40	Pas standard (les jeux pour les adultes ne sont pas conçus pour les petits, vice versa)
41	le problème peut se trouver à la manière de faire passer le message aux joueurs. Les jeux éducatifs sont construits selon des objectifs bien précis. l'enjeu est de s'assurer que les objectifs sont atteints si un joueur joue au jeu

42	La perte d'intérêt des joueurs (en fonction du domaine dans lequel il est utilisé), l'incompréhension de certains utilisateurs.
43	je ne sais pas...
44	Pour quelqu'un qui n'aime ou n'est pas familier aux "High tech", ce sera difficile
45	Incompatibilité de culture en termes d'éducation
46	les parents !!!
47	L'addiction, faisant oublier les autres aspects de l'éducation
48	L'appareil utilisé
50	Je ne pense pas qu'il y ait de problèmes spécifiques aux serious games que l'on pourrait rencontrer. Le problème, pour moi, réside plus dans le "jeu vidéo" tout court lui-même. Même si on est à une époque où le jeu vidéo tient une grande place dans le monde (rien qu'à voir les événements e-sport à l'étranger), il existe encore une grande majorité de personnes qui pensent que le jeu vidéo c'est pour les enfants (tout comme les manga/anime), que cela rend les joueurs agressifs ou débiles. Pour moi, il faut d'abord briser ces préjugés-la.
51	No problems i think
52	Players may stuck more on their screen instead of creating a real life which is already the problem of video games
53	Too challenging - some people might give up too early, falsely advertised, maybe too young people don't understand the game
55	Traditional teaching in school
57	Access and infrastructures
58	Exploitation
59	Like above: It's mainly NOT games, just bad attempts at educational lies. It's not a GAME using education like it should be, its EDUCATION topped off with cheap, lame, game-ish playthrough.
60	Real life issues
61	Sometimes there is a risk of enjoying a lot the game rather than learning through it.

Commenter brièvement votre réponse sur vos expériences acquises

4	Il faut savoir gérer son emploi du temps sur le long terme, en jonglant habilement entre ses occupations personnelles et le contact avec autrui
5	je joue pour analyser le game design
6	Très éducatif et apprend l'importance des valeurs comme la bonne gouvernance et bonne gestion
9	il faudrait être sympa avec les gens, les écouter car ils auront toujours quelques conseils utiles
10	Avoir des relations permet de repousser nos limites. L'argent s'investi mais ne se garde pas en poche uniquement.
11	Pas trop de chose à dire car je n'y ai pas joué suffisamment. Mais de ce que j'ai ressenti, la gestion financière (investissement) m'a beaucoup plus car doit être bien calculé

16	Bien savoir gérer son énergie durant les opérations.
18	Tout est précieux
21	Peut-être l'ai je découvert trop tard mais il ne m'a rien appris d'utile ou de marquant même si j'ai passé un bon moment.
26	C'est un point important dans l'éducation
27	Dans la vie quotidienne, ça m'a appris à m'impliquer plus dans les interactions sociales, et à mieux comprendre l'importance des fréquences de discussion avec les voisins ; ça m'a également inculqué un meilleur sens de l'organisation en m'apprenant la gêne que peut m'apporter une mauvaise gestion de mon temps et de mon argent. Quant au choix des saisons et concernant les mécanismes de l'agriculture, comme ce sont ces jeux qui m'ont donné envie de m'intéresser à ce domaine, ça m'a aidée à assimiler plus facilement le fonctionnement de certaines cultures.
28	C est des aspects que l on réalise pas en y pensant juste
29	Il faut savoir faire une chose en économisant de l'énergie mais surtout au bon moment, une planification s'impose
33	j'y ai joué uniquement pour m'amuser
43	Je suis devenue riche grâce à ça.
44	J'ai jamais joué au jeu alors je peux rien dire
45	Le temps est précieux et il est primordial de savoir le gérer
52	I don't really like games around agriculture, I'm not interested they are boring for me
53	My grandparents have a farm, so I already knew these basics from them
54	I'm great at time management. I notice my time management in my current job is played out the same way as when I'm playing harvest moon. Of course games can be helpful.
58	It can be applied to real life situations.
59	The product in the above questions, was not existing within my individual course of life, and therefore was not taken in in any matter of visual, mental, or other such aspects.
61	I've learn that the time of working in agriculture is very important. But also the choice of period to plant, and the fund you must engage in it should be considered.

Raison de la recommandation de jeu

4	Déjà, c'est dispo sur pc, ce qui est plus accessible par la majorité (si on ne prend pas en compte les émulations de consoles sur pc). Et c'est "cheap", côté matériel requis, avec des graphismes simples, des éléments de gameplay sans prise de tête, une version plus lowcost des Harvest Moon et Rune Factory.
5	bah je ne sais pas
6	C'est un jeu très riche et éducatif, a la fois sur la manière de gérer une ville, mais aussi la campagne.
8	C'est le premier que j'ai joué
10	c'est les seul jeux de ce type auquel j'ai déjà joué.

18	Ce n'est pas assez difficile et c'est le seul que je reconnais
21	C'est un jeu qui m'a fait découvrir une période et un lieu qui jusque là ne m'a jamais interpellé, il y a un soin apporté aux détails et le jeu contient quasiment une encyclopédie médiévale.
24	J'adore les graphismes
27	En basant cet avis sur une recommandation à un pure profane ou un « noob », ainsi que sur la part « serious » du jeu qui sera alors plus logique que ludique :
28	Pour une première fois, il est assez complet mêlant du sérieux entre agriculture, élevage et interactions sociales, mais aussi du fun entre les festivals et le scénario en soi. De surcroît, le graphisme est mignon et attachant ; et question réalisme, même si le niveau n'est pas fameux, il est non seulement moins violent que certains jeux du même genre (comme Rune Factory) mais aussi plus concret, et donc plus adapté à tout public, même les plus jeunes.
29	Je ne suis pas très calé question harvest moon mais je choisirais le jeu le plus récent car c est souvent ceux là qui sont les plus conformes a la réalité actuelle
30	C'est le jeu le plus difficile et le plus réaliste de la série (mort à la fin)
31	C'est le tout premier auquel j'ai joué et j'ai tout de suite accroché, style graphique très "friendly", simple et accessible, et surtout, fun! on ne réalise même pas qu'on est en train d'apprendre
44	J ai pas d'avis... Je voudrai juste jouer à Harvest moon mais je l ai jamais eu. À la place, j ai eu Bendy and the ink machine
45	Idem que la question précédente
46	ce jeu est magnifique tout simplement
51	Because it's quite realistic except for the trees etc
52	None
53	It's more challenging than Harvest Moon or Story of Season because of the aspect that you have to fight monsters, the atmosphere is just more mature (graphics, storyline, the aspect that you have to -kill-)
54	I would have picked a harvest moon game but sos trio of towns was made by the original harvest moon team and this game is an improvement on all games. You must use great time management and it has three different towns with three different cultures, so that's also a great learning area.
55	This game tells about world when You don't care and destroy.
56	My 1st game
58	It hits close to home.
60	Teaches you farming and also the importance of trade and social interactions

Appendix 9: General typology

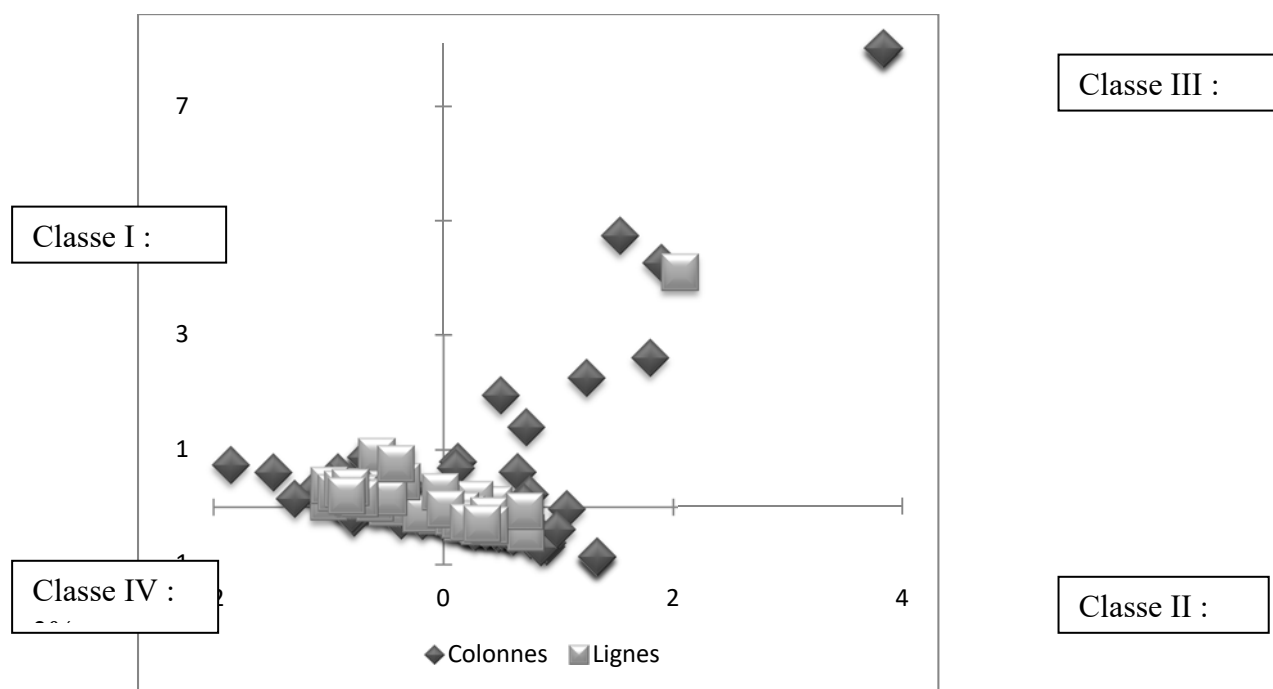


Figure 19: General typology

The lines represent the individuals, and the columns the features. In the table below, the standard coordinates. The lines are highlighted.

Main coordinates :

Classe I			Classe III		
33	-0.599	0.071	5	0.318	0.003
2	-1.001	0.091	15	0.435	0.038
20	-0.679	0.117	21	0.266	0.130
32	-0.660	0.120	16	2.051	4.112
39	-0.775	0.144		0.326	0.000
25	-0.782	0.147		0.695	0.085
48	-0.734	0.149		0.745	0.223
46	-0.482	0.169		0.639	0.612
42	-0.792	0.180		0.105	0.681
40	-0.708	0.185		0.120	0.790
57	-0.843	0.192		0.719	1.394
38	-0.809	0.204		0.496	1.947
44	-0.743	0.223		1.244	2.250
31	-0.838	0.229		1.796	2.601
36	-0.680	0.248		1.888	4.271
41	-0.931	0.249		1.532	4.747
52	-0.030	0.265		3.832	8.024
34	-0.618	0.271		3.832	8.024
22	-0.844	0.297		3.832	8.024
35	-0.495	0.310			
47	-0.877	0.314			
14	-0.880	0.324			
49	-0.810	0.340			

	12	-0.895	0.353			
	19	-0.993	0.377			
	3	-0.480	0.429			
	43	-0.363	0.443			
	50	-0.411	0.753			
	23	-0.581	0.882			
Scénario		-0.300	0.005			
Je ne sais pas si c'était un jeu éducatif		-0.154	0.008			
Action		-0.054	0.010			
J'essaierai peut-être des jeux éducatifs		-0.313	0.013			
Jeu_gestion		-0.345	0.020			
R_Rune Factory		-0.063	0.021			
Notation du système de prise de décision		-0.364	0.048			
Plate-forme		-0.276	0.058			
Education		-0.342	0.063			
Jeu_stratégie		-0.495	0.070			
Cohérence		-0.079	0.071			
Agriculture		-0.728	0.071			
Femme		-0.532	0.077			
Homme		-0.356	0.095			
Madagascar		-0.466	0.129			
Déjà essayé des jeux éducatifs		-0.026	0.134			
Information véhiculée		-0.576	0.136			
Enseignant		-1.295	0.146			
20 - 25 ans		-0.501	0.171			
Possibilité d'utiliser les jeux pour transmettre des informations		-0.491	0.172			
Rien du tout		-0.541	0.186			
Réalisme		-0.489	0.192			
Universitaire		-0.605	0.198			
Action		-0.485	0.223			
Utiliser les jeux pour transmettre des informations		-0.323	0.235			
Europe		-1.135	0.285			
Artisanat		-0.773	0.319			
Influence des jeux vidéos sur le comportement		-0.412	0.323			
Je veux essayer les jeux éducatifs		-0.312	0.346			
R_None		-0.995	0.445			
Informatique		-0.924	0.604			
Jamais essayé de jeu éducatif		-1.478	0.605			
On ne peut pas donner de réponse générale		-1.855	0.735			
My Little farm		-0.678	0.865			
Civilization		-0.678	0.865			
Gestion des ressources		-0.678	0.865			
Revenus économiques		-0.678	0.865			
	Classe IV			Classe II		
	13	-0.059	-0.150	55	0.713	-0.443
	17	-0.197	-0.119	54	0.476	-0.350
	9	-0.494	-0.008	51	0.311	-0.333
chômeur		-0.184	-0.239	4	0.349	-0.324
Culture		-0.368	-0.231	60	0.402	-0.317
Ma vision sur l'Agriculture a PEUT-ÊTRE changé depuis que j'y ai joué		-0.019	-0.209	1	0.301	-0.302
Reflexion		-0.785	-0.183	45	0.402	-0.295
Plus de 25 ans		-0.034	-0.148	61	0.334	-0.290
Influence probable des jeux vidéos sur		-0.071	-0.135	27	0.160	-0.279

le comportement					
Je ne veux pas essayer de jeux éducatifs	-0.799	-0.127	56	0.215	-0.266
Simulation	-0.253	-0.116	30	0.410	-0.237
Jeu_agriculture	-0.137	-0.085	6	0.385	-0.230
Fluidité	-0.281	-0.059	37	0.145	-0.221
Jeu_éducation	-0.295	-0.055	26	0.301	-0.211
Graphisme	-0.377	-0.027	29	0.172	-0.204
Arcade	-0.171	-0.026	10	0.220	-0.196
RPG	-0.202	-0.019	18	0.088	-0.166
Difficulté	-0.404	-0.014	58	0.397	-0.152
Commerce	-0.473	-0.005	8	0.152	-0.152
15 - 20 ans	-0.581	-0.004	11	0.195	-0.149
			24	0.197	-0.126
			7	0.100	-0.091
			59	0.710	-0.072
			28	0.145	-0.065
			53	0.016	-0.036
Brazil				1.331	-0.865
Artiste				1.331	-0.865
Santé				1.331	-0.865
Visual Novel				1.331	-0.865
Autres				0.840	-0.697
On ne peut pas exploiter les jeux pour transmettre des informations				0.890	-0.683
Stardew Valley				0.904	-0.619
Entrepreneur				0.751	-0.575
Innocent Life				0.601	-0.512
USA				0.842	-0.491
Story of Seasons Series				0.471	-0.464
Rune Factory Series				0.589	-0.449
France				0.272	-0.432
Importance du choix des saisons				0.512	-0.420
Importance des interactions sociales				0.374	-0.417
10 - 15 ans				0.562	-0.411
Lycéen				0.562	-0.411
Gestion financière				0.445	-0.404
R_Story of seasons				0.583	-0.398
Note_Expérience				0.621	-0.394
Note_Fun				0.548	-0.391
R_Stardew Valley				0.989	-0.387
Note_Graphisme				0.597	-0.371
Note_Réalisme				0.541	-0.350
Gestion du temps				0.372	-0.339
Ma vision sur l'Agriculture a changé depuis que j'y ai joué				0.452	-0.328
Harvest Moon Series				0.208	-0.303
Farming simulator				0.586	-0.296
New Zealand				0.742	-0.296
R_Harvest Moon				0.201	-0.280
R_Innocent life				0.461	-0.252
Canada				0.271	-0.127
Bénévole				0.029	-0.071
R_Farming Simulator				1.069	-0.034

Appendix 10 : FCA sectors with gaps (Main coordinates)

	61	-0.133	0.060		59	0.160	0.004
	2	-0.162	0.103		7	0.010	0.030
	56	-0.129	0.115		5	0.027	0.038
	45	-0.142	0.118		16	6.960	0.046
	3	-0.129	0.137		30	0.100	0.095
	25	-0.161	0.150		58	0.833	0.181
	57	-0.128	0.169	Je ne souhaite pas le préciser		3.651	0.044
	55	-0.204	5.128	Moins de 10 ans		8.854	0.068
USA		-0.026	0.003	Gaming		8.854	0.068
Education		-0.089	0.011	New Zealand		1.059	0.271
Enseignant		-0.213	0.025				
Entrepreneur		-0.181	0.176				
Femme		-0.123	0.232				
Plus de 25 ans		-0.023	0.788				
Brazil		-0.259	7.670				
Artiste		-0.259	7.670				
Santé		-0.259	7.670				
	28	-0.166	-0.242		35	0.049	-0.220
	19	-0.185	-0.224		11	0.084	-0.152
	29	-0.172	-0.199		15	0.816	-0.139
	48	-0.170	-0.194		10	0.053	-0.138
	26	-0.183	-0.191		34	0.000	-0.087
	31	-0.148	-0.188		52	0.951	-0.042
	50	-0.148	-0.188		54	0.049	-0.019
	40	-0.160	-0.187	Informatique		0.063	-0.330
	1	-0.160	-0.187	Employé		0.963	-0.030
	20	-0.177	-0.173				
	32	-0.157	-0.171				
	4	-0.146	-0.169				
	6	-0.146	-0.169				
	8	-0.146	-0.169				
	12	-0.146	-0.169				
	14	-0.146	-0.169				
	22	-0.146	-0.169				
	23	-0.146	-0.169				
	46	-0.146	-0.169				
	13	-0.179	-0.160				
	18	-0.145	-0.155				
	21	-0.145	-0.155				
	42	-0.170	-0.134				
	43	-0.160	-0.126				
	33	-0.181	-0.126				
	9	-0.168	-0.123				
	38	-0.170	-0.115				
	49	-0.176	-0.103				
	41	-0.174	-0.099				
	60	-0.160	-0.090				
	44	-0.170	-0.090				
	24	-0.143	-0.078				
	27	-0.143	-0.078				
	47	-0.142	-0.075				
	51	-0.186	-0.068				
	39	-0.180	-0.066				

	37	-0.155	-0.066
	36	-0.179	-0.065
	17	-0.176	-0.053
	53	-0.199	-0.047
Canada		-0.211	-0.362
On ne peut pas donner de réponse générale		-0.235	-0.335
Lycéen		-0.233	-0.286
10 - 15 ans		-0.233	-0.286
Homme		-0.147	-0.206
20 - 25 ans		-0.095	-0.204
Artisanat		-0.132	-0.191
Universitaire		-0.133	-0.173
Europe		-0.227	-0.167
chômeur		-0.217	-0.162
15 - 20 ans		-0.233	-0.144
Madagascar		-0.125	-0.142
Agriculture		-0.184	-0.124
France		-0.197	-0.099
Commerce		-0.175	-0.094
Culture		-0.223	-0.079
Bénévole		-0.253	-0.071
Notation du système de prise de décision		-0.108	-0.038

Appendix 11 : FCA Trends toward ga (Main coordinates)

	28	-0.209	0.047		47	0.039	0.000
	56	-0.258	0.058		14	0.039	0.002
	44	-0.140	0.060		20	0.098	0.242
	41	-0.085	0.144		53	0.240	0.275
	25	-0.172	0.148		60	0.191	0.290
	48	-0.255	0.153		7	0.030	0.334
	26	-0.188	0.171		23	3.366	0.433
	1	-0.222	0.179		59	2.090	0.523
	57	-0.112	0.193		31	0.465	1.031
	4	-0.110	0.207		2	0.278	2.433
	9	-0.004	0.221	Je ne sais pas si c'était un jeu éducatif		0.582	0.106
	52	-0.177	0.240	Jamais essayé de jeu éducatif		0.557	0.835
	54	-0.261	0.268	Influence probable des jeux vidéos sur le comportement		0.131	0.961
	27	-0.243	0.465	Autre		5.153	1.070
	37	-0.232	0.717	Possibilité d'utiliser les jeux pour transmettre des informations		1.417	1.437
Plate-forme		-0.232	0.023	Reflexion		0.032	3.242
Jeu_gestion		-0.036	0.060	Je ne veux pas essayer de jeux éducatifs		0.043	3.523
Graphisme		-0.334	0.067				
Jeu_éducation		-0.069	0.067				
Information véhiculée		-0.229	0.099				
Jeu_stratégie		-0.172	0.168				
Simulation		-0.233	0.182				
Jeu_agriculture		-0.032	0.227				
Difficulté		-0.242	0.323				
On ne peut pas exploiter les jeux pour transmettre des informations		-0.493	0.599				
	30	-0.177	-0.646		16	2.021	-1.637
	45	-0.140	-0.418		5	0.664	-0.688
	46	-0.185	-0.353		3	0.639	-0.667
	51	-0.147	-0.317		50	0.515	-0.609
	42	-0.178	-0.260		21	0.365	-0.434
	8	-0.117	-0.258		35	0.027	-0.352
	6	-0.192	-0.246		55	0.183	-0.254
	24	-0.253	-0.242		12	0.053	-0.105
	34	-0.216	-0.240	Interaction avec les gens.		2.395	-2.513
	49	-0.115	-0.204	Autre		2.733	-0.869
	15	-0.146	-0.176	Visual Novel		0.347	-0.569
	33	-0.275	-0.170	Jeu_Autre		2.403	-0.563
	43	-0.245	-0.162	Influence des jeux vidéos sur le comportement		0.088	-0.360
	36	-0.284	-0.148	Je veux essayer les jeux éducatifs		0.125	-0.194
	11	-0.226	-0.139	J'essaierai peut-être des jeux éducatifs		0.059	-0.092
	18	-0.233	-0.126	Action		0.079	-0.009
	40	-0.299	-0.123				
	10	-0.282	-0.120				
	13	-0.087	-0.105				
	38	-0.244	-0.093				
	61	-0.225	-0.089				
	17	-0.144	-0.085				
	39	-0.086	-0.085				
	32	-0.254	-0.071				
	29	-0.251	-0.067				
	58	-0.296	-0.061				
	19	-0.064	-0.029				

22	-0.091	-0.010
Cohérence	-0.142	-1.117
Action	-0.074	-0.337
Déjà essayé des jeux éducatifs	-0.130	-0.317
Utiliser les jeux pour transmettre des informations	-0.123	-0.307
Réalisme	-0.197	-0.166
RPG	-0.206	-0.133
Scénario	-0.204	-0.064
Fluidité	-0.261	-0.045
Arcade	-0.245	-0.023

Appendix 12 : FCA Trends toward serious games – Madagascar (Main coordinates)

8	0.000	0.000
2	0.000	0.000
21	0.000	0.000
22	0.000	0.000
39	0.000	0.000
37	0.000	0.000
41	0.000	0.000
33	0.000	0.000
24	0.000	0.000
19	0.000	0.000
34	0.000	0.000
23	0.000	0.000
16	0.000	0.000
50	0.000	0.000
9	0.000	0.000
49	0.000	0.000
3	0.000	0.000
29	0.000	0.000
40	0.000	0.000
28	0.000	0.000
27	0.000	0.000
15	0.000	0.000
6	0.000	0.000
38	0.000	0.000
25	0.000	0.000
4	0.000	0.000
17	0.000	0.000
47	0.000	0.000
32	0.000	0.000
1	0.000	0.000
7	0.000	0.000
13	0.000	0.000
35	0.000	0.000
36	0.000	0.000
11	0.000	0.000
14	0.000	0.000
26	0.000	0.000
43	0.000	0.000
30	0.000	0.000
44	0.000	0.000
42	0.000	0.000
20	0.000	0.000
5	0.000	0.000
10	0.000	0.000
18	0.423	3.194
46	8.392	0.921
améliorer	0.000	0.000
permettent	0.000	0.000
mémoire	0.000	0.000
challenging	0.000	0.000
adapté	0.000	0.000
Simulation	0.000	0.000

better	0.000	0.000
déstressant	0.000	0.000
appliquer	0.000	0.000
novateur	0.000	0.000
management	0.000	0.000
éducation	0.000	0.000
beaucoup	0.000	0.000
Donnent	0.000	0.000
équilibre	0.000	0.000
intention	0.000	0.000
Génial	0.000	0.000
Super	0.000	0.000
jouer	0.000	0.000
difficile	0.000	0.000
message	0.000	0.000
cognitif	0.000	0.000
apprendre	0.000	0.000
bien	0.000	0.000
sérieusement	0.000	0.000
Didactique	0.000	0.000
information	0.000	0.000
air	0.000	0.000
connaissance	0.000	0.000
faire	0.000	0.000
efficace	0.000	0.000
court	0.000	0.000
instructif	0.000	0.000
apprend	0.000	0.000
chose	0.000	0.000
irréaliste	0.000	0.000
mal	0.000	0.000
facile	0.000	0.000
Répétitif	0.000	0.000
amusant	0.000	0.000
accès	0.000	0.000
livres	0.000	0.000
enfantin	0.000	0.000
ludique	0.000	0.000
pratique	0.000	0.000
m'apprendront	0.000	0.000
nouveau	0.000	0.000
développement	0.000	0.000
doter	0.000	0.000
apprentissage	0.000	0.000
joyeux	0.000	0.000
ennuyeux	0.000	0.000
non-stimulant	0.000	0.000
intéressant	0.000	0.000
méthode	0.000	0.000
moderne	0.000	0.000
modernisant	0.000	0.000
capacité	0.000	0.000
frustrant	0.000	0.000
aptitude	0.000	0.000
fun	0.000	0.000
innovant	0.000	0.000

			logique	0.000	0.000	
			quizz	0.000	0.000	
			pédagogique	0.000	0.000	
			utile	0.000	0.000	
			captivants	0.000	0.000	
			Attractifs	0.000	0.000	
			exploiter	0.000	0.000	
			professionnelle	0.000	0.000	
			quotidienne	0.000	0.000	
			transmettre	0.000	0.000	
			vie	0.000	0.000	
			perfectible	0.000	0.000	
			joueur	0.000	0.000	
			informatif	0.000	0.000	
			plaisant	0.000	0.000	
			intrigant	0.000	0.000	
			rapidement	0.000	0.000	
			jeu	0.000	0.000	
			vidéo	0.000	0.000	
			éducatif	0.000	0.000	
			entends	0.000	0.000	
			initier	0.000	0.000	
			science	0.000	0.000	
			culture	0.000	0.000	
			lassant	0.000	0.000	
			éduque	0.000	0.000	
			original	0.000	0.000	
			enrichissant	0.000	0.000	
			entraîne	0.000	0.000	
			immersif	0.000	0.000	
			finir	0.000	0.000	
			maniable	0.000	0.000	
			satisfaisant	0.000	0.000	
			cerveau	0.000	0.000	
			but	0.000	0.000	
			art	0.000	0.000	
			Dora	0.000	0.000	
			collectif	0.000	0.000	
			stimulant	0.000	0.000	
			enfants	0.000	0.000	
			avenir	0.000	0.000	
			décision	0.000	0.000	
			aiderait	0.000	0.000	
			individu	0.000	0.000	
			prise	0.000	0.000	
			réflexion	0.000	0.000	
			renforcerait	0.000	0.000	
	31	-4.755	8.465	Type	0.000	0.000
	45	-2.705	1.208	amusent	0.000	0.000
	esprit	-2.705	1.208	Intelligent	0.000	0.000
	corps	-2.705	1.208	agréable	0.000	0.000
	sain	-2.705	1.208	bof	8.392	0.921
	stratégie	-4.755	8.465	Difficilement réaliste	0.423	3.194
	48	-3.881	-10.335	12	0.450	-1.599
	n'attire_pas	-3.881	-10.335	Action	0.450	-1.599

Objectif	0.450	-1.599
Perfection	0.450	-1.599
Réalisme	0.450	-1.599
Sensibilisation	0.450	-1.599

Appendix 13 : FCA Trends toward serious games (English) (Main coordinates)

58	-2.640	5.138	51	0.206	0.000
59	-0.075	0.637	52	3.501	1.151
change	-2.640	5.138	53	0.206	0.000
non-thrilling	-0.075	0.637	54	0.206	0.000
not-game-like.	-0.075	0.637	61	0.206	0.000
Unrealistic	-0.075	0.637	age	0.206	0.000
			brain	0.206	0.000
			challenging	0.206	0.000
			concept	0.206	0.000
			enjoying	0.206	0.000
			fairy	3.501	1.151
			games	0.206	0.000
			Interesting	0.206	0.000
			knowledge	0.206	0.000
			learning	0.206	0.000
			love	0.206	0.000
			motivating	0.206	0.000
			puzzles	0.206	0.000
			Realistic	3.501	1.151
			useful	0.206	0.000
55	-0.603	-0.719			
57	-0.603	-0.719			
60	-0.603	-0.719			
Cognition	-0.603	-0.719			
Educational	-0.603	-0.719			
edutainment	-0.603	-0.719			
Entertaining	-0.603	-0.719			
Fun	-0.603	-0.719			
Helpful	-0.603	-0.719			
new	-0.603	-0.719			
playfulness	-0.603	-0.719			
Practical	-0.603	-0.719			
technologies	-0.603	-0.719			
youth	-0.603	-0.719			

Appendix 15 : FCA justification of recommendations (Main coordinates)

24	-1.044	0.070	46	0.995	0.267
10	-0.191	0.182	30	0.096	0.528
28	-0.451	0.288	6	1.948	3.019
31	-0.901	0.352	jeu	0.763	0.170
8	-0.706	0.368	magnifique	1.043	0.287
18	-0.243	0.687	simplement	1.043	0.287
Rune_factory	-0.801	0.044	fin	0.100	0.568
graphisme	-0.899	0.055	mort	0.100	0.568
adore	-1.094	0.075	série	0.100	0.568
accessible	-1.036	0.079	campagne	2.041	3.247
simple	-1.036	0.079	éducatif	2.041	3.247
type	-0.200	0.196	gérer	2.041	3.247
adapté	-0.473	0.310	manière	2.041	3.247
attachant	-0.473	0.310	riche	2.041	3.247
complet	-0.473	0.310	ville	2.041	3.247
concret	-0.473	0.310			
élevage	-0.473	0.310			
fameux	-0.473	0.310			
festivals	-0.473	0.310			
genre	-0.473	0.310			
interactions	-0.473	0.310			
jeunes	-0.473	0.310			
mêlant	-0.473	0.310			
mignon	-0.473	0.310			
niveau	-0.473	0.310			
non	-0.473	0.310			
public	-0.473	0.310			
scénario	-0.473	0.310			
sociales	-0.473	0.310			
soi	-0.473	0.310			
surcroît	-0.473	0.310			
violent	-0.473	0.310			
agriculture	-0.473	0.310			
joué	-0.628	0.324			
fun	-0.708	0.344			
premier	-0.719	0.361			
accroché	-0.944	0.379			
friendly	-0.944	0.379			
graphique	-0.944	0.379			
style	-0.944	0.379			
suite	-0.944	0.379			
train	-0.944	0.379			
apprendre	-0.944	0.379			
réalisme	-0.439	0.419			
assez	-0.364	0.524			
difficile	-0.077	0.653			
reconnais	-0.254	0.739			
4	-1.077	-0.205	44	0.982	-1.789
pc	-1.129	-0.221	27	0.899	-0.916
cheap	-1.129	-0.221	21	1.456	-0.780
compte	-1.129	-0.221	29	0.346	-0.382
consoles	-1.129	-0.221	jouer	1.029	-1.924

côté	-1.129	-0.221	juste	1.029	-1.924
dispo	-1.129	-0.221	machine	1.029	-1.924
éléments	-1.129	-0.221	place	1.029	-1.924
émulations	-1.129	-0.221	voudrai	1.029	-1.924
gameplay	-1.129	-0.221	avis	0.985	-1.454
lowcost	-1.129	-0.221	jamais	1.278	-1.381
majorité	-1.129	-0.221	basant	0.942	-0.985
matériel	-1.129	-0.221	logique	0.942	-0.985
prend	-1.129	-0.221	ludique	0.942	-0.985
prise	-1.129	-0.221	noob	0.942	-0.985
requis	-1.129	-0.221	profane	0.942	-0.985
tête	-1.129	-0.221	pure	0.942	-0.985
version	-1.129	-0.221	recommandation	0.942	-0.985
question	-0.055	-0.051	Harvest_moon	0.088	-0.852
déjà	-0.664	-0.013	contient	1.526	-0.839
			découvrir	1.526	-0.839
			détails	1.526	-0.839
			encyclopédie	1.526	-0.839
			interpellé	1.526	-0.839
			lieu	1.526	-0.839
			médiévale	1.526	-0.839
			période	1.526	-0.839
			quasiment	1.526	-0.839
			apporté	1.526	-0.839
			actuelle	0.362	-0.411
			choisirs	0.362	-0.411
			conformes	0.362	-0.411
			réalité	0.362	-0.411
			récent	0.362	-0.411
			souvent	0.362	-0.411
			sérieux	0.235	-0.338

Appendix 16 : FCA justification of recommendations (English) (Main coordinates)

	53	-0.336	0.273
	54	-0.336	0.273
	55	-0.336	0.273
	56	-0.336	0.273
	58	-0.524	0.403
fight		-0.336	0.273
graphics		-0.336	0.273
just		-0.336	0.273
mature		-0.336	0.273
monsters		-0.336	0.273
Season		-0.336	0.273
storyline		-0.336	0.273
challenging		-0.336	0.273
atmosphère		-0.336	0.273
aspect		-0.336	0.273
Harvest_Moon		-0.336	0.273
Story_of_Seasons_trio_of_towns		-0.336	0.273
all		-0.336	0.273
cultures		-0.336	0.273

improvement	-0.336	0.273			
learning	-0.336	0.273			
made	-0.336	0.273			
management	-0.336	0.273			
original	-0.336	0.273			
picked	-0.336	0.273			
team	-0.336	0.273			
time	-0.336	0.273			
use	-0.336	0.273			
different	-0.336	0.273			
great	-0.336	0.273			
three	-0.336	0.273			
towns	-0.336	0.273			
area	-0.336	0.273			
game	-0.336	0.273			
destroy	-0.336	0.273			
don	-0.336	0.273			
tell	-0.336	0.273	60	2.994	0.154
world	-0.336	0.273	farming	2.994	0.154
care	-0.336	0.273	importance	2.994	0.154
first	-0.336	0.273	interactions	2.994	0.154
close	-0.524	0.403	social	2.994	0.154
hits	-0.524	0.403	Teaches	2.994	0.154
home	-0.524	0.403	trade	2.994	0.154
	51	-0.146			
except	-0.146	-3.737			
quite	-0.146	-3.737			
realistic	-0.146	-3.737			
trees	-0.146	-3.737			

Table of contents

ACKNOWLEDGMENTS	i
ABSTRACT	ii
SUMMARY	iii
LIST OF TABLES	v
ACRONYMS	vi
LIST OF APPENDIX.....	viii
GLOSSARY	ix
1 Introduction	1
2 Materials and Methods	3
1.1 Concepts and state of the art	3
1.1.1 Concepts	3
1.1.2 State of the art.....	6
1.2 Materials	16
1.2.1 Study area	16
1.2.2 Justification for choosing the study theme	16
1.2.3 Tools	17
1.3 Methods	20
1.3.1 Methods of verification common to the assumptions.....	20
1.3.2 Verification method specific to each assumption.....	21
1.4 Study Limitations.....	25
Results	26
1.5 Relevance of the use of serious games in the educational field.....	26
1.5.1 Identification of lacking sectors	26
1.5.2 Importance of the stated sectors	27
1.5.3 Gap in key-development sectors.....	28
1.5.4 Use of serious gaming in said sectors.....	30
1.6 <i>Serious games in conventional education and information transmission system.</i>	31
1.6.1 Point of view on serious games	31
1.6.2 Serious games recommendation usable in agronomic training	34
1.6.3 Basis for serious games recommendations usable in agronomic training	36
1.6.4 Criteria for selecting serious games in Agriculture.....	38
Discussions and recommendations.....	39
1.7 Discussions	39
1.7.1 Growth sectors: education or agriculture.....	39
1.7.2 Serious games and vocations.....	39

1.7.3	Divergence of points of view	40
1.7.4	Problems with serious gaming application.....	40
1.7.5	Conflict between the games played and the game recommendations	40
1.8	Recommendations.....	41
1.8.1	Promote the training of decision-makers in Agronomy	41
1.8.2	Improving understanding of serious gaming.....	41
1.8.3	Use of emulators.....	41
1.8.4	Conditions of application	42
1.8.5	Personal opinions.....	42
	Conclusion.....	43
	Citations.....	44
	Webography	45
	Appendix 1 : Games on the protection of the environment.....	II
	Appendix 2 : Games on economics	IV
	Appendix 3 : Factorial Correspondence Analysis	V
	Appendix 4 : Research work having been carried out with TROPES.....	VII
	Appendix 5 : Symposium on Biogas	XIV
	Appendix 6 : Survey questionnaire	XV
	Appendix 7 : Data base.....	XIX
	Appendix 8 : Discours	XXXVII
	Appendix 9: General typology	XLIX
	Appendix 10 : FCA sectors with gaps (Main coordinates)	LII
	Appendix 11 : FCA Trends toward ga (Main coordinates).....	LIV
	Appendix 12 : FCA Trends toward serious games – Madagascar (Main coordinates).....	LVI
	Appendix 13 : FCA Trends toward serious games (English) (Main coordinates)	LX
	Appendix 14 : FCA games and recommendations (Main coordinates).....	LXI
	Appendix 15 : FCA justification of recommendations (Main coordinates).....	LXII
	Appendix 16 : FCA justification of recommendations (English) (Main coordinates) ...	LXIII
	Table of contents	65