

An approach to teaching with computer games by applying the flow experience

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Main Purpose of the study

- Verify if games are a way to learn.
- Verify if the user is feeling the flow experience when using educational games.

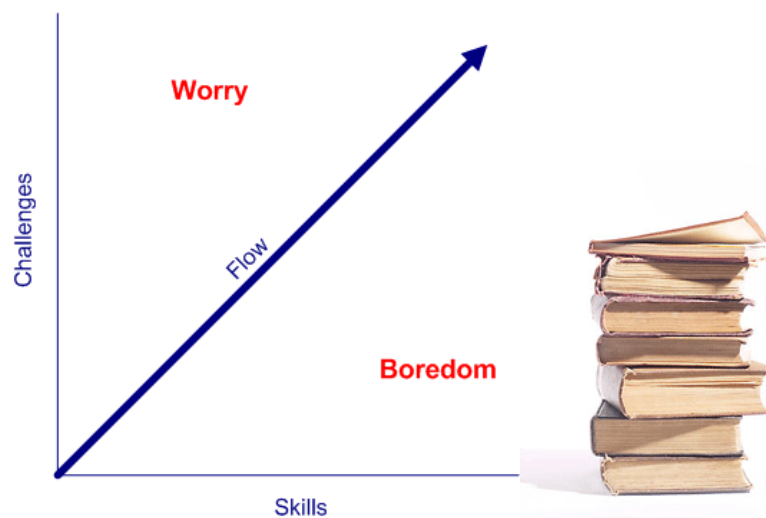


Educational games and the flow experience

- A aspect related with the interaction of the users with games has to see with the flow experience introduced by Csikszentmihalyi [1975].
- Csikszentmihalyi says that a person who is in the presence of the flow state has the following characteristics:
 - Clear goals and immediate feedback;
 - Equilibrium between the level of challenge and personal skill;
 - Merging of action and awareness;
 - Focused concentration;
 - Sense of potential control;
 - Loss of self-consciousness;
 - Time distortion;
 - Autotelic or self-rewarding experience.



Educational games and the flow experience



Educational games and the flow experience

- This study uses five dimensions to define the flow state (Trevino e Webster, 1992; McKenna e Lee,2005) :
 - Control;
 - Attention Focus;
 - Curiosity;
 - Intrinsic Interest.
 - Sense of time



The case study “A Escola Digital”

- This study involves students from primary school, with ages between five and seven years, in the interaction with the game “A Escola Digital”.
- Twenty nine students had participated in this study
- The survey used five dimensions:
 - Control;
 - Attention Focus;
 - Curiosity;
 - Intrinsic Interest.
 - Sense of time

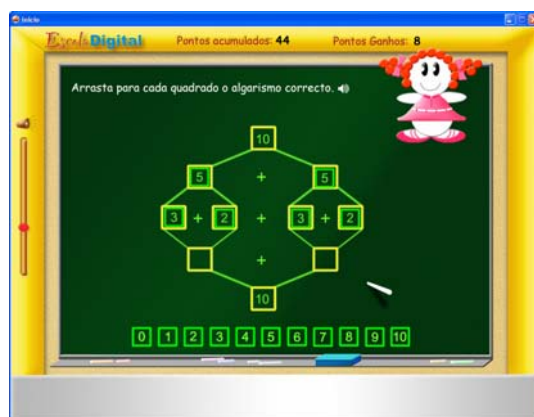


The case study “A Escola Digital”

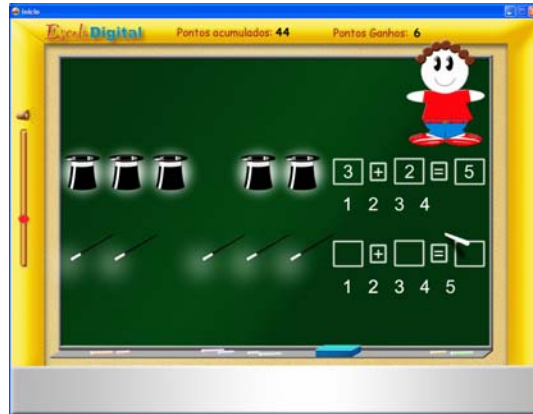
Questão	Dimensão
Quando jogava, estava concentrado no jogo e não pensava em outras coisas? Quando jogava, tinha a sensação de que sou eu que tomo as decisões e não o computador?	Concentration
Quando jogava, sentia controlo sobre o jogo? Quando jogo, perco a noção de onde estou?	Control
Quando jogo, tenho curiosidade sobre como se joga? Quando joguei, testei as várias possibilidades?	Curiosity
Este jogo é útil para eu aprender? Este jogo é divertido?	Intrinsic Interest
Quando jogo, perco a noção do tempo? Quando jogo, parece que o tempo passa mais depressa?	Sense of time



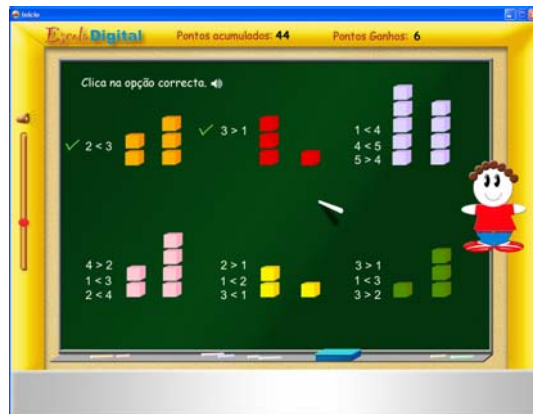
The case study “A Escola Digital” Game 1



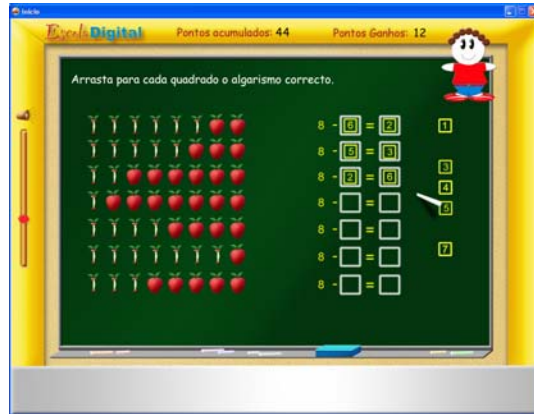
The case study “A Escola Digital” Game 2



The case study “A Escola Digital” Game 3



The case study “A Escola Digital” Game 4



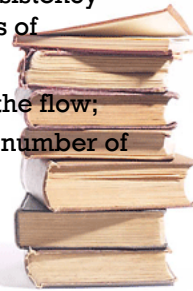
The case study “A Escola Digital” Game 5



The case study “A Escola Digital”

The statistical treatment of the data and the respective procedure :

- Descriptive Statistics of the variables in the study;
- Evaluation of the index of internal consistency (Cronbach’s alpha) for the dimensions of the flow experience
- Correlation between the variables of the flow;
- Factor analysis in order to reduce the number of variables



The case study “A Escola Digital” Descriptive Statistics of the variables in the study

In this study we verified:

- 58,6% males;
- 79,3% had 6 years;
- 44,8 and 34,5 % had classifications between t \hat{e} m Satisfactory and Good ;
- 79,3 had interest for computers ;
- 100% like to play computer games;
- 65,2 pass little time per day playing ;
- 79,3 play at home and 50% at school;
- 44,8% like mathematics very much ;
- Only 3,4% disagree that mathematics is a easy course;



The case study “A Escola Digital” Correlation

Games	Correlation	Value	Type of Correlation
1	Attention Focus and Curiosity	0.7	Strong
2	Attention Focus and Curiosity	0.598	Moderate
2	Attention Focus and Control	0.886	Strong
2	Intrinsic Interest and sense of time	0.656	Strongly Moderated
3	Attention Focus and Control	0.764	Strong
3	Attention Focus and Curiosity	0.530	Moderate
3	Intrinsic Interest and sense of time	0.952	Strong
3	Control and Curiosity	0.649	Strongly Moderated
4	Attention Focus and Control	0.632	Strongly Moderated
4	Attention Focus and Curiosity	0.646	Strongly Moderated
4	Intrinsic Interest and sense of time	0.711	Strong
4	Control and Curiosity	0.573	Moderate
5	Attention Focus and Control	0.635	Strongly Moderated
5	Attention Focus and Curiosity	0.646	Strongly Moderated
5	Intrinsic Interest and sense of time	0.857	Strong
5	Control and Curiosity	0.555	Moderate



The case study “A Escola Digital” Factor analysis in order to reduce the number of variables

Nesta análise foram retidos dois factores em cada jogo:

- For the first game, it was verified that the first factor explained 41.57% of the total variation and the second 21.57%, explaining both 63.15%.
- For the second game, the first factor explains 51.28% and the second 31.02%, explaining the two, 82.3%.
- The third game, with these factors, 85.56% of the total variation are explained;
- The forth game, 80.43%
- The fifth game, 82.556%.



The case study “A Escola Digital”

Matrix of components after rotation method

	Jogo 1		Jogo 2		Jogo 3	
	Component		Component		Component	
	1	2	1	2	1	2
Concentração	0,888	0,204	0,931	0,100	0,850	0,237
Controlo	0,852	0,227	0,928	-0,036	0,935	0,004
Curiosidade	0,124	0,818	0,785	0,130	0,816	0,102
Interesse Intrínseco	0,389	-0,058	-0,118	0,930	0,104	0,984
Distorção Tempo	0,043	0,842	0,304	0,879	0,135	0,975

	Jogo 4		Jogo 5	
	Component		Component	
	1	2	1	2
Concentração	0,865	0,169	0,881	0,118
Controlo	0,863	0,009	0,856	-0,022
Curiosidade	0,832	0,174	0,830	0,181
Interesse Intrínseco	-0,034	0,951	-0,017	0,971
Distorção Tempo	0,337	0,871	0,229	0,942



The case study “A Escola Digital”

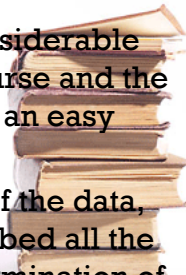
Matrix of components after rotation method

- Factor 1: Focus (Attention Focus, Control and Curiosity)
- Factor 2: Motivation (Intrinsic Interest and Sense of time)



Conclusions

- The analysis of data allows us to conclude that the majority of the students were males, had six years of age, whose classifications varied between Satisfaction and Good.
- In relation to the mathematics, a considerable percentage of students liked the course and the majority agreed that mathematics is an easy course .
- When going further to the analysis of the data, we verified that the variables described all the same characteristic (through the determination of the cronbach's alpha).



Conclusions

- From the factor analysis it was possible to isolate two factors
 - Factor 1: Focus (Attention Focus, Control and Curiosity)
 - Factor 2: Motivation (Intrinsic Interest and Sense of time)
- The majority of the students, in each one of the five games, are in the presence of the flow experience

