

VNIVERSITAT EVALÈNCIA

LABORATORIORPGDOCENTE: A GAME-BASED LEARNING

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Introduction

Due the situation caused by COVID-19 the use of new technologies have become more important, this work proposes the development of a game-based learning to simulate a qualitative analysis laboratory. The created videogame has been evaluated by satisfaction surveys in order to be able to verify the opinion of the students. The results show a very positive perspective of the use of the videogame as educational reinforcement.

Esthetics

- The game has been designed according the structure and distribution of the Universitat de



València.

- Places such as the fountain square or the chemistry building have been recreated, as well as the laboratory for analytical chemistry practices.
- The aesthetics of environments have been designed for minigames that liven up the content.
- A system to select the aesthetics of their character has also been developed.

Objetos	Configuración general	Daño
0146 Precipitado de Pb c…	Nombre: Icono:	Tipo: Elemento:
0147 tubo de precipitado…	sobrenadante con oxalato (178 🔊	Nada 🔻
0148 precipitado de Pb l…	Descripción:	Fórmula:
0149 todos los sobrenada…		
0150		
0151 precipitado con EDTA		Variacion: Golpes criti
0152 precipitado con EDT…	Tipo de objeto: Precio: Consumible:	Ţ Ţ
0153 placa de gotas con …	Objeto normal 🔻 1 🗘 No 🔻	
0154 placa de gotas con …	Afecta a: Ocasión:	Efectos
0155 cristal de Na2S	1 aliado ···· Siempre V	Tipo Contenido
0156 tubo con mitad de l…		
015/ disolucion de EDIA ···	Inversión	
0158 tubo con EDIA y ac1	Velecidadu Éviter Beneticu DT canadar	
0159 Cristal Na2S someti	Velocidad: Exito: Repetir: Pi ganado:	
0160 tubo con EDTA calen		
0167 sobronadanto do Ca un	Tipo de golpe: Animación:	
0162 (NH4)2(204) 0 5M	Golpe certero 🔻 Nada …	
0164 sobrenadante de cal···		
0165 sobrenadante con ox···		Netza
0166 sobrenadante con ox…		Notas
0167 precipitado de oxal…		
0168 precipitado de oxal…		
0169 precipitado de oxal…		
0170 precipitado de oxal…		
0171 dis. oxalato disuelto		
0172		
0173 asa níquel 🔻		
Cambiar el máximo		

Programming

- The content has been programed with various aspects that allow the simulation. Among them are objects and common events.
 - The objects are the most important elements in the game, which the student will identify with the elements of the laboratory and with which they will have to interact. Furthermore, the objects must be programmed with a series of characteristics.
 - Common events are the programming codes that will allow certain things to happen, such as the substitution of some objects for others when performing "reactions". These will happen when the events are triggered
- The videogame has been designed to simulate the procedure of the analytical chemistry laboratory-I of the degree in chemistry at Universitat de València. In this subject, qualitative analysis was carried out by the identification of metal cations in a solution.
- The game develops the contents of the practice in a realistic way following the laboratory instructions.
- Two types of theorical information can be used within the laboratory to achieve useful reinforcement content. The first is the explanation of the basis of the tests incorporating the chemical reactions that it take place. The other is the procedure to carry out the practice.
- The game uses visual content so that the student remembers the processes and the meaning of the results. For this, images of real laboratory results are used.







y un precipitado negro alrededor del cristal



Teaching Content

Analytical Chemistry Department

Eventos comunes	Configuración general	I		
0006 imagan da tuba agid	Nombre:	Desencadenante:	Interruptor:	
0006 imagen de tubo acid…	humedecer papel	Nada	•	
0007 imagen de tubo acid				
0008 imagen de tubo blanco	Contonidos			
0010 0011 sësdir sleebel	◆S1: examen es UN	Le Martine Desta infesta		^
0011 dilduir alconol	◆lexto Nada, Nad	la, Ventana, Parte inferior		
0012 anadir peroxido 1	: ¿Que quie	eres anadir al papel?		
0013 anadir peroxido 2	◆Mostrar eleccion	les : AgNU5, Muestra problema	(Ventana, Parte derecha, #1, #2)	
0014 driddir EDIA	Cuando AgNU3	1		
0015 LUDO EDTA	◆S1 : El grupo t	tiene AgNU3		
0010 0017 noch ol oluminic	◆Cambiar obje	etos : #0064 + 1		
0017 NdON at atuminio	◆Cambiar obje	tos: AgNU3 - I		
0010 nanel cen mancha				
	Tauta i Nada	Node Vestere Dente infor		
0020	◆lexto: Nada,	Nada, Ventana, Parte interi	lor	
0027 guion grupo II	· · no ti	enes pase		
0022 and if a tubo II	◆Cambiar obje	tos papel de filtro + i		
0024 granatta	i Fin			
	Cuando Muestra p	problema	la alteriata	
0027 tubo con nocl2	◆S1:EL grupo t	tene sobrenadante con posibilitari i	le aluminato	
0020 acidirical placa	◆Cambiar obje	tos papel con problema + 1	luminata d	
0029 alladir zride conc	◆Cambiar obje	tos - sobrenadante con posibi	te atuminato - i	
0031 introducir tubo				
0032 añadir agua		Nada Vantana Darte inform	or	
0032 calentar tubo	✓Texto: Nada,	waua, ventana, Parte Interi	lur	
	· · NO TI	tes i papel de filtre : 1		
Cambiar el máximo		itus - nghet de littio + 1		

by actions or situations.

On the other hand, the programming includes the coding of the minigames through new environments and fantastic events that make the activity something enjoyable and entertaining. These minigames are programmed from another less realistic perspective.











Surveys

observa un color ul en la capa orgáni

- In order to evaluate the videogame, online surveys have been developed.
- The surveys got, on the one hand, parameters related with the person in order to stablish the population profile and, on the other hand aspects related to the videogame.
- As can be seen in the radial graph all the participants evaluated very positively (above 7 on a scale of 1 to 9) parameters such as originality, teaching experience, realism or degree of satisfaction.
- The surveys had also a section that includes the opinion of the users in order to improve the videogame in the future.

User's Opinion

It shows the potential that the world of videogames must transmit | It seemed to me a very original solution to the problem that is having theoretical and practical knowledge in a different way. We are facing a to do the practices. In addition to being functional, I have found it tool that can undoubtedly change educational practice, and more so in useful and easy to use (especially thanks too the incorporation of



Conclusions

- From the results of the surveys, it can be concluded that the videogame achieves the ability to reinforce the contents of the laboratory effectively.
- The user's opinion has shown that the game has potential and has given us new perspectives for improve it.
- It is aimed to continue the Project to polish the videogame and to incorporate new reinforcement elements.

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times where social distancing prevails due to health circumstances. A elements such as the map or being able to always have the great job, without a doubt.

The game in general is very Good as a tool to replace laboratory Even without having anything to do with my professional Branch, it has practices in situations like the current one (Covid-19). At first it is a bit difficult to start, but with the appropriate instructions you adapt and can comfortably do the practices. With a Little more Dynamic instructions to be able to read them faster and more easily, it would be formulated it that way.

luxurious.

