Unidad de Innovación Docente

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MEMORIA FINAL

Actuaciones Avaladas para la Mejora Docente, Formación del Profesorado y Difusión de Resultados
Modalidad C

Identificación de la actuación	
Código:	
Título:	

Responsable	
Apellidos y nombre:	Gil Montero Almoraima
Correo electrónico:	Almoraima.gil@uca.es
Departamento:	Química Física

1. Describa la contribución a la actuación de cada uno de los participantes. Copie y pegue las líneas que necesite para contemplarlos a todos y disponga del espacio que necesite.

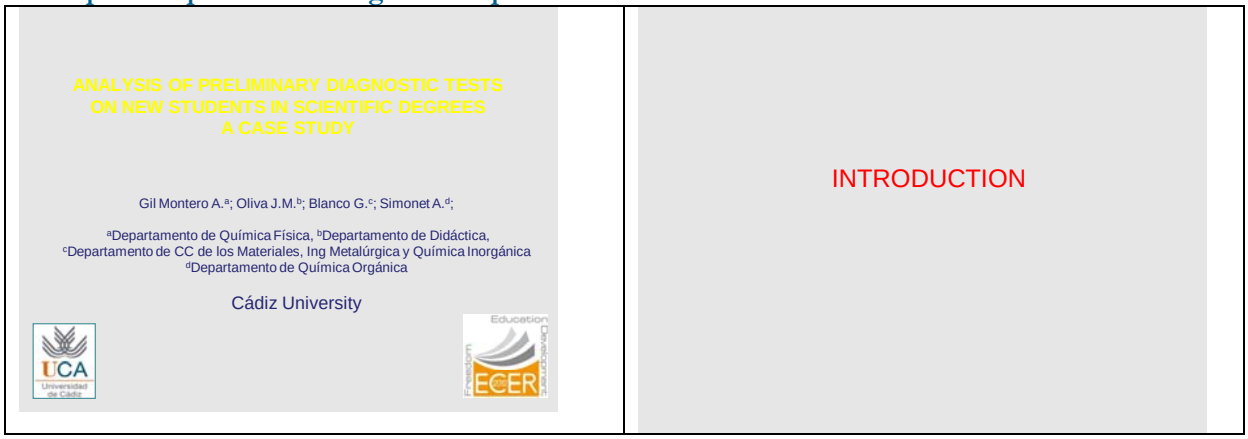
Apellidos y nombre:	Gil-Montero, Almoraima
Análisis cuantitativo de los datos, y elaboración de la ponencia presentada	

Apellidos y nombre:	Oliva-Martinez, Jose Maria
Análisis estadístico de los datos, búsqueda bibliográfica.	

Apellidos y nombre:	Simonet-Morales, Ana Maria
Preparación de los datos aportados por la prueba	

Apellidos y nombre:	Blanco-Montilla, Ginesa
Elaboración y ejecución de la prueba analizada, examen de nivel de acceso al grado en química	

2. Aporte el producto final generado para la difusión.



INTRODUCTION

THIS PAPER IS PART OF A LARGER PROJECT CARRIED OUT WITHIN THE TRAINING NETWORK "EQUILIBRIUM" (CADIZ UNIVERSITY)

THE AIM OF THE PROJECT IS TO ANALYZE THE COMPETENCES OF NEW STUDENTS WHO TAKE DEGREE COURSES IN CHEMICAL SCIENCES

TROUGH THIS PROJECT WE HOPE TO DESIGN EDUCATIONAL SUPPORT AND GUIDANCE INSTRUMENTS FOR THOSE STUDENTS WITH TRAINING DEFICIENCIES AND LEARNING DIFICULTIES

STRUCTURE OF THE WORK

WE STARTED WITH THE PRELIMINARY TEST ADMINISTERED DURING THREE YEARS TO NEW CHEMISTRY DEGREE STUDENTS

FIRST WE ANALYSED THE EVALUATION RESULTS TAKING INTO ACCOUNT ALL OF THE COMPETENCES ASSOCIATED TO THE DEGREE

AFTERWARDS WE PERFORMED A QUALITATIVE ANALYSIS OF THE CORRESPONDENCES BETWEEN THESE COMPETENCES AND THOSE THAT THE TEST REALLY SEEMS TO ASSESS

AND FINALLY WE MADE A QUANTITATIVE ANALYSIS OF THE DATA BY MEANS OF DESCRITPTIVE, CORRELATION, FACTOR AND RELIABILITY ANALYSIS

OBJECTIVES

TO WHAT EXTENT

1. ARE THESE TESTS USEFUL IN ASSESSING THE WIDE RANGE OF COMPETENCES IN QUESTION
2. IS THE ENSUING ASSESSMENT ACCURATE AND DISCRIMINATING
3. IS THE RESULTING INFORMATION MULTIDIMENSIONAL IN NATURE

METHODOLOGY

TEST CHARACTERISTIC

QUESTION TYPES
- SHORT ANSWER
- PROBLEMS RESOLUTION
- MULTIPLE CHOICE

QUESTION NUMBER AND LEVEL
6 QUESTION GROUPED IN 15 ITEMS WITH SEVERAL SECTIONS:
- BASIC LEVEL (5 ITEMS)
- MEDIUM LEVEL (5 ITEMS)
- ADVANCED LEVEL (5 ITEMS)

SAMPLE
- 108 FIRST YEAR STUDENTS
- START OF THE ACADEMIC YEAR 2009/10, 2010/11, 2011/12


Prueba Diagnóstica de Nivel de Conocimientos en Química

Alumnos de nuevo ingreso de Primer Curso del Grado en Química

Fecha:.....
Nombre:.....
Apellidos:.....

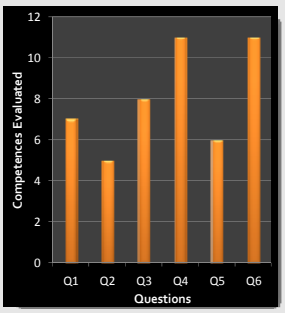
FIRST OBJECTIVE

¿TO WHAT EXTENT ARE THESE TESTS USEFUL IN ASSESSING THE WIDE RANGE OF COMPETENCES INVOLVED FOR THE SCIENTIFIC EDUCATION AT PREVIOUS EDUCATIONAL STAGES?

TYPES OF EVALUATED COMPETENCES

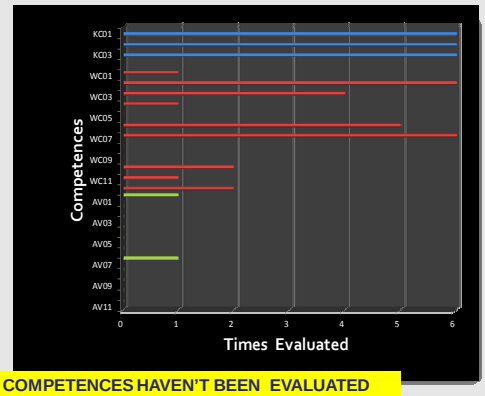
COMPETENCES AREAS	COMPETENCES
KNOWING CHEMISTRY	Understanding concepts, laws and theories
	Knowing the levels of representation in chemistry: macroscopic, nanoscopic symbolic
	Reteiring information
	Knowing basic laboratory equipment and its usefulness
	Observing and analyze situations, to propose problems
WORKING IN CHEMISTRY	Performing calculations and direct applications
	Making predictions and explanatory hypotheses, which may be contrasted experimentally.
	Designing problem-solving strategies to new situations
	Designing experiences and experiments to increase knowledge and testing hypotheses managed
	Reasoning ability, interpretation and analysis of argument concerning scientific knowledge
	Knowing the levels of representation in chemistry: macroscopic, nanoscopic symbolic
	Searching analyzing, synthesizing and communicating information
	Developing digital competence at work and learning
	Using mathematical tools
	Handling basic laboratory equipment
	Makeing estimates and approximations
ATTITUDES AND VALUES IN CHEMISTRY	Developing curiosity and critical
	Assessment of the usefulness of chemistry to our lives and in today's world
	Rational assessment of the scientific work
	Differentiation of science over other types of knowledge and other human activities
	Conceptualizing knowledge in chemistry as temporary, which can change and evolve over time
	Designing and accept the limited nature of scientific knowledge and rough, and not as absolute truths
	Assessing the rigor and precision as important ingredients in the chemical
	Designing chemistry as a group activity within the scientific community
	Assessing the risks of laboratory work and learn and practice basic safety standards
	Understanding and to establishing relationships within the polynomial "Chemistry-Technology-Society"
	Responsible values and attitudes, and actions that contribute to a sustainable future

COMPETENCES EVALUATED PER QUESTION



ALL THE QUESTION EVALUATE COMPETENCES

TIMES EACH COMPETENCE IS EVALUATED

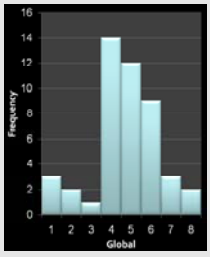


SOME COMPETENCES HAVEN'T BEEN EVALUATED

SECOND OBJECTIVE

¿TO WHAT EXTENT IS THE ENSUING ASSESSMENT ACCURATE AND DISCRIMINATING; THAT IS, DOES IT OFFER RELIABLE RESULTS, GOING FAR BEYOND THE IDIOSYNCRASY OF THE QUESTIONS AND PARTICULAR SITUATIONS AT HAND.
IS IT USEFUL TO DIFFERENCIATE BETWEEN STUDENTS THEMSELVES.?

STATISTICAL ANALYSIS



68% OF SCORES ARE BETWEEN 2,4 AND 5,8

HIGEST GRADE

N	Minimum	Máximum	Average	Standard Deviation
108	0.00	7.67	4.15	1.669

STANDARD DEVIATION LOW

KURTOSIS COEFFICIENT OF GLOBAL RATINGS IS BIG ENOUGH AND POSITIVELY
DEMONSTRATES A LIMITED DEGREE OF DISCRIMINATION AMONG STUDENTS

THE GRADE DISTRIBUTION SHOWS TWO STUDENTS POPULATIONS
THOSE WITH SUFFICIENT PRIOR CHEMICAL TRAINING
THOSE WHO HAVE NOT STUDIED CHEMISTRY IN HIGH SCHOOL

THIRD OBJECTIVE

¿ IS THE RESULTING INFORMATION MULTIDIMENSIONAL IN NATURE, OR IT SIMPLY LIMITS ITSELF TO A COMPREHENSIVE ASSESSMENT?

PRINCIPAL COMPONENT ANALYSIS (SPSS)

Basic Level	
	Factor 1
P5_Basic	0,890
P2_Basic	0,840
P1_Basic	0,791
P6_Basic	0,765
P3_Basic	0,595

Medium Level		
	Factor 1	Factor 2
P5_Medium	0,810	
P2_Medium	0,780	
P1_Medium	0,700	
P6_Medium		0,876
P3_Medium		0,682

	Factor 1	Factor 2	Factor 3
P2_Advanced	0,805		
P3_Advanced	0,728		
P1_Advanced	0,708	0,458	
P6_Advanced		0,945	
P5_Advanced			0,980

IN THIS SENSE, IF AS EXPECTED SEPARATE PARTS OF THESE TESTS CORRESPOND TO DIFFERENT ASPECTS OR DIMENSIONS OF THE STUDENT'S KNOWLEDGE (DIFFERENT COMPETENCES),

THEN THE RESULTS OBTAINED SHOULD REFLECT SUCH A DIVERSITY OF ASPECTS, THUS PROVIDING DATA MATRICES RATHER THAN ONLY GLOBAL MARKS.

PRINCIPAL COMPONENT ANALYSIS TOTAL

	Factor 1	Factor 2	Factor 3	Factor 4
P1_Basic	0,847			
P2_Basic	0,727			
P3_Basic	0,654			
P4_Basic	0,625	0,425		
P6_Basic			0,559	0,553
P1_Medium	0,720			
P2_Medium	0,717			
P3_Medium		0,741		
P5_Medium	0,618			
P6_Medium		0,732		
P1_Advanced	0,679			
P2_Advanced	0,729			
P3_Advanced	0,422	0,652		
P5_Advanced				0,888
P6_Advanced			0,768	

IT LOSES MUCH OF THE INFORMATION IN ORDER TO QUALIFY WITH A SINGLE MARK

CONCLUSIONS

- IT IS NECESARY TO DECREASE THE DEGREE OF DIFFICULTY OF THE TEST
- IT IS NECESSARY TO ASSESS COMPETENCES THAT CURRENTLY ARE WITHOUT VALUE. ESPECIALLY THOSE RELATED TO KNOWLEDGE AND ATTITUDES ABOUT THE NATURE OF THE CHEMISTRY AND MANY RELATED WITH WORKING IN CHEMISTRY
- IT IS NECESARY TO ASSESS COMPETENCIES, BUT A SINGLE SCORE SHOULD NOT BE USED
- IT IS NECESARY TO SEARCH FOR MECHANISMS IN ORDER TO TAKE ADVANTAGE OF THE INFORMATION PROVIDED BY THE TEST TO ADDRESS THE DIVERSITY OF INITIAL LEVELS