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Table of Contents

Sumario

Studies and Notes
Estudios y Notas

Book reviews

Call for papers

This is the English version of the research articles and book reviews published originally in the Spanish printed version of issue 275 of the **revista española de pedagogía**. The full Spanish version of this issue can also be found on the journal's website http://revistadepedagogia.org.

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Mathematics teaching issues

A measurement instrument for establishing the algebraic skills of engineering students on a Differential Calculus Course in engineering

Instrumento de medición para diagnosticar las habilidades algebraicas de los estudiantes en el Curso de Cálculo Diferencial en ingeniería

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Abstract:

A highly reliable algebraic skill measurement instrument with content and approach validity was developed. Its content focusses on the algebraic skills engineering students require to successfully follow a Differential Calculus Course. A team of 10 teachers, each with minimum of a master's degree and teaching experience in differential calculus, participated in the design of this instrument. The measurement instrument is a large-scale multiple-choice criteria test comprising 25 test items. Its quality is described and analysed on the basis of the answers given by engineering

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students during the first and second semesters of the 2018-2019 academic year. The results show that topics that can predict student success and have the greatest power of discrimination in the measurement instrument are strongly related to skills students acquire in primary and secondary education, such as operating with fractions and the laws of exponents. It was also found that the main shortcomings in the algebraic skills of students are rationalisation, division of polynomials, factoring sums, and difference of cubes.

Keywords: calculus, questionnaire, predictive evaluation, reliability and validity.

Resumen:

Se construyó un instrumento de medición altamente confiable, con validez de contenido y de criterio. Su contenido está basado en las habilidades algebraicas que los estudiantes de ingeniería requieren para desempeñarse favorablemente en un Curso de Cálculo Diferencial en las carreras de ingeniería. En el diseño del instrumento participó un equipo de 10 profesores con al menos grado de maestría y experiencia docente en el área de cálculo diferencial. El instrumento de medición es de opción múltiple, criterial, de gran escala, está integrado por 25 reactivos y su análisis de calidad se describe y se deriva de las respuestas emitidas durante los ciclos lectivos 2018-2 y 2019-1 por estudiantes de nuevo ingreso en la carrera de ingeniería. Los resultados muestran que los tópicos que predicen el éxito del alumno y cuentan con el mayor poder de discriminación en el instrumento de medición están fuertemente relacionados con habilidades que los estudiantes adquieren desde la primaria y secundaria, como es el caso de las operaciones con fracciones y las leyes de los exponentes. También se logró identificar que la mayor deficiencia en las habilidades algebraicas de los estudiantes pertenece al tema de la racionalización, división de polinomios, factorización de suma y diferencia de cubos.

Descriptores: cálculo, cuestionario, evaluación predictiva, fiabilidad, validez.

1. Introduction

A command of mathematics is a vital skill in a society undergoing unprecedented technological development. However, for many students it is one of the most inaccessible skills as it comprises a large number of difficulties and failures (Carbonero & Navarro, 2006), making mathematics a critical filter that shapes students' choice of degree (Sells, 1973). Students who start university with a negative perception of mathematics develop a reluctant attitude and consequently have low academic performance, and attribute their failure to a variety of factors (Orozco & Díaz, 2009).

In Mexico, mathematics levels are considered to be an educational problem, with 50% of students in early stages of their education showing a lack of interest in this area (González, 2005). This is

reflected in what Mexico's Department of Public Education (Secretaría de Educación Pública, SEP) has published in coordination with the National Institute for Evaluating Education (Instituto Nacional para la Evaluación de la Educación, INEE) and the educational authorities of Mexico's different states, in which they make use of the test of the National Plan for Evaluating Education (Plan Nacional para la Evaluación de los Aprendizajes, PLANEA) for secondary education to reflect the low performance of baccalaureate students in the area of mathematics at a national level in the three years between 2015 and 2017 (Table 1). This shows that the largest percentage of Mexican students are at level one, where they perform operations with fractions and operations that combine unknowns and establish and analyse relationships between two variables.

TABLE 1. Figures in percentages from the PLANEA test.

Year/Level	2015	2016	2017
Level 1	51.3	49.2	66.2
Level 2	29.9	30.0	23.3
Level 3	12.4	14.4	8.0
Level 4	6.4	6.3	2.5

Source: Own elaboration.

It is necessary to establish the students' initial level of knowledge to enable them to learn and avoid making assumptions. For example, mathematics is a vital subject in the training of engineers (Morales, 2009); if they do not have basic knowledge of mathematical skills owing to poor training in the baccalaureate, then they will struggle to understand and assimilate university-level mathematics (Encinas, Osorio, Ansaldo, & Peralta, 2016). Evidence of deficient pre-university education is found in the students' poor performance on university courses (Orozco & Diaz, 2009).

As a result, studies have analysed personal, sociodemographic, psychological, intellectual and cognitive factors and even the academic records of the students (Reynoso & Méndez-Luévano, 2018; Arriaga, 2015; González, 2013; Gatica-Lara, Méndez-Ramírez, Sánchez-Mendiola, & Martínez-González, 2010; Difabio, 1994). However, we did not find research analysing the topics or items that could affect the students' success in the area of mathematics.

The students' abilities are not constructed alone, but rather on the basis of prior knowledge. Accordingly, Ausubel, Novak, and Hanesian (1983, p. 1) observe that «the most important factor influencing learning is what students already know. Find this out and teach them accordingly.» This is apparent in the study by Orozco-Moret and Morales (2007), where 70% of the students who were repeating a mathematics module in the first semester of university agreed that lack of previous

knowledge was the main cause of their problem with the module.

In view of the above, this research refers to the construction and validation of an instrument to measure the algebra skills university students require to perform adequately in a Differential Calculus Course on engineering degrees at the Universidad Autónoma de Baja California (UABC). Establishing what algebra skills they have acquired during their education at lower levels is crucial for the students' success on a differential calculus for engineering course.

2. Method

To construct this measurement instrument, we used the Nitko model (1994) for developing exams shaped by the curriculum. This model is complemented by Popham's (1990) methodology for constructing criterion-referenced tests and by methodological and operational contributions from Contreras (1998, 2000).

The quality of the measurement instrument was analysed in accordance with classic test theory (CTT) to ensure the instrument allows for measurement of the algebra skills required to take the Differential Calculus Course on an engineering degree. Accordingly, it is necessary to determine its reliability, validity, indexes of difficulty and discrimination, and the biserial correlation (Carmines & Zeller, 1987).

The analyses of reliability allow us to measure the consistency or stability of the measurements when the measurement process is repeated (Prieto & Delgado, 2010), determining its capacity to demonstrate stability in its results (García & Vilanova, 2008). To do this, we used the Kuder-Richardson KR-20 formula and the split-half method.

Reliability analysis using the Kuder-Richardson (KR-20) formula makes it possible to establish an instrument's reliability based on the data obtained in a single application. The items are evaluated as correct or incorrect answers and the fact the items have different indexes of difficulty is taken into consideration (Corral, 2009). In the split-half method reliability analysis, the test is split in half and separated into two different parallel tests. The internal consistency coefficient is calculated using the Spearman-Brown formula (Reidl-Martínez, 2013). If the instrument is reliable, there should be a strong correlation between the scores in both halves.

Content and criterion validity were also calculated in turn to analyse the quality of the instrument. The content validity is guaranteed by choosing indicators that are appropriate and related to the mathematical processes, as well as and by testing the validity of the items by expert judgment (Alsina & Coronata, 2014). In this type of validation, a panel of experts is selected. These experts have at least 5 years' experience in the topics being validated and will analyse whether the items are consistent with what they are intended to evaluate, the complexity of the items, and the cognitive skill being

evaluated (Barrazas, 2007), as well as the sufficiency and relevance of the items, considering the aspects of the construct that are relevant, including those in the competences and indicators (Cisneros, Jorquera, and Aguilar, 2012).

The measurement instrument designed is intended to establish the students' knowledge or command of the algebra content or topics considered necessary for studying and handling differential calculus on engineering programmes. With the aim of determining whether the items in the measurement instrument actually examine the topics and indicators of achievement established in the design specifications, the measurement instrument was reviewed by a panel of six expert university teachers from the field of mathematics with master's or doctoral level degrees who were not connected with the process of designing and constructing the instrument. The expert panel evaluated the measurement instrument using a questionnaire which included 8 significant aspects for each of the 25 items. A scale of 0 to 4 was used to evaluate each aspect and item, with 0 indicating strongly disagree, 1 disagree, 2 neutral position, 3 agree, and 4 strongly agree.

Aspect 1 establishes the relevance of the content of the reactive to topics covered in level one of higher education. Aspect 2 measures whether the content of each item comprises topics covered in the introductory algebra, geometry, and trigonometry course for incoming students at the Mexicali Faculty of Engineering (FIM) at the UABC. This course is taken by incoming students who will study engineering programmes before the start of the academic year. The algebra topics covered are real numbers, exponents, radicals, fractions, rationalisation, polynomials, and factoring. Aspect 3 relates to the consistency between the indicator of achievement and the thematic content of the item. Aspect 4 considers the relevance of the content of the item to the requirements a student must fulfil to take the Differential Calculus Course in the FIM. Aspect 5 identifies whether the vocabulary used in each item is commonly used in the subject. Aspect 6 considers whether the distractors in each item are plausible. Aspect 7 considers whether each item has the correct answer. And aspect 8 refers to whether what is asked of the student is clear in each item.

Criterion validity refers to the extent to which the test correlates to variables external to it, which are called criteria. Consequently, the criterion is an indicator of what the test is intended to measure or of what should present a given relationship. The correlation found is called the coefficient of validity. The differential calculus baseline test was used to test criterion validity. The design and construction of this baseline test is described in Encinas, de las Fuentes, and Rivera, (2007) and in Contreras, Encinas, de las Fuentes, and Rivera (2005) and it is applied formally at the UABC to all students who take differential calculus module (more than 3000 students per semester distributed across the campuses in the state of Baja California, Mexico). The results of this exam form part of

their ordinary evaluation, representing 30% of the final grade for the Differential Calculus Course with the other 70% being allocated by the teacher who delivers the module. The differential calculus baseline test, which has been in use since 2005, currently comprises 60 items and is aligned with the curriculum. It is criterion-referenced, multiple choice, and large scale.

The measurement instrument is classed as a criterion-referenced test as it is intended to establish algebra skills and support the diagnosis of the teaching design for the Differential Calculus Course. The difficulty index (DI) relates to the proportion of students who correctly solve an item. It is calculated in accordance with Crocker and Algina (1986). There are parameters for accepting an item depending on its level of difficulty. The difficulty index set by Contreras, Backhoff, and Larrazolo (2004) states that it must be greater than 0.05 and less than 0.95. For CTT this index must be between 0.1 and 0.9. According to Backhoff, Larrazolo, and Rosas (2000) the mean level of difficulty of the instrument should be between 0.5 and 0.6, with the values of the difficulty index being distributed as follows: 5% very easy items ($0.87 < DI < 1$), 20% fairly easy ($0.74 < DI < 0.86$), 50% with an average level of difficulty ($0.53 < DI < 0.73$), 20% fairly difficult ($0.33 < DI < 0.52$), and 5% very difficult ($DI < 0.32$).

The index of discrimination (IDC) of the item makes it possible to differentiate (discriminate) between students who obtained high scores in the test and those who obtain low scores. It relates to the high possibility that students with an excellent overall performance in the test will correctly answer the item, while students with poor performance will not. This analysis considers 54% of the sample population, including 27% of the students with high performance and the same percentage of students with the lowest performance for each item reviewed. Contreras, Backhoff, and Larrazolo (2004), and CTT regard an item's discrimination value as suitable if it is greater than 0.2. According to Guilford (1975), the index of discrimination of an item is accepted if it has a value greater than 0.2 or 0.3. The IDC scale according to Backhoff, Larrazolo, and Rosas (2000) is: poor ($IDC < 0.20$), mediocre ($0.20 < IDC < 0.30$), good ($0.30 < IDC < 0.40$), and excellent ($IDC > 0.40$).

Also regarded as important for the reliability and validity of the instrument is the point biserial correlation (rpbis), as this considers 100% of the sample population, not just 54% as in the case of the index of discrimination. According to Henrysson (1971), this coefficient is an indicator of predictive validity where a student's response to an item and result in the test are related. It is calculated in accordance with the model of Backhoff, Larrazolo, and Rosas (2000) and the scale of values for this indicator is: poor discrimination ($rpbis < 0.14$), mediocre discrimination ($0.15 < rpbis < 0.25$), good discrimination ($0.26 < rpbis < 0.35$), and excellent discrimination ($rpbis > 0.35$).

The results for each answer option are subjected to a frequency analysis in which the percentages of students who gave each of the four answer options is identified. Distractors are classed as unsuitable (UD) if they do not get over 5% of the answers from students (Rodríguez, Casas, & Medina, 2005). An analysis of variance (ANOVA) test was performed along with a *post-hoc* Tukey HSD test, in which the number of UDs was taken as the factor and the UDs, IDCs, and the rpbis of the items as the dependent variables. The objective of this was to identify significant differences between and within groups.

The database was analysed with classical test theory (CTT) using the IBM SPSS Statistics 25 program and Excel spreadsheet program with which we found the psychometric data for each item, distractors, difficulty indexes, discrimination indexes, and the point biserial correlation.

3. Process for constructing the measurement instrument

Six lecturers took part in the construction of the measurement instrument: two in the instrument design committee, two in the specifications preparation committee, and two in the item preparation committee. All of them held doctorates and had a minimum of 5 years' teaching experience in the area of algebra, differential calculus, and integral calculus.

The role of the measurement instrument design committee was to analyse the area's curriculum, detect and structure the important content that was to be evaluated, create a table of specifications for the instrument, and prepare a document to explain their decisions. It should be noted that the measurement instrument is based on the minimum arithmetic and algebraic skills engineering students require to successfully complete a Differential Calculus Course as part of their engineering studies. These skills were determined by the instrument design committee and validated by the specifications preparation committee and by the panel of experts. The mathematical concepts and procedures covered by the measurement instrument are part of the curriculum the students followed throughout their studies on the programme of the Mathematics I course on both the general baccalaureate and the technological baccalaureate (SEP, 2017). The topics are also covered in the algebra, geometry, and trigonometry course that students take when starting engineering degrees at the Universidad Autónoma de Baja California.

The aim of the measurement instrument is to establish the starting conditions of newly-enrolled students on engineering degrees regarding the algebra knowledge and skills required to complete the differential calculus module. To reflect these conditions, we established indicators of achievement for each specification and its respective item, representing the student behaviours that make it possible to evaluate the level of command of a particular algebra skill. The topics and indicators of achievement for each of the 25 items that comprise the measurement instrument are described in Table 2.

TABLE 2. Topics and indicators of achievement for each item in the measurement instrument.

Item number	Topic number	Topic	Indicators of achievement
1	1	Operations with fractions	Adding fractions with different denominators.
2	1	Operations with fractions	Multiplying fractions.
3	1	Operations with fractions	Dividing two fractions.
4	2	Laws of exponents	Using the laws of exponents to multiply two numbers.
5	2	Laws of exponents	Using the laws of exponents to divide two numbers.
6	2	Laws of exponents	Converting a radical number to an exponential.
7	3	Rationalisation	Rationalising the denominator of a numerical expression.
8	3	Rationalisation	Rationalising the denominator of an algebraic expression.
9	3	Rationalisation	Rationalising the numerator of a numerical expression.
10	4	Operations with polynomials (sum)	Calculating the sum of polynomials.
11	4	Operations with polynomials (sum)	Eliminating grouping symbols and simplifying the algebraic expression.
12	4	Operations with polynomials (product)	Calculating the product of two binomials.
13	4	Operations with polynomials (division)	Calculate the division of a polynomial by a monomial.
14	4	Polynomial operations (division)	Calculate the division of a polynomial by a binomial.
15	4	Operations with polynomials	Isolating a variable.
16	4	Operations with polynomials (product of binomials)	Squaring a binomial.

17	4	Operations with polynomials (binomial conjugates)	Calculating the product of binomial conjugates.
18	4	Polynomial operations (product of binomials)	Calculating the product of two binomials.
19	4	Operations with polynomials (product of cubed binomials)	Expanding the cube of a binomial.
20	5	Factoring	Factoring a non-perfect-square trinomial.
21	5	Factoring	Identifying a perfect-square trinomial.
22	5	Factoring	Factoring a perfect-square trinomial.
23	5	Factoring	Identifying a difference of squares (first version) / Factoring a sum of cubes (final version).
24	5	Factoring	Factoring a difference of squares.
25	5	Factoring	Factoring a difference of cubes.

Source: Own elaboration.

The design of each item is based on its respective specification, which for each item covers aspects such as the algebra topic it belongs to, its indicator according to Zabala and Arnau (2008), a comment on the meaning and functionality of the content, the foundation of the item, the vocabulary and type of information used in the item, the characteristics of the distractors, the process for obtaining the correct answer, an example item, and the estimated completion time (Table 3). The specifications preparation committee designed the specification for each item.

TABLE 3. Specification of item 16 on the measurement instrument.

Topic: Operations with polynomials (special product)	**Subtopic:** Squaring a binomial
Comment on the meaning of the content: Certain processes often appear in differential calculus topics, such as integral calculus and differential equations among others, and are classified as special products. This is the case with squaring a binomial which is done like this: $(a+b)^2=a^2+2ab+b^2$. It can also be written as: $(a-b)^2=a^2-2ab+b^2$. It is expected that the student will correctly square a binomial.	

Indicator of achievement: Expanding the square of a binomial.
Foundations of the item: A binomial is provided for which the students must expand its square. The binomial has the following characteristics: a) The signs of the coefficients can be the same or opposite. b) The coefficients of the terms are whole numbers. c) The literals can be any letter in the alphabet, not just x or y as is usual. d) To ensure that the item is not too difficult, use of fractional coefficients is not recommended.
Vocabulary and textual, graphic, or tabular information: The information given in this item is textual, including an algebraic expression that corresponds to the binomial and from which its square must be established.
Distractors: These will be binomials or trinomials with the following characteristics: a) The square of the first plus the square of the second. b) The square of the first minus the square of the second. c) The square of the first minus two times the product of the first and second plus the square of the second. d) The square of the first plus the first term multiplied by the second term plus the square of the second term.
Correct answer: The correct answer is obtained by following the rule for squaring a binomial: the square of the first term plus two times the product of the first term and second term plus the square of the second term.
Proposed item: Expanding the binomial $(3x-4y)^2$ gives the following result: A) $9x^2-24xy+16y^2$ B) $9x^2+16y^2$ C) $9x^2-16y^2$ D) $9x^2+24xy+16y^2$
Estimated completion time: 2 minutes.

Source: Own elaboration.

The instrument comprises 25 multiple-choice items where the student is asked to choose the correct answer from four possibilities. Each item in the instrument is independent, as it contains the information needed to approach it and answer it. The instrument is criterion-referenced as its aim is to evaluate learning and provide information about what each student can and cannot do. The items were designed by the item preparation committee.

4. Results and discussion

The pilot application of the first version of the measurement instrument was carried out in the facilities of the FIM at the UABC during the first week of the first semester of the 2018-2019 year. The

instrument was applied to 177 students who had just started at the FIM and were enrolled on the Differential Calculus Course (21% of the students enrolled on this module during the semester in question). For Contreras, Backhoff, and Larrazolo (2004) and for Muñoz and Mato (2006), the reliability of the instrument calculated using the KR-20 formula r=0.88 and by the split-half method r=0.93 is classed as appropriate when it is greater than or equal to 0.85 in the case of standardised, large-scale instruments.

The mean DI was 0.70±0.19 (mean ± standard deviation). The percentage distribution for the DI is: very easy items 8% (two items), fairly easy 48% (twelve items), average difficulty 28% (seven items), fairly difficult 4% (one item), and very difficult 12% (three items).

Of the items, 68% have excellent discrimination, 24% have good discrimination, and 8% have bad discrimination. The mean IDC is 0.49±0.18 (mean ± standard deviation), which is classed as excellent.

The means of the IDC were calculated for the 5 algebra topics considered, namely: operations with fractions (items 1, 2, and 3) 0.56; law of exponents (items 4, 5, and 6) 0.61; rationalisation (items 7, 8, and 9) 0.33; operations with polynomials (items 10-19) 0.48; and factorising (items 20-25) 0.50. The highest power of discrimination was identified for the items corresponding to the law of exponents topic followed by the items from the fractions topic. In contrast, we found that the lowest power of discrimination was for the items from the rationalisation topic, which are more difficult.

The mean of the biserial correlation coefficients for the test is 0.52±0.14 (mean ± standard deviation). Of the items, 80% have excellent discrimination, 16% have good discrimination, and 4% have mediocre discrimination. No items were found with poor or worst discrimination.

Regarding content validity, the means for each item in each of the eight aspects declared in the expert evaluation were greater than or equal to 3.5. According to Contreras, Backhoff, and Larrazolo (2004), the criterion that must be satisfied is to achieve an average from the experts equal to or greater than 3.5. In this case, the instrument is classed as valid with regards to its content. Aspect 9 covered the instrument as a whole and concerned the time students are given to answer it. In this case, the maximum time permitted for completion is 60 minutes. The panel of experts believed that the time allowed for students to answer the 25 items is appropriate.

The information was extracted from the application of the differential calculus baseline test corresponding to the first semester of the 2018-2019 academic year, with answers to 60 items by 758 engineering students from the UABC's FIM being recorded. The reliability analysis using the KR-20 formula gives a coefficient $\propto$=0.87. In view of the above, the criterion used to validate the instrument is the same. Of the 177 students from the sample analysed, we have the results of 151 who sat the

differential calculus baseline test. We used these to calculate the correlation between the grade obtained on the measurement instrument and the grade from the baseline test. When comparing the grades, a Pearson correlation coefficient of r=0.70 was obtained significant at the 0.01 level, classed as a significant positive correlation on the scale of Hernández, Fernández, and Baptista (2006).

The diagnostic instrument had a total of 100 options: 25 correct answers and 75 distractors. Of the distractors evaluated, 33% (25) were classified as unsuitable; 6 items (24%) had 3 suitable distractors; 14 items (56%) had 1 UD; 2 items (16%) had 2 UDs, and 1 item had 3 UDs. The mean number of UDs per item was 1.00 ± 0.74 (mean ± standard deviation).

The mean of the DI and IDC for items with 0 unsuitable distractors was 0.45 ± 0.18 and 0.46 ± 0.17, respectively (mean ± standard deviation). In contrast, these psychometric parameters in items with 2 UDs were 0.87 ± 0.03 and 0.34 ± 0.08 with 42% higher DI (in other words, 42% easier) and 12% less discrimination. For items with 1 UD, the mean DI and IDC were 0.74 and 0.58.

The ANOVA reflected statistically significant differences ($p<0.001$) in the DI between the groups of items with different numbers of UDs. The *post-hoc* Tukey test displayed significant differences ($p<0.001$) in the difficulty index (Table 4) and discrimination index between items with 0 UDs and other items with one or 2 UDs. A significant difference was found between one and 2 UDs in the IDC. With regards to the biserial correlation between the items, no significant difference was found. Item 10, which had 3 UDs, was excluded from this analysis.

TABLE 4. One-Way ANOVA, Difficulty Index for Groups of Items with Zero to Two Unsuitable Distractors.

Difficulty index
Tukey's B[a,b]

Unsuitable distractor	N	Subgroup for Alfa = .05	
		1	2
0	6	.4533	
1	14		.7450
2	4		.8725

The means for the groups in the homogenous subgroups are shown.

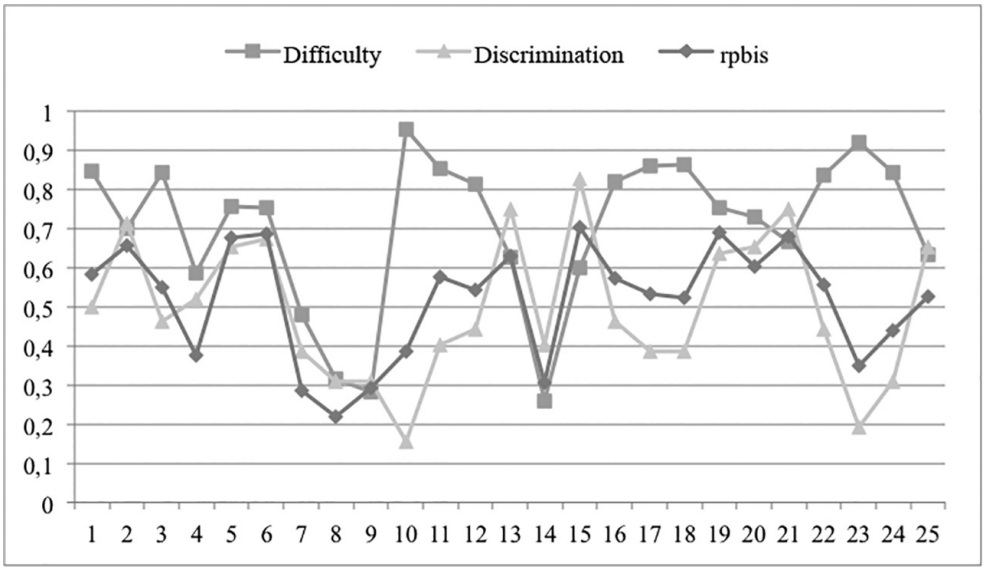
a. The sample size is used for the harmonic mean = 6.146.

b. The group sizes are not the same. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Source: Own elaboration.

The biserial correlation varies between 0.22 and 0.70 (Graph 1). A positive correlation indicates that answering the question well is an indicator of obtaining a good score on the measurement instrument. Therefore, the questions with positive rpbis are the ones that best discriminate the sample of subjects.

GRAPH 1. Item number compared with difficulty index, discrimination, and biserial correlation in the first version of the measurement instrument.



Source: Own elaboration.

Based on this line chart we can see that items with a difficulty greater than 0.80 (items 1, 3, 10, 11, 12, 16, 17, 18, 22, 23, and 24) have discrimination and rpbis below 0.60. In fact, the lowest discrimination values are found in this group of items. In contrast, higher discrimination values are found (classed as excellent) when the difficulty is between 0.40 and 0.75. Item 15 refers to isolating a variable and is the item with the greatest power of discrimination (IDC = 0.83). At the same time, it is the best predictor of the success of a student in this instrument in accordance with the biserial correlation coefficient (rpbis = 0.70).

To identify which algebra topics, items, and indicators of achievement lead to success for a student on this measurement instrument, we calculated the means of the biserial correlation coefficient for the algebra topics and ordered them from highest to lowest: operations with fractions (topic 1, 0.60), laws of exponents (topic 2, 0.58), operations with polynomials (topic 4, 0.55), factorising (topic 5, 0.53), and rationalisation (topic 3,

0.26). The topics that mainly predict students' success are those studied at the primary and secondary educational levels. At the individual level, the two items with the highest biserial correlation coefficient were chosen, namely: item 15, isolating a variable (rpbis = 0.70) and item 19, expanding the cube of a binomial (rpbis = 0.69).

In the two very easy items (10 and 23), the students are asked to calculate the sum of polynomials and identify a difference of squares respectively. However, given that the IDC in both cases (0.15 and 0.19) were less than 0.2 and the DI is greater than 0.9 according to the criterion of Backhoff, Larrazolo, & Rosas (2000) and CTT, we decided to modify it substantially. In the case of item 10, the expression degree was raised from first to second and the number of terms from 4 to 6. The indicator of achievement was not modified (Table 5). In the case of item 23, the topic was not changed, but the indicator of achievement was, from identifying a difference of squares to factorising a sum of cubes. Smaller changes were also made to the distractors that were not suitable.

TABLE 5. Initial and final version of item 10 from the measurement instrument.

Performing the operation 2x+7y-5x-3y gives the following result:			
A) $-3x+4y$	B) $3x-4y$	C) xy	D) $-xy$
Performing the operation $2x+7y-5x-3y-3x^2-(-7x^2)$ gives the following result:			
A) $4x^2-3x+4y$	B) $4x^2+3x-4y$	C) $-4x^2-3x+4y$	D) $-4x^2+3x+4y$

Source: Own elaboration.

After making changes to the UDs and substantially modifying items 10 and 23, we carried out a second pilot application during the first week of the second semester of 2018–2019 with a sample of 138 newly enrolled students (20% of the student body enrolled on this module during the semester in question) on the engineering degrees at the UABC's FIM. The measurement instrument was again analysed with CTT and its reliability calculated using KR-20 r=0.87 and the split-halves method r=0.92. The reliability is virtually the same with the two methods in the final version of the instrument. However, the psychometric indexes improved notably.

The information was again extracted from the application of the differential calculus baseline test. For the second semester of 2018-2019, the answers to 60 items by 627 engineering students at the FIM were recorded. The reliability analysis using the KR-20 formula gives a coefficient =0.87. Of the 138 students in the sample, we have the results of 117 students who took the differential calculus baseline test. With these results, we calculated the correlation between the grade obtained in the measurement instrument and the grade for the baseline test. Comparison of the grades gives a Pearson correlation coefficient of r= 0.72 significant at the 0.01 level, with an increase in correlation of 2.8% compared with the first version. High grades in the measurement instrument translate into high grades in the differential calculus baseline test.

In the final version of the measurement instrument, the mean DI was 0.58±0.17 (mean ± standard deviation). The percentage distribution from the DI is as follows: very easy items 4% (1 item); fairly easy 24% (6 items); average difficulty 32% (8 items); fairly difficult 36% (9 items) and very difficult 4% (1 item). This distribution best matches the criteria established by Backhoff, Larrazolo, and Rosas (2000).

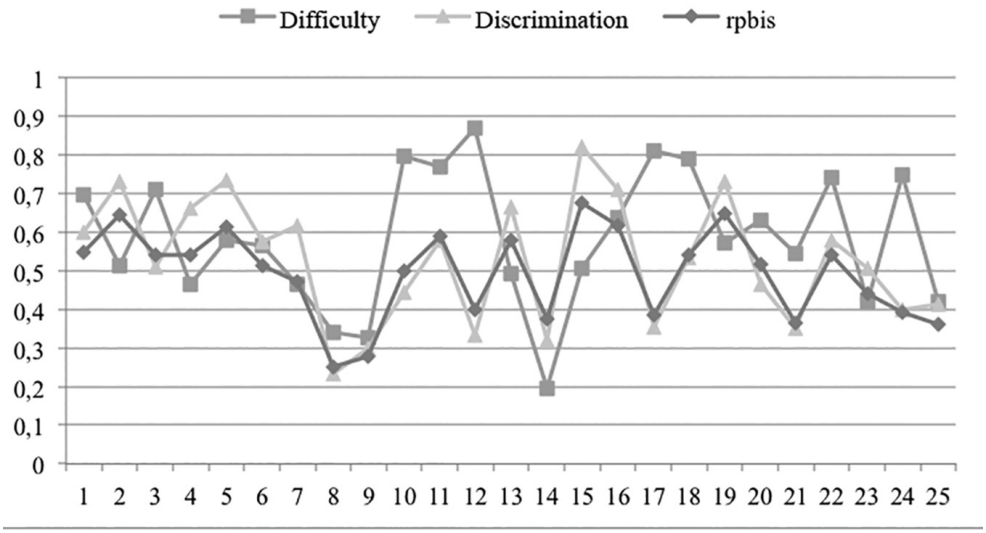
We found that 72% of the UDs have excellent IDCs and 24% have good discrimination, while 4% have mediocre discrimination. The mean IDC is 0.53±0.16 (mean ± standard deviation), which falls within the band classed as excellent. This final version of the measurement instrument increased the power of discrimination by 8%.

The mean discrimination figures were also calculated for the 5 algebra topics covered, namely: operations with fractions 0.61 (items 1, 2, and 3); law of exponents 0.65 (items 4, 5, and 6); rationalisation 0.38 (items 7, 8, and 9); operations with polynomials (items 10-19) 0.55 and factorising 0.45 (items 20-25). In the final version of the instrument, it is worth noting that we found the greatest power of discrimination in the items corresponding to the law of exponents topic, followed by the items from the fractions topic. In contrast, we found that the lowest power of discrimination still corresponds to items from the rationalisation topic, which are most difficult.

In the final version, the mean biserial correlation coefficients for each algebra topic were calculated again and were ordered from highest to lowest: operations with fractions (topic 1, rpbis = 0.58); laws of exponents (topic 2, rpbis = 0.55); operations with polynomials (topic 4, rpbis = 0.53); factorising (topic 5, rpbis = 0.44); and rationalisation (topic 3, rpbis = 0.33). Consistency was found with the topics that predict the success of students in relation to the first version of the instrument. At the particular level, the two items with the highest biserial correlation coefficients also correspond to items 15:

isolating a variable (rpbis = 0.68) and 19, cubing a binomial (rpbis = 0.65). The psychometric indicators show less dispersion in this final version of the instrument (Graph 2). The figure for the mean squared deviation from the mean for the DI is 0.90 in the first version of the instrument and 0.72 in the final version; for the IDC they are 0.79 and 0.62, and for the rpbis they are 0.51 and 0.33. The difficulty varies between 0.2 and 0.87, the discrimination between 0.23 and 0.82, and the biserial correlation coefficient varies between 0.25 and 0.68.

GRAPH 2. Item number against difficulty index, discrimination index, and biserial correlation in the final version of the measurement instrument.

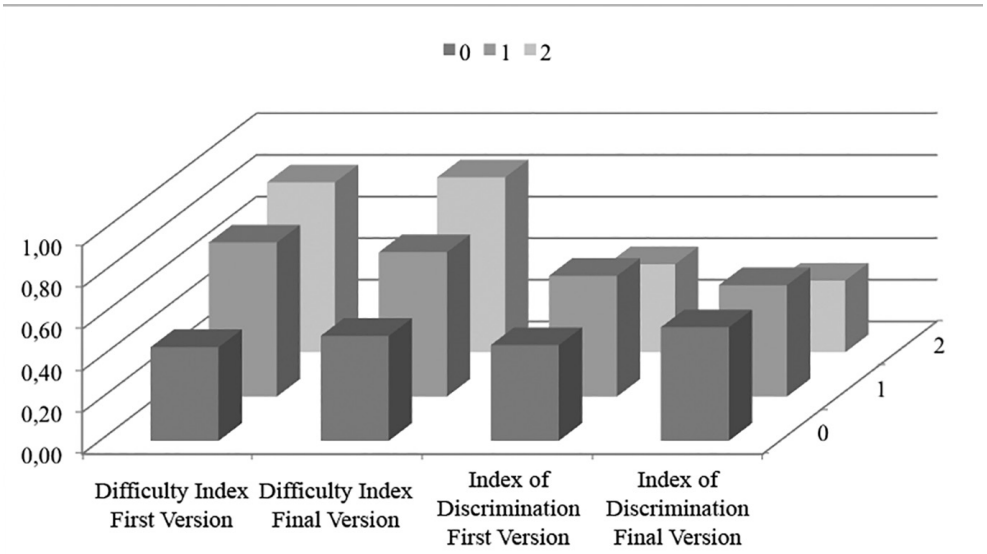


Source: Own elaboration.

Of the distractors evaluated, 15% (11) were classified as unsuitable, 16 items (64%) had 3 suitable distractors, 7 items (28%) had 1 UD, 2 items (8%) had 2 UDs, and no item had 3 UDs. The mean number of UDs per item was 0.44 ± 0.64 (mean ± standard deviation). In this final version, we reduced the UDs from 25 to 11.

The mean DI and IDC in items with 0 UDs was 0.50 ± 0.15 and 0.55 ± 0.17. In contrast, for items with 2 UDs, these psychometric parameters were 0.84 ± 0.03 and 0.34 ± 0.01 with 34% greater DI (in other words, 34% easier) and 11% less discrimination. For items with 1 UD, the mean DIs and IDCs are 0.69 ± 0.09 and 0.54 ± 0.11 respectively (mean ± standard deviation). It is confirmed that when there are 1 or 2 UDs, the item is easier (Graph 3) and the power of discrimination falls.

GRAPH 3. Comparison of unsuitable distractors and indexes of difficulty and discrimination in the first and final versions of the measurement instrument.



Source: Own elaboration.

A *post-hoc* Tukey test between item topics and the DI did not show significant differences between the groups. However, in the final version, the greater difficulty of answering rationalisation items (topic 3) is apparent with a mean index of 0.38, followed by the topic 2 items corresponding to the laws of exponents with a mean DI of 0.54. The next most difficult topics are those with factorising items (0.58), operations with fractions (0.64), and polynomials (0.65). Nonetheless, it is worrying that only 64% of the students starting an engineering degree can correctly solve arithmetic operations of addition, subtraction, multiplication, and division of fractions, as these skills are practised from the basic level of education.

Items 8, 9, and 14 have indexes of 0.34, 0.33, and 0.20 respectively and are the most difficult in the measurement instrument. Items 8 and 9 (fairly difficult) correspond to rationalisation of the numerator and denominator of algebraic expressions, while item 14 (very difficult) refers to calculation of the division of polynomials. Items 23 and 25 are classed as fairly difficult, both having indexes of 0.42. For these items, the student has to factor a sum of cubes and a difference of cubes respectively. This shows that the items relating to rationalisation, division of polynomials, and factorising with cubes are the most difficult ones for new students. In particular, these algebraic skills are vital to be able to calculate the limits

of a function, find the zeros for an equation, or simplify algebraic expressions.

5. Conclusions

We created a valid and reliable instrument with the aim of determining the extent to which a newly enrolled student on an engineering degree has the algebra skills required to be able to take the module in Differential Calculus, and also to predict their likelihood of success on this module.

A panel of experts evaluated whether the content of the items examined the proposed algebra topics and whether the items are indicators of what is intended to be measured. The experts gave favourable opinions relating to the diagnostic potential of the measurement instrument. The differential calculus baseline test was used as the criterion to determine the criterion validity. This exam has been used at the UABC since 2005. When comparing grades from the instrument with the criterion, a Pearson correlation coefficient of 0.72 was obtained, significant at the 0.01 level. Accordingly, high grades on the measurement instrument translate into high grades on the differential calculus baseline test, and so this measurement instrument is considered to be a predictor of the students' performance on the Differential Calculus Course for engineering degrees.

We used two methods to calculate its reliability, KR-20 and split halves. The results are consistent between the first version and the final version, and so the instrument is very reliable and can be considered for large-scale use.

We found the greatest power of discrimination in the items corresponding to the topics that involve the law of exponents and operations with fractions. These topics mainly relate to the skills acquired in primary and secondary education. In contrast, we found that the lowest power of discrimination is still for the items relating to the topic of rationalisation, which the students find most difficult. We also found that the topics that predict the success of the students in the measurement instrument, in other words, the point-biserial correlation coefficient, are the operations with fractions and laws of exponents.

The results from the application of this measurement instrument make it possible to identify which algebra topics cause the most problems for students who are starting engineering degrees and will study the differential calculus module. At the same time, these results make it possible to take measures to improve the instruction and academic performance of the students on the Differential Calculus Course on the engineering programmes.

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The issue of didactical suitability in mathematics educational videos: experience of analysis with prospective primary school teachers

La cuestión de la idoneidad de los vídeos educativos de matemáticas: una experiencia de análisis con futuros maestros de educación primaria

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Abstract:

The number of educational videos available on the internet on the most varied topics is rapidly increasing. These include mathematics videos that cover virtually any type of curriculum content. However, their quality as a learning resource varies greatly. As a result, it is necessary to provide teachers with tools to enable them to analyse the appropriateness of using educational videos, considering the various aspects involved. This paper describes the design, implementation and results of an educational intervention with 93 prospective primary school teachers, focussed on developing their ability to analyse the educational suitability of videos about proportionality. Preliminary analysis of the video revealed significant errors and inaccuracies in the definitions, propositions, and procedures, as well as shortcomings and inaccuracies in the arguments, and so its level of epistemic suitability is rated as medium. However, the majority of the prospective teachers rated its degree of suitability as high in almost all components.

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Students regard studying didactic suitability and implementing it through components and indicators as positive, believing that this activity facilitates professional reflection. However, mastering this tool requires analysing a greater number and variety of videos and further collective discussion of the results of the analyses performed by the students.

Keywords: teachers' education, onto-semiotic approach, didactical suitability, educational videos, proportionality.

Resumen:

La cantidad de vídeos educativos disponibles en Internet sobre los más variados temas está aumentando a un ritmo acelerado. Así, nos encontramos vídeos de matemáticas que cubren prácticamente cualquier tópico curricular, aunque su calidad como recurso didáctico es muy desigual. En consecuencia, es necesario proporcionar a los profesores herramientas que les permitan analizar la pertinencia del uso de estos vídeos, teniendo en cuenta los diversos aspectos implicados. En este trabajo se describe el diseño, implementación y resultados de una acción formativa con 93 futuros maestros de educación primaria, orientada al desarrollo de la competencia de análisis de la idoneidad didáctica de vídeos sobre proporcionalidad. El análisis *a priori* del vídeo reveló errores e imprecisiones significativas en las definiciones, proposiciones y procedimientos, así como carencias o inexactitudes en los argumentos, por lo que el nivel de idoneidad epistémica se valora como media. Sin embargo, la mayoría de los futuros docentes valoraron su grado de idoneidad como alto en casi todos los componentes. Los estudiantes consideran positivo el estudio de la idoneidad didáctica y su implementación a través de componentes e indicadores, considerando que esta actividad facilita la reflexión profesional. No obstante, el dominio de esta herramienta requiere incrementar el número y variedad de vídeos para analizar y mayor discusión colectiva de los resultados de los análisis que realizan los estudiantes.

Descriptores: formación de profesores, enfoque ontosemiótico, idoneidad didáctica, vídeos educativos, proporcionalidad.

1. Introduction

The use of educational videos from YouTube and other platforms has increased dramatically in recent years, offering a promising learning resource for students and the general public (Azer, AlGrain, AlKhelaif, & AlEshaiwi, 2013).

These educational resources and the pedagogical models that use them, such as *flipped learning* (Bergmann & Sams, 2012), should be the subject of educational research as it is not clear how possible it is to achieve meaningful learning by watching recorded classes. Indeed, several researchers discuss the role that the use of YouTube and other social media might play in formal education, analysing how online resources are organised and how they can be inserted

as informal tools in specific educational settings (Borba et al., 2016; Dabbagh & Kitsantas, 2012; Duffy, 2008; Portugal, Arruda, & Passos, 2018; Ramírez, 2010). It is widely regarded as necessary for the field of educational studies to investigate the adequacy of online educational resources to ensure that technology is in accordance with learning objectives (Turney, Robinson, Lee, & Soutar, 2009).

Research in mathematics teaching regarding the use of educational videos emphasises the importance of the teachers themselves evaluating and recommending suitable videos for their pupils (Beltrán-Pellicer, Giacomone, & Burgos, 2018; Ruiz-Reyes, Contreras, Arteaga, & Oviedo, 2017; Santos, 2018). This is because some of these videos show formally incorrect procedures, not all of them indicate the educational level for which they are intended, and the meanings they raise might not be relevant to what is being covered in class. Accordingly, there is a clear need to design and implement training processes that make it possible to promote teachers' professional growth and develop their knowledge and competences (Chapman, 2014; English, 2008; Mason, 2016; Ponte & Chapman, 2016; Sadler, 2013).

In view of this issue, the aim of this research is to design, implement, and evaluate a training activity for future primary school teachers, focussing on developing knowledge and competences, relating to the analysis of the epistemic suitability of educational videos about proportionality that are available on the internet.

The work is based around the following sections. Section 2 outlines the theoretical framework and specific research problem. Section 3 describes the design of the training process implemented. Section 4 includes a preliminary analysis of the video about proportionality, which is used as an instrument for evaluating the competences achieved by the future teachers. Section 5 shows in detail the results of the experiment, analysing qualitatively and quantitatively the reports drawn up individually by the future teachers. The final section includes a summary of the research and discussion of its implications, and limitations.

2. Theoretical framework and research problem

In the field of research into training mathematics teachers, different theoretical frameworks are used to categorise and promote different types of professional knowledge and competences (Pino-Fan & Godino, 2015). We consider that the didactic–mathematical knowledge and competences (DMKC) model (Godino, Giacomone, Batanero, & Font, 2017; Breda, Pino-Fan, & Font, 2017), developed within the framework of the onto-semiotic approach to mathematical knowledge and instruction (OSA) (Godino, Batanero, & Font, 2007), provides suitable tools for approaching our research problem. This model emphasises the importance of designing and implementing training resources that promote teachers' competence in

analysing educational suitability. *Didactical suitability* is understood as the degree to which an instructional process combines certain characteristics that mean it can be described as appropriate or adequate, the main criterion being the fit between the personal meanings students construct (learning) and the institutional meanings, whether these are intended or actually implemented (teaching), taking into account the influence of the environment (Godino, 2013). This involves coherently and systematically articulating six criteria relating to the facets that affect a training process (Godino et al., 2007): epistemic, ecological, cognitive, emotional, interactive, and those relating to media.

We consider that a mathematics training process is more epistemically suitable the better the institutional meanings implemented (or intended) represent a reference meaning. The reference meaning will relate to the particular educational level and should be drawn up, taking into account the different types of problems and contexts for use of the content taught, as well as the operational and discursive practices required (Godino, 2013). Consequently, it will be necessary to take into account the degree of adequacy of the situations–problems and it will also be necessary to consider the variety and adequacy of the representations, definitions, procedures, and propositions, as well as the arguments supporting them. High suitability from an epistemic perspective requires the situations–problems proposed to involve a variety of representations, to offer students a variety of ways of approaching them, and to require students to interpret, generalise, and justify the solutions. Furthermore, the different partial meaning of the mathematical objects that appear must be connected and defined (Godino, Font, Wilhelmi, & Lurduy, 2011).

Using didactical suitability enables teachers to reflect systematically on their own practice (Aroza, Godino, & Beltrán-Pellicer, 2016; Beltrán-Pellicer, Godino, & Giacomone, 2018; Posadas & Godino, 2017) and it can also be applied to analyse partial aspects of the instructional processes, such as the use of technological resources. Specifically, Beltrán-Pellicer, Giacomone, and Burgos (2018), using the theoretical–methodological tools from OSA, analysed the degree of epistemic suitability of a selection of the educational videos viewed most frequently by users of YouTube™, relating to problems of proportional sharing. On the one hand, they found a wide variety of focuses and methods for solving this type of problem, which can interfere with the teaching and learning process in the classroom if the teacher does not previously select or record these videos. On the other hand, the epistemic suitability of the sample of videos analysed was very diverse, with videos that contained errors and inaccuracies as well as many of them offering an unrepresentative or poorly defined treatment of the mathematical content. Finally, they noted that the videos with the metrics reflecting the greatest popularity were not the most suitable ones. This work is the main antecedent of the present paper.

We consider that it would be desirable for teachers to understand the didactic

suitability of the tool and acquire the necessary competence to use it to analyse educational resources critically, particularly in the use of videos available online.

Furthermore, various pieces of research show that teachers, both in their initial training and in service, show difficulties with teaching concepts relating to proportionality (Bartell, Webel, Bowen, & Dyson, 2013; Ben-Chaim, Keret, & Ilany, 2012; Berk, Taber, Gorowara, & Poetzl, 2009; Hilton & Hilton, 2018). Teacher training must take into account the development of mathematics teaching knowledge and competences relating to this topic by designing and implementing specific training interventions. This is why the trainee teachers were asked to analyse a video on proportionality.

3. Design of the training process

The training experience was carried out during the 2018-2019 academic year in the framework of the Curriculum Design and Development in Primary Education module with ninety-third year students from the Primary Education degree.

During their degree studies, future teachers receive specific training about epistemic (mathematical content), cognitive (mathematics learning, errors, and difficulties), instructional, and curricular aspects, so that when carrying out their school placements, they should be able to put into practice the knowledge they have acquired to analyse, design, and support teaching-learning according to specific content (in our case, proportionality).

Furthermore, before carrying out this research, and in line with the chosen DMKC model, we carried out training workshops with the group of students focussing on developing the competence of analysing global meaning (based on identifying situations-problems and the operational, discursive, and normative practices involved in solving them), and onto-semiotic analysis of the practices (description of the framework of objects and processes involved in the practices) used in the mathematical activity of solving problems involving proportionality.

The first session comprised a two-hour workshop where the characteristics of the theory of didactical suitability were presented, as well as how the different epistemic, cognitive, affective, interactional, media related, and ecological dimensions of a given study process relate to each other. The aim was to involve future primary school teachers in a reflection on the need to have a system of specific indicators that make it possible to evaluate teaching practice systematically.

In the next session, also lasting two hours, the future teachers worked in teams to analyse the epistemic suitability of online educational videos on proportionality. The initial group work enabled the students to compare, discuss, and improve their proposals for evaluating the epistemic suitability of different educational videos relating to proportionality.

In the third phase, the students individually completed the tasks described in

the following section as a final evaluation instrument, the results of which are analysed in this work.

4. Preliminary analysis of the epistemic suitability of the video

In this section we analyse the epistemic suitability of the video, that is, the mathematical knowledge brought into play in it. This analysis will serve as a benchmark for interpreting the students' answers when they evaluate the suitability of the educational video. The researchers performed the analysis and preliminary evaluation independently. They then compared them to decide on a common evaluation.

The educational video analysed[1] covers the topic of direct arithmetic proportionality from the perspective of presenting the notions of ratio and proportion (Ben-Chaim, Keret, & Ilany, 2012). The idea is that the future teachers will watch the video closely and critically assess its degree of suitability, in line with the epistemic suitability components and indicators (Godino et al., 2007; Godino, 2013).

In general, the situations-problems proposed in the video are presented in context and the mathematical ideas are connected. Various ways of approaching the problems are proposed, but we consider that the sample of the problems is not sufficiently representative or defined. The solution methods proposed are only applied to problems with a missing value, in which the condition of regularity is assumed in advance, and problems involving comparing ratios, for example, are not considered. The video features a great variety of linguistic registers and representations: natural registers (oral and written), symbolic (numerical and algebraic), tabular, and graphic ones.

Furthermore, we have identified some errors and inaccuracies in the presentation of rules (definitions and propositions) and arguments:

— Error of expression in the handling of simplifications of fractions. To simplify, the numbers that appear in the numerator and denominator are crossed out, leaving as superscript the factors that remain when canceling terms.

Graph 1. Screenshot from minute 7.

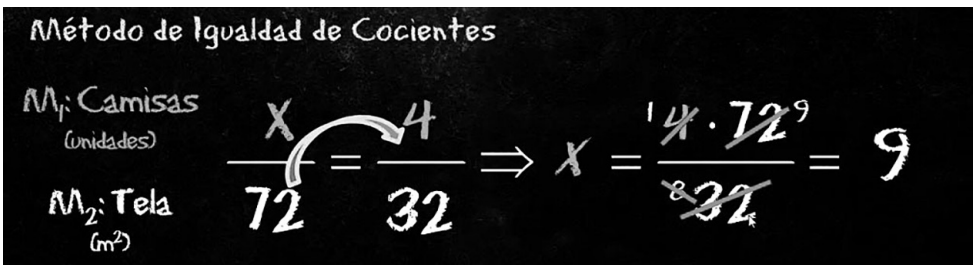

Image text: Quotient Equality Method. M_1: shirts (units) M_2: fabric (m^2)

Source: Clasemáticas, 2012.

— Error in the definition of ratio and proportion.

(1:00) «Ratio, mathematically speaking, means quotient. The proportion, the ratio, the quotient between these two magnitudes is always the same.»

Here we see incorrect use of the concepts of ratio and proportion. A ratio is not always a quotient and a ratio is not the same as a proportion, a confusion found with some frequency in teaching practice.

— The doubling rule does not necessarily denote a relationship of direct proportionality.

(3:20) The narrator presents a «trick» to find out whether two magnitudes are directly proportionate: «To find out if two magnitudes are directly proportionate, all you have to do is check that doubling one is the same as doubling the other, tripling is the same as tripling.»

This is a necessary but not sufficient condition for two magnitudes to be directly proportionate. The proportionality of magnitudes is a linear function established between the values of the magnitudes.

— When the relation of direct proportionality is justified, this is based on the relationship that doubling one magnitude corresponds to doubling the other.

(4:30) Next, the narrator tells the students the question they should ask after finding the magnitudes: «Will twice as many shirts need twice as much cloth?»

(4:43) «If the answer is yes, and in this video it obviously will be, because if not, we would be looking at another type of proportionality … then we are looking at a problem of direct proportion.»

This is incorrect. The answer to a question like the one he asks might be no and it might be that no other situation of proportionality is involved.

— Neither the operations in a proportion nor the reason for using cross multiplication are explained.

We consider that the degree of suitability regarding relationships between objects, on a low-medium-high ordinal scale, is medium, as not all of the propositions and procedures have an associated argument. Furthermore, the various meanings of the objects that appear in the exercises are sometimes but not always identified, and so the degree of suitability is medium in this aspect.

Graph 2. Screenshot from minute 8:15. General method.

Image text: General Method of Proportionality. M_1: shirts (units) M_2: fabric (m^2)

Source: Clasemáticas, 2012.

(8:15) «In other words, the quotients are equal between the magnitudes, within them, or comparing one with the other magnitude, so this quotient is also correct.»

In the first method he presents, the «equal quotients» one, he uses external ratios. Here, in what the author calls the «general proportionality method», he uses internal ratios, without appropriately explaining the relationship between the two proportions. Furthermore, he uses the term proportion instead of ratio to refer to the fractions that appear on screen.

The final procedure for solving proportionality problems that the author of the video presents is the rule of three:

(11:35) Put the magnitudes in a column; «we put x is to 72 as 4 shirts is to 32.»

GRAPH 3. Screenshot from minute 11:47. Rule of three method.

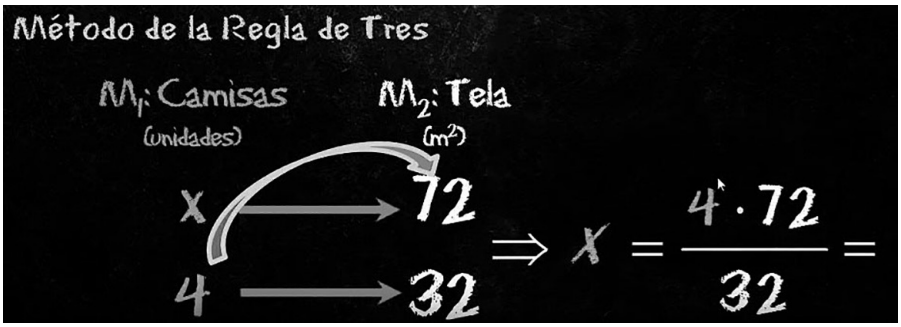

Image text: Rule of three method. M_1: shirts (units) M_2: fabric (m^2)

Source: Clasemáticas, 2012.

(11:47) «And this, in reality, if you rewind the video, is the general method. The thing is I don't know why you love putting arrows on it. The general method has a mathematical explanation and this one doesn't really.»

He relates the rule of three method, which he solves by cross multiplication, to the general method. Thus, he is referring to to a «debased rule of three», that is to say, he does not present the proportional equation, which he distinguishes as another method. Therefore, what he calls «the rule of three» is, in the diagram (using arrows), accompanied by cross multiplication, which is not justified in the video.

Based on these analyses, the researchers quantitatively evaluated the video's degree of epistemic suitability in each of the six components, scoring each indicator according to whether its contribution to the suitability is low, medium, or high (0, 1, or 2 points, respectively). The total maximum score will, therefore, be 12. Table 1 shows the marks given by the research team.

TABLE 1. Evaluation of epistemic suitability by components.

Component	Score given to the video
Situations-problems	1
Language	2
Rules	1
Arguments	1
Relationships between objects	1
Articulation of meanings	1
Final score	7

Source: Own elaboration.

5. Results

For the second working session, we asked the students firstly to watch at home three videos[2] about directly proportional distributions which had different degrees of suitability. Individually, they had to decide on the greater or lesser degree of suitability of the videos as well as their level of use of algebra, taking into account the type of solution developed. Afterwards, in class, they were asked to discuss their evaluations with the work group and then prepare a group opinion about the degree of suitability of the different videos. The instructions given to the students for analysing the videos are the same as the ones proposed in the final task. That is to say, should consider: a) the variety of situations-problems presented; b) the presence of different registers of representation; c) the clarity and correctness of the definitions, propositions, and procedures; and d) the argumentation of the propositions and procedures.

As a result of this session, we saw that the future teachers overlooked the errors in definitions, propositions or procedures present in the videos and that in the idea-sharing in the working group, they found it hard to agree on the degree of suitability of the different videos. Discussing the individual positions in many cases led them to modify their preliminary analyses, identifying new elements of analysis that had gone unnoticed.

In this section, we analyse the answers the students gave in the final evaluation task (third working session), which consequently reflect what these students have learnt. We then analyse the answers given to the quantitative evaluation instruction for each of the six components of suitability, as well as the overall adequacy of the video.

Table 2 shows the frequencies and percentages of the answers given regarding the characteristics of the situations-problems presented in the video.

TABLE 2. Variety of situations-problems proposed (n = 93).

Characteristics of the situations	Frequency (%)
A representative and defined sample of problems is presented	83 (89.25)
The situations appear in context	83 (89.25)
The mathematical ideas are connected	87 (93.55)
Various ways of tackling the problems are suggested	89 (95.70)

Source: Own elaboration.

We can see that the majority of the students adequately recognised that the situations are presented in context in the educational video being analysed, the ideas are connected, and various ways of approaching the problems are provided. The majority of them (89.25%) also accepted that the videos show a representative and defined sample of problems.

In relation to the presence of different representations and language registers, the students have no difficulty in identifying the natural register and the symbolic register. However, they identify the tabular and graphic registers to a lesser extent. Other students, to a lesser extent, identify animation and other different types (Table 3).

TABLE 3. Identification of linguistic representations (n = 93).

Type of language	Frequency (%)
Natural (oral)	92 (98.9)
Natural (written)	93 (100.0)
Symbolic (numerical)	89 (95.7)
Symbolic (algebraic)	83 (89.2)
Tabular	74 (79.6)
Graphic	28 (30.1)
Animation	49 (52.7)
Others (iconic, multimedia, diagrammatic, etc.)	10 (10.8)

Source: Own elaboration.

The majority of the future teachers have difficulties locating the errors or inaccuracies in the definitions, propositions or procedures, as well as in the arguments given for the transformations, or when the relationship of direct proportionality in the situations presented is justified (Table 4).

TABLE 4. Clarity and correction of definitions, propositions, procedures, and arguments.

Errors and inaccuracies in the rules and arguments		Frequency (%)			
		Not stated	Explicitly states there are none	Yes but does not specify what	Yes and describes it
Rules	Errors in arithmetic-algebraic treatment	63 (67.7)	21 (22.6)	2 (2.2)	7 (7.5)
	Errors in definitions	51 (54.8)	22 (23.7)	2 (2.2)	18 (19.4)
	Errors in propositions or procedures	51 (54.8)	21 (22.6)	5 (5.4)	16 (17.2)
Arguments	Error or inaccuracy when justifying a relationship of proportionality	45 (48.4)	20 (21.5)	6 (6.5)	22 (23.7)
	Error or inaccuracy when justifying an arithmetic-algebraic transformation	54 (58.1)	20 (21.5)	4 (4.3)	15 (16.1)
	Other errors or inaccuracies	52 (55.9)	20 (21.5)	2 (2.2)	19 (20.4)

Source: Own elaboration.

When the future teachers identify errors of arithmetic or algebraic processes, some mention that the author of the video does not explain some of the symbols used, including subscripts, or that simplifying the results of the operations might confuse the students.

With regards to errors or inaccuracies the students recognise in definitions, we find the following categories of answers:

— Error in the definition of ratio. This is the category with most answers that identify conflicts in the definitions.

For example, E50 said: «Ratio: the video defines this as the proportion of the quotient between both magnitudes. This could cause confusion; one alternative would be "link between two magnitudes that can be compared to each other."»

— Inaccuracy in the definition of direct proportionality.

— Confusing definitions or ones that are inappropriate for primary school.

— As well as these categories, some students include as errors in the defini-

tions descriptions that are not relevant in relation to procedures or modes of expression. For example, E84 notes that: «The names used for the methods for calculating the proportion could cause confusion as in different places different names might be used for these methods.»

The future teachers show difficulties assigning errors to the appropriate categories and providing relevant descriptions. They refer to «confusing explanations» in «Errors relating to definitions». For example, E54 identifies as an error in definitions:

> In the explanation of the proportionality method (in the exercise with the shirts) he isolates «x» as if it were an equation. He should have found the proportion between the shirts and the metres of cloth (how many times bigger the metres of cloth are than the number of shirts) and then divided the metres of cloth to get «x».

Then adds regarding «Errors in propositions or procedures»: «In procedures, I would put the same error as in "Errors in definitions"».

Most of the students who identify conflicts in procedures refer to the rule of three: «He crosses out numbers and isolates «x» in the rule of three confusingly, writing small numbers next to big ones might give the impression they are powers (E52)».

Other students identify procedural errors: «In the equal quotients method, putting the unknown quantity «x» in the numerator, it is easier for the student to place it in denominator of the left fraction (E26).»

Or they feel that the explanations that accompany the procedures are complex or insufficient.

Only one student (E83) refers to the error in the proposition: «To find out wether two magnitudes are directly proportionate or not, all you have to do is check that doubling one is the same as doubling the other, tripling is the same as tripling …»

No student mentions as an inaccuracy the fact that the argumentation of the relationship of direct proportionality is only based on the proposition that «doubling one magnitude corresponds to doubling the other». Most of the students who place an error in this category do so incorrectly, either because they indicate «confusing explanation» or «limited argumentations» or because they refer to inaccuracies in the explanation of transformations and not in the relationship of proportionality.

Only six students make any reference to the lack of argumentation of the operations. For example, E67 states that: «The only problem I can see with this video is that when simplifying he does not explain this process, it is true that the video is not about simplification but it could mean students get lost when solving problems.»

In relation to other errors, the future teachers fundamentally identify:

— Errors or inaccuracies in the expression (oral) or language used.

— Unsuitable presentation for primary-school pupils.

— Difficulties understanding the differences between the methods for solving the problem.

— Insufficient arguments for arithmetic transformations.

Regarding the «trick» the author of the video presents, E68 includes the following as an error:

> Trick: «To find out whether two magnitudes are directly proportional, it is enough to establish that the double of one of them corresponds to the double of the other». Although this is a quick way of seeing if there is direct proportionality or not, it seems imprecise as it only mentions doubling. He should mention «halves match», «sums match», «differences match», in other words, using all four operations.

Table 5 shows the frequency of errors detected by the future teachers. We distinguish between answers that mention an error in a somewhat relevant way in the appropriate category and answers that are not relevant because they are not in the appropriate category, because the description of the error is not conclusive or is subjective, or because what they include cannot be regarded as an error or inaccuracy. In general, the percentages of students who recognised errors and inaccuracies were low. The highest related to the justification of the relationship of proportionality, mentioned by 22 students (23.7%).

TABLE 5. Errors identified by the students.

Errors and inaccuracies in the rules and arguments detected by the future teachers		**Frequency**				
		Relevant answer	Irrelevant answer			Total (%)
			It is an error but not in the category identified	Inconclusive or subjective description	Not an error	
In rules	Arithmetic-algebraic treatment	1	1	1	4	7 (7.5)
	In definitions	7	3	5	3	18 (19.4)
	In propositions-proportions	4	3	5	4	16 (17.2)
In arguments	When argumenting the relationship of proportionality	3	8	4	7	22 (23.7)
	When argumenting transformation	5	3	3	4	15 (16.1)
	Others	5	2	7	5	19 (20.4)

Source: Own elaboration.

Section d) of the instructions asked the trainee teachers to identify whether the mathematical objects and the meanings are presented in connection in the video. Apart from two students who did not answer this section, 73.12% of the future teachers believed that the mathematical objects are related in a relevant way and that, as such, the degree of suitability of this aspect is high (Table 6). Furthermore, 63.44% said that the different meanings of the objects involved are always connected.

TABLE 6. Relationships between objects and meanings.

Relationships between mathematical objects		Suitability	Frequency (%)
Relationships between objects	All of the propositions and procedures have an associated argument	High	68 (73.1)
	Some of the propositions and procedures have an associated argument	Medium	23 (24.7)
	None of the propositions and procedures have an associated argument	Low	0 (0.0)
The meanings of the objects that appear are identified and interwoven	Always	High	59 (63.4)
	Sometimes	Medium	30 (32.3)
	Never	Low	2 (2.2)

Source: Own elaboration.

According to the results obtained in the preliminary analyses (variety and representativeness of the situations-problems proposed, variety of representation systems, clarity and correctness of the rules and arguments, connection between objects and meanings), the future teachers had to quantitatively evaluate the degree of didactical suitability of the video. They had to assign a score of 0, 1, or 2 depending on whether they regarded its suitability as low, medium, or high, respectively.

TABLE 7. Frequency (%) of evaluation of epistemic suitability by components.

Components	Evaluation of the video		
	0	1	2
Situations–problems	1 (1.1)	40 (43.0)	52 (52.9)
Language	3 (3.2)	37 (39.8)	53 (57.0)
Rules	3 (3.2)	33 (35.5)	57 (61.3)
Arguments	1 (1.1)	42 (45.2)	50 (53.8)
Relationships between objects	4 (4.3)	22 (23.7)	67 (72.0)
Articulation of meanings	2 (2.2)	37 (39.8)	54 (58.1)

Source: Own elaboration.

Table 7 shows that over half of the students gave the highest mark for relevance in each of the epistemic suitability components. The aspect with the highest valuation is the relationship between objects (72.0% indicated high suitability here) followed by correctness of rules (61.3%).

We can see that the highest score that can be assigned to the video is 12 points. The minimum score assigned was 4 points (one student) and the mean was 9.5 points. The most common score (in 29% of cases) was 10 points. Furthermore, 9 students (10%) gave the video the maximum score.

The future teachers were asked to explain the reasons for their epistemic suitability scores. Analysing their answers has enabled us to identify the categories in Tables 8 and 9, where we distinguish arguments for a positive evaluation and arguments for a negative evaluation.

TABLE 8. Arguments for giving a positive evaluation (n = 93).

Indicator	Frequency (%)
Attractive presentation	8 (8.6)
Adequate language	43 (46.2)
Varied language	21 (22.6)
Variety of examples (representative and articulated sample of situations-problems)	26 (28.0)
Everyday situations-context/connection with real life	27 (29.0)
Appropriate arguments/clear explanations	38 (40.9)
Enough arguments	17 (18.3)
Varied and adequate procedures/methods	23 (24.7)
Coherent/adequate definitions	19 (20.4)
Articulated meanings	17 (18.3)
Favours reasoning or that pupils construct, perfect, and use their own representations to organise, record, and share ideas	14 (15.1)
Appropriate relationships between objects (propositions with associated argument; related methods)	15 (16.1)
No error in rules or arguments	7 (7.5)

Source: Own elaboration.

The future teachers gave a positive valuation to the language used and to the arguments used being appropriate and the explanations clear. For example, E14 gave 2 points to the language component, saying:

The language used is varied: natural (oral and written), symbolic (numerical and algebraic), tabular (using tables), animation (a child thinking and asking a question, a gif with movement in the result of the problem), and with arrows establishing relationships of proportionality.

> … Also, the level of language is clear and simple suitable for the Primary Education level it is aimed at.

E22 gives the arguments component 2 points: «I did not think there were any notable errors regarding the arguments and the procedures used in the video. The arithmetic operations are always accompanied by an argument and justification. The arguments and procedures are clear.»

However, these components are where negative evaluations are most often given, referring both to errors in expression and language and to unclear or confusing arguments (Table 9). E38 said: «Sometimes it uses language that is a bit technical for a primary-school child. I think the arguments are good, but they could be a bit clearer in some of the 4 methods it explains for direct proportionality.»

TABLE 9. Arguments for giving a negative evaluation (n = 93).

Indicator	Frequency (%)
Situations-problems not adequate for primary level	3 (3.2)
Errors in expression/language	11 (11.8)
Language not suitable for primary level	11 (11.8)
Poor representations (little connection, lack of graphic or visual language)	3 (3.2)
Difficulty distinguishing methods	4 (4.3)
Excessive arguments	3 (3.2)
Unclear, confusing or fast arguments	19 (20.4)
Propositions with no connected argument	1 (1.1)
Incorrect or insufficient definitions	2 (2.2)
Definitions not adequate for primary level	4 (4.3)
Procedures not adequate for primary level	3 (3.2)
Procedures unclear or fast	4 (4.3)
Errors in procedures (simplification in rule of 3)	5 (5.4)
Arguments not adequate for primary level	4 (4.3)
Unconnected meanings	12 (12.9)
Lacks situations of meaning construction or own representations	3 (3.2)
The author includes ideas out of context or that might cause confusion (for example, inverse/compound proportionality)	3 (3.2)
Situations contextualised poorly or only in a mathematical context	4 (4.3)

Source: Own elaboration.

The analysis as a whole should lead future teachers to decide whether the video seems suitable to them, explaining their decision. In this case, we have classified the students' responses into «yes», «yes, but …» when they make some kind of objection, and «no». Table 10 includes the frequencies and percentages of each of these options.

TABLE 10. Adequacy of the video in the final reflection (n = 93).

In your opinion, is this video adequate?	Frequency (%)
Yes	48 (51.61)
Yes but…	38 (40.86)
No	7 (7.53)

Source: Own elaboration.

Of the future teachers, 51.61% consider the video to be adequate, and they valued most highly the presence of various ways of solving the problems and the degree of adequacy of the argumentation. Table 11 summarise the different explanations the students used to evaluate how adequate the video is.

TABLE 11. Arguments when they believe the video is totally adequate (n = 48).

Indicator	Frequency (%)
Various ways of solving problems	46 (95.8)
Variety of examples	22 (45.8)
Adequate and detailed explanation	42 (87.5)
Simplifies definitions/presents the most relevant and representative information	13 (27.1)
Adequate representation/language	26 (54.2)
Useful/motivational	7 (14.6)
Includes tricks/advice	12 (25.0)
Relatable context	10 (10.8)
Inspires reflection on most adequate method	6 (12.5)

There are no errors	7 (14.6)
Adequate length	2 (4.2)
Attractive presentation, informal tone	5 (10.4)

Source: Own elaboration.

Of the future teachers, 40.86% did not believe that the video was wholly adequate (Table 10). They identify as drawbacks the length, the language, and some of the methods used being inadequate for primary-level, or it potentially being boring for the pupils.

TABLE 12. Arguments that indicate drawbacks («yes but ...») (n = 38).

Indicator	Frequency (%)
Language not adequate for primary level	11 (28.9)
Arithmetic procedures not explained	4 (10.5)
Excess length	6 (15.8)
Boring or causes pupils to switch off, lacks animations or visual resources	19 (50)
Causes confusion among the students	6 (15.8)
Lacks variety of contexts	3 (7.9)
Incorrect explanations	5 (13.2)
Too long and dense for primary school	11 (28.9)
Not all situations/concepts/methods are adequate for primary level	12 (31.6)
Does not take into account prior knowledge or problems with learning	4 (10.5)
Contains errors	7 (18.4)

Source: Own elaboration.

Finally, only 7.5% of the students did not believe the video was adequate. They state that the explanations are not very accurate or not at all accurate and the arguments are inadequate or confusing for primary level.

Analysing students' answers has enabled us to detect some conflicts relating to the identification of components and descriptors in the analysis of epistemic suitability, essentially relating to rules and articulation of meanings. For example, E32 identifies rules with ways of solving a problem and states: «I have given the rules a mark of 2 because they do display a wide variety of ways of solving the problem.»

Similarly, E56 noted that:

> For the rules, I have given a score of 2 (high) for suitability because I agree with how he does the operations in each case where he solves the problems and because I do not think he makes any errors when doing them.

Some students consider that the meanings are articulated when various methods are used or what is being done in the video is justified. For example, E41 said: «I think that the definition of concepts has a high level, because it uses various methods to solving the problems.»

E30 added: «Regarding the articulation of meanings, the suitability is high as it constantly explains what each thing being done means.»

6. Summary, implications, and limitations

The aim of this work was to design, implement, and evaluate a training activity for future primary school teachers focussed on developing the knowledge and competence to analyse the epistemic suitability of educational videos on proportionality. We started by stating why the topic is of interest, given the abundance and availability of videos that are offered as resources to help teach mathematics. However, given the inconsistent quality and variety of meanings in the educational videos (Beltrán-Pellicer, Giacomone, & Burgos, 2018), there is a need to train teachers in how to evaluate these resources and use them suitably.

The training activity focusses on providing future teachers with a theory-based tool for analysing epistemic suitability, that is to say, the mathematical content presented in a video about proportionality. Preliminary analysis by the researchers of the video revealed errors and inaccuracies in definitions, propositions, and procedures, as well as shortcomings or inaccuracies in the explanations used to justify the procedures and propositions. Also, the presentation and treatment of a variety of situations-problems and the articulation of meanings of proportionality have major shortcomings, and so we rated its level of epistemic suitability as medium on the low-medium-high ordinal scale. However, the majority of the future teachers, after the training process had been applied, ra-

ted the degree of suitability of the video as high in almost all components.

The evaluation instrument used, based on epistemic suitability components and indicators, considers the variety of situations-problems posed, the presence of different registers of representation, the clarity and correctness of the definitions, propositions, and procedures, and the justification for procedures and propositions using arguments that are relevant and adapted to the corresponding educational level. Failure to recognise the absence of some important indicators led a high percentage of students (51.6%) to regard the video as an adequate teaching resource without identifying its shortcomings.

We also observed a degree of inconsistency in the allocation of scores by the participants, finding some evaluations with the maximum score where students identify more drawbacks than in others with lower scores. While these variations keep the overall evaluation coherent, they do indicate that it is perhaps necessary to define the criteria more, in order to achieve greater uniformity between participants. Nonetheless, we have to take into account that this is a qualitative evaluation of suitability and that the final number, within certain margins, is only the summary result of a more complex process in which the different components of suitability are identified.

These results suggest there is a need to consider in greater depth the development of future teachers' specialised content knowledge, in this case regarding proportionality, increasing the training time allocated, analysing a larger variety of educational videos, and increasing group discussion of the results of the analysis phase.

This type of training action, focussing on the content of the discipline but with a clear orientation towards knowledge and didactic competences, aligns with works by other authors such as Davis (2015), where he notes the impact of his concept study, both when revealing the complexity of the underlying mathematical ideas and when developing the mathematical ideas necessary for teaching.

Furthermore, in addition to the epistemic element, the didactical suitability theoretical tool includes the cognitive, emotional, interactional, media, and ecological aspects, which are not considered in this piece of research. Although it is not relevant to apply some of these aspects to the case of using didactic resources, in particular the aspect of learning achieved, the other aspects could be the subject of analysis and reflection by the teachers who use these resources.

Notes

[1] The video from the *Clasemáticas* channel can be viewed at https://www.youtube.com/watch?v=o1Mu-lkgv-o

[2] The videos suggested can be viewed at:
https://www.youtube.com/watch?v=0Z5DejetHR8
https://www.youtube.com/watch?v=v8KN44iNPIs
https://www.youtube.com/watch?v=1uAbIb-McLo

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Online training in the world of education: experiences from the United States

Integrating online and residential master's programs in education

Integración de programas de máster online y presenciales en educación

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Abstract:

Online Principal Certification and Advanced Teacher Degree programs have taken up an incresingly larger share of graduate enrollments in U.S. colleges of education. This paper discusses how a major educational leadership department expanded its residence programs to incorporate online leadership degrees. Having started in 2008, the program now has current enrollments of over 80 students including students from outside the U.S. The paper discusses overcoming obstacles such as faculty resistance, meeting state licensing and accreditation requirements, staffing online courses, funding and marketing. Leadership for the program came from the department and college where online learning was increasingly seen as a priority.

Keywords: program reform, organizational change, degree programs.

Resumen:

Los programas *online* para la Titulación Avanzada de Profesor y la Certificación como Director representan un porcentaje cada vez mayor de las matriculaciones de posgrado en las facultades de educación de Estados Unidos. Este artículo analiza cómo uno de los principales departamentos de liderazgo

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educativo ha ampliado sus programas presenciales para incluir titulaciones *online* sobre liderazgo. Iniciado en 2008, el programa cuenta ahora con más de 80 estudiantes, incluidos alumnos de fuera de Estados Unidos. El artículo examina tanto los obstáculos superados como la reticencia del profesorado, el cumplimiento de los requisitos estatales de acreditación y concesión de licencias, la dotación de personal para los cursos *online*, la financiación y el *marketing*. Los administradores del programa procedían de la facultad y el departamento, donde el aprendizaje *online* se veía cada vez en mayor medida como una prioridad.

Descriptores: reforma de programas, cambio organizativo, programas académicos.

1. Introduction

School leadership programs at university level in the U.S. have undergone a massive shift. Principal certification programs that were previously residential, and often emphasized night or weekend courses, have increasingly moved online. The 2018 Babson Group Report (Seaman, Allen, & Seaman, 2018) documents the fact that while residential enrollments in education programs continue to dwindle, online enrollments are increasing. Over the last two decades, programs that emphasize teacher leadership have also arisen (Wenner & Campbell, 2017), and leadership programs increasingly emphasize the idea of *distributed leadership*. In addition, many states have altered certification requirements for both principals and superintendents. Some of the larger districts in the U.S. have created their own leadership programs. This has resulted in a complex, patchwork of programs that aim to train future school leaders.

Despite this proliferation of programs and certification requirements, the U.S. appears to face a *leadership* shortage — but this shortage is largely driven by high attrition rates for principals. As (Fuller & Schrott, 2015) noted, principal turnover, particularly in STEM (science, technology, engineering and mathematics) fields is high. This indicates the need for new and innovative ways to train principals. While «online education is one of the largest and fastest growing segments of higher education,» and thus, program enrollments have rapidly expanded, it is not clear that these programs have taken advantage of the most important findings in online education, nor is it clear how best to integrate online programs with residential programs (Clinefelter & Aslanian, 2016, p. 4).

Blended programs — programs that offer a mixture of online and residential instruction — may have great appeal to some practitioners, but it is not yet clear what is the ideal combination of or balance between online and traditional learning components. Similarly, as schools recognize the need for many different types of leaders (principals, superintendents, teacher leaders, instructional coaches, etc.), would various district and building level leaders benefit from similar training? Should they receive distinctly different training that provides specialized skills? Any university contemplating offering online degrees in educational leadership needs to confront these daunting questions.

This paper discusses the current enrollment trends and pressures facing U.S. colleges of education, and then describes how the Penn State University launched its online teacher and principal degree programs. Penn State is a land-grant university, and trains large numbers of both teachers and principals within the state. The educational leadership program is ranked in the top ten in the nation by the *U.S. News and World Report*[1]. Penn State also has a long history in experimenting and expanding distance and online education, with many of its World Campus programs receiving various national awards. The Penn State model of online instruction focuses on high quality program-level development. Rather than offering a plethora of short courses taught by non-tenured, adjunct faculty, Penn State's World Campus emphasizes the creation of complete online certification or degree programs, developed and staffed by a mixture of tenured and non-tenured faculty. These programs satisfy the same requirements as the residential courses. Course and instructional development is supported by a variety of curriculum and instructional designers. However, development and continual improvement of these programs is not without its challenges. The paper highlights the difficulties inherent in moving programs that were traditionally residential to online formats, and how these issues were addressed.

2. Growth of online learning and decline of residential education

Universities once relied upon education, specifically teacher training programs, as «cash cows» that could reliably produce a steady stream of revenue. Over the last 40 years, undergraduate enrollments in the education majors that once dominated undergraduate Bachelor's degrees, have now shrunk to a small percent (see Graph 1). In 1970, education majors comprised almost a fifth of total Bachelor's degree enrollments in the United States, but by 2010 this had reduced to just over 6%. Dramatic growth in other majors such as business, health professions or communications can explain some of this shift, but relative to other degrees (such as English or Biology), Education has lost *market share* of enrollment.

Graph 1. Education degrees as percent of total U.S. bachelor's degrees: 1970-2010.

Year	Percent
1970	22%
1975	17%
1980	12%
1985	9%
1990	11%
1995	9%
2000	9%
2005	8%
2010	6%
2014	6%

Source: NCES (National Center for Education Statistics), 2014, 2017.

While teacher education continued to dominate undergraduate offerings at most colleges up through the early 2000s, colleges increasingly sought to expand their graduate programs and professional development offerings. This included many switching to an MA as opposed to an MS degree. This market, however, has recently undergone a sharp decline. Clinefelter and Aslanian (2016) report that, in 2014-2016, graduate enrollment in education programs dropped from 22% of total enrollments to 14%, although educational administration continued to be among the top five graduate majors. This data suggests that continued issues with dropping enrollments may put pressure on colleges in the foreseeable future. Specifically, while residential programs may feel pressure from ceasing to thrive, online programs may also feel pressure to grow and compensate for shifts in learning methods.

Not only has enrollment at the undergraduate level decline; enrollments have shifted to online programs. In the United States of America, it is now possible to obtain a wide range of degrees and certifications purely online. Becker, Gereluck, Dressler, & Eaton (2015) report that 24 U.S. universities offered full online bachelor level degrees in education in 2015. Given the state-by-state nature of teacher certification, these pro-

grams have tended to enroll within state students. The rankings of these universities indicate that the schools with the lowest ranking and status have been the most affected by these market pressures. However, now that some large public universities like Central Michigan have opened pure online education programs, it is likely that more and more colleges will offer online courses, if not whole online programs, in teacher education. The real growth in enrollments, however, has been at the master's level.

Sloan Foundation reports (e.g. Allen & Seaman, 2016) have estimated growth rates of over 10% per year for online programs enrollments nationally. US News and World Report lists 311 universities with «online graduate education programs.» These universities tend to be concentrated in major population centers, and this presents a problem for large rural states. The vast majority of teacher preparation programs are still *traditional* — i.e. provided by colleges or universities — but a growing number are no longer based in colleges or universities. These would include programs operated independently by large school districts, or programs that are partnerships between large districts and universities (see Boggess, 2008). In both traditional and alternative programs, online classes and programs may increasingly be part of the curriculum.

One obstacle facing online programs are faculty concerns within higher education about the overall quality of online instruction. While some previous studies indicated that online courses were inferior to residential courses, Stack (2015) argues that these studies do not account for the great variation within both residential and program quality. Studies have attempted to isolate the qualities that determine effective online instruction, but it remains an open question as to what conditions or practices make online education more or less effective than residential education (Dede 2006; Dede, Ketelhut, Whitehouse, Breit, & McCloskey, 2008). Some aspects of educator preparation, such as field placement, may be challenging to orchestrate online. Kennedy & Archambault (2012) found that little over 1% of teacher education programs used online methods for the field experience. Additionally, research, specific to leadership preparation and online/blended learning, is sparse, and without the benefit of a more robust research base, we will likely continue to see «educators and policymakers implement online learning environments without much guidance from the scholarly literature» (McLeod & Richardson, 2014, p. 285). Thus, online education practices, for both teacher and leadership preparation, need to better align with the goals of advanced training in teaching and leadership.

However, faculty attitudes have also changed, opening up the range of possibilities for online education. The Babson Survey Research Group has been tracking overall trends in online higher education since 2002. From 2003 to 2015 the percent of faculty surveyed who thought online education was somehow inferior

to residential education has dropped from nearly 50% to under 30% (Allen & Seaman, 2016). This attitudinal change may mean that faculty are more likely to experiment with online degree programs. Penn State has responed to these ongoing quality issues by creating a faculty development program for online instructors (Boggess, 2020).

Online education has profoundly affected US teacher education and teacher professional development by offering low-cost, alternative routes to certification during a period when public university tuitions experienced high levels of increase and the profession was subject to poor portrayals in the media and a systematic political movement to deregulate teaching credentials or certification. Faced with the prospect of large student debt, a low-status profession with relatively flat professional trajectories, and high initial drop-out rates, low-cost online programs (regardless of their quality) offer many students a way to enter teaching. Investment in expensive university teacher education programs has become less appealing, and the long-term decline in education as an undergraduate major will likely accelerate under current conditions.

Online programs appear to be changing the nature of leadership education even more rapidly than most academics have understood, and yet, a scholarly research base has yet to develop for development of these online and blended learning programs (McLeod & Richardson, 2014). Dede (1995) argued with considerable foresight that technology would rapidly change implementation of instruction in higher education. His work also documents the kinds of effective professional development for teachers that online programs can present. In the last twenty years, traditional distance education (correspondence courses, radio and television programming) have dwindled, while online programs in the U.S., Australia, and other countries have grown exponentially.

3. Transitioning to an online environment

Established in 1998, Penn State's World Campus (Penn State Online) was a pioneer in the world of online education among major universities. The online teacher leadership degree[2] originated at the same time that the Educational Administration program was attempting to merge faculty from Curriculum and Supervision to form a new Educational Leadership Program. After an initial successful few years of strong enrollments from largely local districts in the early 2000s, the program faced severe financial difficulties. In 2008, the existing program was suspended and reorganized. It was then re-launched in 2012 as a Masters in Educational Leadership program with emphasis either in Teacher Leadership or School Leadership.

The early failure of the program was linked to conflicts inherent in the curricular and staffing needs of residential versus online programs. Traditional ou-

treach models of professional development typically use a cohort model based on alternative, face-to-face meetings, which does not mesh well with the online environment. The original teacher leadership program was conceived as a cohort program drawing on a local population of teachers. Thus, the program was locked into a local base and suffered declining enrollments as local teachers passed through the program. Additionally, as a cohort model, new entrants were restricted to a single opportunity for admission and thus time of entry into the program. This severely limited interest in the program. Instructional costs soon outpaced revenue, and the program had to be suspended until it could be reconstituted as a non-cohort, open-enrollment program that could draw on state-wide, national and international populations alike.

Dropping the cohort model and moving outside the local school base allowed a broader range of educators to enroll in the program. Rolling admissions (three times a year) meant that educators could enter the leadership preparation program in a time line that best aligned with their professional goals. To accommodate faculty concerns about scaffolding the curricular content, a three-level course model was employed, so that students could enroll in different Tier 1 courses instead of adhering to a specific course sequence. This allowed more flexibility in staffing, as each course did not need to be offered each semester, but still allowed students to progress from basic core instructional material, to electives, to a final culminating capstone project.

The World Campus was also working to standardize its expectations for courses and programs at this time. The following list specifies some of the common features of courses and program scheduling that faculty needed to accommodate. The basic rules required faculty to adjust their expectations for admission (students can begin in any semester), work schedule (weekly, not daily assignments), and interaction (synchronous activities were all optional). As students could enter in any semester, scheduling of the program courses became more complicated than residential scheduling (where students typically began at the start of fall semester). The online model required more intentionality from program coordinators to record and project enrollments.

Common features of online educational programs:

- Each course in the degree program is offered at least twice a year.
- Gateway courses — those that are prerequisites to other courses — are offered three times a year.
- Students have multiple entry points to start the degree program. They can begin in any semester. If they have to stop taking classes for a semester, they don't have to wait a year before re-starting the program.

– Enrollment caps on the courses are set at 20 students for each course offering. A second section may be opened when course enrollment exceeds 20.

– The faculty members in all the online education programs abide by the University schedule for late drop and late add periods. The faculty must accommodate all students who register through the first week of the class, provided there is space available.

– All online education programs must have group activities, discussions and projects built into the weekly schedule, however, there are no daily assignments or requirements for participation: courses have weekly due dates, not daily due dates.

– Any synchronous activities such as live chat or live video/audio conferencing are strictly optional — and are options that are chosen through the consensus of individual work group members. (Scheduling live chats or audio calls becomes a problem for students (international students) who reside in a different time zone.

Another obstacle in moving forward with the online program arose from the unique structure of Penn State. As a *single university, geographically distributed*, Penn State has 24 distinct (satellite) campuses within the state. Several of these campuses had large teacher and principal preparation programs. Again, this structure functioned well under an older model of outreach education when physical presence in a geographic region was critical to providing student access. As the university shifted emphasis to online offerings, rather than outreach, programs at some satellite campuses were closed. Subsequently, much of the initial planning for program approval of the teacher leadership and school leadership programs were affected by ongoing negotiations about faculty and program roles in the larger context of shifting university priorities. There was significant conflict over coordinating the staffing and resource distribution of programs. Specifically, different campus leaders had conflicting views on the roles the faculty would play in the new online program (e.g. which courses they would staff and develop) as well as how revenue would flow to the different campuses.

Negotiating these changes took extensive time, and multiple trips to hold face-to-face consultations with faculty at different campuses. This situtation, while arising from Penn State's unusual campus structure, highlights how online development may be affected by other resources issues within the university. Given the ongoing decline in traditional teacher educator programs at the undergraduate level, it is likely that the development of online programs at other universities may well be affected by broader resource conflicts within the university. Administrators promoting online program development must then prepare to deal with broader conflicts

over resources that are not directly related to the costs of transitioning to an online program.

Since World Campus has a different tuition and revenue structure to the residential program, confusion and conflict arose over income from these new online programs. As the budget structure was unclear, it was difficult for administrators to estimate what their budget would be, and ultimately, faculty felt that more money should be returned to the program. Unlike residential education, where funding for programs and faculty salary are de-coupled from enrollments, the World Campus model reimbursed programs on a per-capita basis. The more students on a course, the more income generated. Conversely, when enrollments fall past a certain point, it is difficult to pay for full-time faculty, with required and regulated course loads, to teach courses. The solution that evolved over time required a new funding model that was more market-based and could reflect shifting enrollments. Over time, a model evolved wherein the World Campus and the College of Education split the tuition dollars. Following that split, the College allocated a certain percentage of the dollars back to the department and program. This allowed greater transparency, and also made clear the enrollment-driven nature of online programs.

Another key resource issue in the transition to online education was course scheduling. Here, we encountered multiple problems. Online programs function best when students can apply on a rolling adminissions basis. Thus, courses need to be offered more often, and this strained faculty ability to staff both online and residential courses. Initially, to accommodate student's schedules, many courses were offered on a shorter, 13-week schedule. However, to comply with U.S. federal laws governing student aid eligibility, all courses in the program had to be revised to a 15-week format in order for students to qualify for student aid. Since this revelation came just as some faculty were concluding final revisions of courses, it delayed the finalization of courses. It also created a morale problem, in that faculty felt that they were being asked to engage in seemingly endless course revisions. Issues of curricular offering and content development continue to be a major resource consideration for online programs.

4. Curricular content

Certification, for both principals and superintendents in the U.S, is distinct from certification for teachers in most states, and the course requirements differ significantly. The inclusion of an online teacher leadership component in a program focused on school leadership preparation raised both curricular issues based on philosophies of school leadership as well as venue (e.g. residential vs. online). The restructuring of the program appeared to be a window of opportunity to move faculty into new areas of instruction and implement new theories of leadership about how schools might operate (Spillane, Parise, & Sherer, 2011).

These changes met considerable opposition on both sides. Those trained in traditional educational administration practices were not receptive to increased leadership roles for teachers, except in the area of instructional supervision. Faculty on the teacher education side did not see enough emphasis on the curriculum, and expressed concern that increased leadership duties could overburden teachers. Some faculty expressed a concern that teachers and principals should not be taking courses in the same class, reflecting the divisions of traditional K-12 staffing where the majority of teachers are unionized and administrators are considered to be management. We found that some faculty members were concerned about overcoming issues of *us vs. them* — as traditional school roles tend to cast administrators as «supervisors» and teachers as «workers.» Growing acceptance of shared leadership models has helped to alleviate some of these differences of opinion to some degree.

Other faculty felt that the interaction between future building leaders and future teacher leaders was beneficial, providing each group with an opportunity to learn the perspectives of the other. A few faculty felt this was inappropriate, as the they viewed the role of administrators as antithetical to the ethos of self-empowered teacher professionals. This difference seemed to reflect a tension between the Professional Development School model of teacher professional development, and the incorporation of a teacher leadership degree within a program that had historically educated principals and superintendents. These differences of opinion, specific to the goals of the program, underscored differences in what competencies faculty thought teachers would need. For example, the ideals of inquiry (Lieberman & Friedrich, 2010) as the core of teacher leadership were reflected in the program by a heavy emphasis on curriculum inquiry projects. Over the course of the program, students engaged in inquiry projects in multiple courses. This meant that there was less time in the curriculum for issues of leadership development.

In working to create and maintain this program, faculty dealt with issues such as how theories related to the distribution of leadership align with, or are not in accordance with, the needs of teacher leaders. Additionally, as teacher leadership prioritizes inquiry and promotes student engagement as a critical component of successful engagement, this served as a new emphasis that required re-thinking the curriculum, and ascertaining what core knowledge students should receive. The lack of clear institutionalized roles for teacher leaders in U.S. public schools hindered the development of clear curricular goals. There appeared to be an unstated difference between the goal of training teachers to take on a leadership role in their school and the goal of helping teachers attain the status of a leader among peers. Some faculty seemed to see leadership as a distinctive social position, while others emphasized leadership that seemed to flow from mastery acquired by powerful inquiries.

Another obstacle for faculty was the lack of flexibility in online curriculum. The asynchronous model of distance education requires a high degree of activity planning, and far less room for last-minute reassignment of topics and readings than the traditional graduate seminar. Initially, it was difficult to find experts or models that could help faculty prepare for this environment. Over time, the World Campus developed significant faculty resources (Boggess, 2020) that aided faculty in thinking about course design. Also, recently hired junior faculty were far more comfortable working in online environments, having experienced some of these courses in their own education.

Taken together, the university has benefitted from serving as a pioneer in the world of online instruction, via partnership and collaboration with Penn State World Campus, confronting many organizational, structural, instructional, fiscal, and philosophical obstacles along the way. On the program and department level, this benefit was offset by considerable costs in time as faculty were forced to wrestle with issues of staffing, budget and course offerings all at the same time. Also, given the rapid evolution of the field of online instruction, within a few years, the program looked remarkably different to that which was originally conceptualized. Current faculty now must deal with the demands of maintaining a high quality online program (in a marketplace saturated with online programs) while struggling to maintain residential program enrollments. Ongoing revisions of state certification for both principals and teacher leaders create more challenges, and the program faculty must consider new modes of service that can address the needs of school leaders adequately.

5. Venue and work roles

Faculty varied greatly in their reaction to moving to an online environment. For some faculty, working at a distance from students, and utilizing various online technologies (e.g. online course management systems, web-conferencing, etc.), posed little problem. Others felt that online interactions were inherently inferior to those found in residential education. Some were of the opinion that sustained intellectual interaction is possible only in face-to-face instructional spaces. Those critical of online education cited lack of contact between instructor and student as well as limited student-student interaction. Time, experience, and research-based (specific to instructional design) continual improvement would demonstrate this to be more a problem of course design rather than online learning methodology. At the time, those objections to online learning appeared to be common (while not unanimous) amongst veteran faculty. Many appeared uneasy with moving to a completely online instructional environment.

Two factors appeared salient in this regard. Faculty who had had more exposure to professional development educa-

tion and distance education appeared to grasp the principal that the online content could be integrated into the busy lives of working professionals more readily than residential education, which imposed the significant time constraints of travel. Also, faculty that were aware of rapid developments in video-conferencing and video exchange also understood that new technologies had eased the difficulty of communicating at a distance. Part of the job of the departmental leadership was to demonstrate these technologies in meetings as support for using these new tools for instruction and to provide budgetary support for updating existing classroom technology.

Blending the use of technology with residential courses appeared to have positive effects. Even residential students, especially those unable to travel to each class, requested virtual participation in classrooms. More and more faculty meetings also began to allow for the virtual participation of peers who were traveling, at conferences, or at research sites. The move from telephone conference calls to full screen video participation of peers or students in residential meetings was swift and impactful. These changes taken together began to demonstrate a model for how online education could approximate the interaction of a residential classroom. The integration of online meetings into the department workspace helped to normalize the use of online environments for instruction.

6. Preparation and facilitation

Online education also required a different preparation and engagment from instructors. For asynchronous courses to be successful, the readings, assignments, grading rubrics and goals of the course must be clearly defined ahead of time. Under the Penn State model, given that students are not required to be logged on at any specific or common time, changes in instructional content after the course has opened to the class are discouraged. This was a sharp departure from the traditional graduate seminar model where the instructor provided a list of readings and could make substantial shifts in content or direction each class period. Faculty needed to re-think their role and shift more emphasis to planning and articulating the interrelations of readings, class goals, and outcomes. Planning and scaffolding sequences of learning within the course became a key concern.

The online environment also makes for challenges specific to field supervision in educator preparation programs. Typically, U.S. universities partner with local school districts to provide a supervised teaching experience for undergraduates pursuing teacher certification, or a supervised administrative experience for graduates pursuing principal certification. For online programs, this means that students working far from the campus must seek out, and faculty must approve, mentors that can supervise and support development of practice for candidates in the field. In addition, these mentors must be com-

fortable working online, as mentors must be willing to provide reports about student progress and coordinate with the supervising faculty online. Working with mentors at a distance required faculty to gain skills in technologies like web conferencing and email communication, in order to create the necessary liaison with field supervision.

7. Lack of flexibility

As noted above, traditional graduate seminars in U.S. universities offer a high level of interaction and maximum flexibility for instructors. Faculty can alter the course content on short notice, and also introduce timely topics for discussion that may be covered in the news media. The primary focus of such seminars is the sustained intellectual interaction between students and faculty. As such, for many faculty members, the flow of these graduate seminars traditionally represents the most productive type of class. Flexibility in class flow is highly prized by many faculty.

In sharp contrast, online courses seemingly constrict the amount of material that faculty can introduce, and the order in which it can be introduced. Although the course management system, used by the World Campus, allows the addition of new materials (both readings and assignments), faculty need to plan these additions well in advance of delivery, and often before the course commences, so that students have access to course materials and have both the time and course spaces for sharing their thoughts online. In courses where students are all in the same time zone, faculty can re-create some of this flexibility by scheduling synchronous discussions, but when a wide number of time zones is a reality for students (nationally and internationally alike) in the course, special measures and strategies must be determined and applied.

8. Student views of online education

In response to some faculty concerns that the program would not be able to adequately assess student experiences and needs, student surveys were developed and administered. Students did indeed voice concerns about some aspects of the program. Two key points identified included:

- Better integration of the courses and inquiry project.
- Leadership outside the classroom.

Since students take courses within the program, as well as electives outside the program, not all instructors are aware of the final project that teacher leaders are required to undertake. The program has tried to achieve greater integration by aligning the goals and objectives of the core courses. These aspects suggested that the final project for teacher leadership and for principal leadership needed to be distinct. The teacher leadership project would need to incorporate a great deal of inquiry, and the principal project needed enhanced

field supervision to meet state requirements.

Leadership outside the classroom arises in many forms. The need to provide better recruitment and mentoring for teachers from under-represented groups is a major issue in the U.S. Outreach to communities, particularly communities of color that have been traditionally underserved by schools is another major aspect of leadership that has not been addressed in many traditional school leadership programs. The faculty continue to revise the courses and seek out material and activities that can develop teacher and principal knowledge of these issues, and create a broader awareness of the importance of a social justice perspective among leaders.

9. Responses and implementation

Curricular content was the most critical issue facing the integration of the teacher leadership program. In order to move courses online, faculty needed to work closely with an instructional designer who could integrate the instructional content (assignments, readings, assessments, etc.) into a coherent course that fit with World Campus templates for course spaces. While the World Campus provided instructional designers to work with new programs, the faculty found the amount of time allotted to be insufficient. The department was initially unable to hire its own instructional designer due to issues between the college and the World Campus. The resolution of this staffing issue provided a major step forward in the online translation.

To meet the needs of the different emphases in teacher versus school leadership, the program created final projects that would meet the graduate school's requirements for the master's degree, but, at the same time, allow students to engage in projects that were relevant to their focus. The teacher leadership students undertake and present an inquiry project related to their instructional practice, while school leadership students (aspiring principals) work with an onsite mentor to document their supervised internship experiences online, under the supervision of a faculty member.

For the principalship, this meant creating a new supervisory course and setting up an online structure so that administrative mentors could log in regularly to provide assessments of student progress. A good deal of this work can now be accomplished through software designed to create online work portfolios. This required communicating with mentors and supporting students at a distance, while engaging them via online methods. For the teacher leader emphasis, this meant creating a core curriculum including specific courses that provide students with knowledge and skills for conducting inquiries and understanding the ways in which teachers can support and provide leadership in schools, and one that culminates with

a capstone course for completing a final project, informed by literature, with practical application to their career goals and leadership aspirations.

The program continues to monitor student views about the program. Most students seem satisfied with their education and the quality of interactions. Efforts are now being focused to create more specific specialties or certificates within the program. These include developing a a specific certificate in teacher leadership and STEM leadership. The program faculty continue to work with local districts in order to assess how practitioners perceive the need for leadership education.

10. Discussion

Administrative leadership can play a crucial role in managing the transition from residential to online programs within an academic department. As in any organization, opportunities for change and innovation may not occur under optimal circumstances. The shift to online learning in U.S. university educational programs has occurred during a period of declining enrollments, increased privatization of teacher and administrator certification, and a lack of a strong regulatory oversight or accreditation of online programs. Like our department, units may find themselves trying to achieve multiple goals with a move to online learning (e.g. increasing enrollment through easier access, offering new programs or certification, and adjusting to increased competition from other universities).

Sadykova and Dautermann (2009) provide a model, based on international online distance education, that focuses on separate discourses: host institution, technology, student learning models and faculty teaching models. In this case, all but the student learning model provided significant challenges for the implementation of the program. As Sadykova and Dautermann (2009) note, these are distinct areas of discourse; they are inter-related, but within each area, leadership must respond to the distinct problems and rules. Sadykova and Dautermann provide an example (2009, p. 92) of how institutional discourse creates unforeseen problems:

> Policies that are applied to all students on a campus regardless of full time or part time status can also present difficulties to distant online students. The State of New York, for instance, has a requirement that any student in its universities and colleges must show proof of immunization against certain diseases particularly prevalent in college age populations. Other systems have mandatory health insurance fees for students who register. Program directors in New York were able to get the immunization requirement waived only for students who never set foot on the campus under any circumstances. The institutional discourse of a residential campus that underlies many of these examples may depend on long held assumptions about campus life and may require careful negotiation of traditional institutional practices.

As noted above, Penn State itself had to work out processes for funding, supporting and expanding programs. The models introduced by the World Campus did not always fit with those in place for residential instruction and required department leadership to engage in considerable negotiations within and across the colleges. Essentially, this means re-negotiating or re-configuring some of the university's core processes — e.g. how classes are staffed, and how faculty get paid.

The second major area of discourse was the technology itself. World Campus provide a basic course management system, but initially many faculties were not familiar with this. Over time, the university has improved the Course Management System (CMS) and adopted a single CMS for residential an online education. New technologies (like Zoom meeting rooms) now offer faculty better ways to supplement communication within the online environment. Department leaders can support the integration of these technoogies in classes by also integrating them into the academic department's work flow.

Finally, the discourse around faculty learning models proved to be the most difficult set of issues to solve. Faculty needed to have working mental models for how they could provide online education. This means that faculty must be able to see how the online environment can afford them similar levels of contact and intellectual rigor as residential education. *Similar* is the key term here, as online education requires substantially different faculty work (e.g. front-loading course development, and limiting spontaneous changes during class time). It can also be disorienting and even feel isolating for faculty used to residential interactions to implement instruction online for the first time, and beyond. Another way to provide this support is to increase access to competent instructional designers. As collaboration is critical to the development process of a comprehensive and high quality online course, and therefore ultimately to overall opinions of online instruction, the interaction between instructor and instructional designer proved critical in improving faculty estimation of the viability of online programs.

One way in which department leadership can support development of viable online programs is by connecting faculty with colleagues from other programs who've already achieved success developing their existing programs. Additionally, program leaders must be able to connect issues across these domains of discourse. For example, education programs are typically subject to accreditation reviews by an outside organization. The lack of guidelines and rubrics for online accreditation and standard alignment may mean that presentation of the online program to the accrediting agency is lost in tanslation from one venue to another. There is a clear lack of studies examining how states should regulate online preparation for educators, although Kennedy

and Archambault (2012) offer some limited policy recommendations.

11. Conclusion and recommendations

Online education and professional development are expanding in many nations. In Europe, the e-Twinning (www.etwinning.net/en/pub/index.htm) program has dramatically reshaped teacher professional development. Online education for teachers offers the prospect of highly adapted curriculum delivered directly to teachers that can be exceptionally responsive to teacher professional development needs. Yet, with such rapid development and expansion, it is also possible that online learning may not address critical needs for professional education (McLeod & Richardson, 2014). Additionally, it leaves open the question of how nations are to effectively monitor the quality of the certification offered and maintain high standards for the national teaching force (for models of national teaching force development and improvement see Akiba & LeTendre, 2009; LeTendre & Wiseman, 2015).

Organizational change often happens at times that are less than optimal. Leadership plays a critical role in making change successful, by working to utilize available resources, and by supporting faculty in responding to difficult situations. Facing a long-term decline in residential enrollments, our faculty were under significant pressures to move to an online venue, therefore this transition was hindered by: resistance to online education, the integration of teacher leadership within a program that had previously focused solely on administrators, lack of department level support for online curriculum development, and a host of issues that arose from dealing with the institutional logics of the university.

In the day-to-day operation of a large academic unit, it can be easy to forget to step back and consider the issues at hand, and to reflect on theories and studies that might provide insight. In the case of the leadership program at Penn State, it was clear that problems with discourses around technology, instructional practice and institutional rules and procedures frequently intermingled and caused delays and difficulties in implementing the program. Much of the work of a leader in this system is to keep the discussions distinct, and to help faculty and staff focus on discrete tasks with concrete goals. In short, some basic rules can be applied:

- Make the transition to the largest feasible audience. Online programs for local or regional audiences only are likely to have too small a population base to be sustainable.
- Assess the ability to integrate hybrid offerings for local groups with online courses for geographically dispersed populations.
- Set out clear expectations for faculty involvement in course development.

– Hire instructional designers that can work inside the program and department level.

– Discuss issues of institutional rules, funding and other issues with faculty early, and where possible, engage faculty as decision makers.

Online programs in higher education are swiftly gaining traction, especially from within leadership preparation programs comprised of students working full time as teachers in schools while simultaneously trying to balance their graduate work. As noted by McLeod and Richardson (2014), literature that informs preparation of aspiring leaders for practice is sparse. We recommend that future research be conducted and prioritized by education scholars in ways that serve to build and grow this necessary research base. Such studies may begin, as we have done here, to document what existing programs are doing to develop and grow their online/blended learning programs for preparing leaders. In this way, documenting the progression of such programs and preparation may serve to inform development of future programs and the preparation of future leaders.

Notes

[1] https://www.usnews.com/best-graduate-schools/search?program=top-education-schools&name=&specialty=education-administration

[2] https://www.worldcampus.psu.edu/degrees-and-certificates/educational-leadership-masters/overview

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Innovations in online faculty development: an organizational model for long-term support of online faculty

Innovación en la capacitación docente online*: un modelo organizacional para brindar apoyo a largo plazo a la docencia* online

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Abstract:

In 2008, Penn State University's online delivery organization, Penn State World Campus, established a dedicated faculty development unit to improve online instruction. The Online Faculty Development (OFD) unit was designed to prepare faculty for online teaching through a large and varied curriculum of asynchronous online training courses built on the theory and research of best practices for online instruction. This paper describes the Penn State World Campus OFD unit, its mission and program, and the assumptions underlying its day-to-day operations.

Keywords: online faculty development, online teaching, professional development, online teaching competencies, asynchronous training, online teaching certificate.

Resumen:

En 2008, la organización de enseñanza *online* de la Pennsylvania State University, el Penn State World Campus, creó una uni-

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dad dedicada a la capacitación docente para mejorar la formación *online*. La unidad de capacitación docente *online* (en adelante OFD, del inglés *Online Faculty Development*) fue diseñada con el objetivo de preparar al profesorado para la enseñanza *online* a través de un programa amplio y variado de cursos asíncronos de formación *online* basados en la teoría e investigación de las mejores prácticas relacionadas con la instrucción *online*. En este documento se describe la unidad OFD del Penn State World Campus, su misión y programa, y las premisas sobre las que se basan sus operaciones diarias.

Descriptores: capacitación docente *online*, enseñanza *online*, desarrollo profesional, competencias de enseñanza *online*, formación asíncrona, certificado de enseñanza *online*.

1. Introduction

Online education has become a mainstream delivery system for academic degree programs and courses in higher education. Online teaching, however, can be a very different experience to face-to-face teaching because the learning environment — asynchronous, distant, and digital — is still new for many instructors transitioning from the face-to-face classroom. Online teaching requires specialized training designed to develop best practices, understandings, skills, and competencies needed for effective instruction and student success. This is the case for several reasons:

1) Few skills and competencies from face-to-face teaching transfer to online.

2) Many mid-career instructors new to online teaching lack a first-hand understanding of how online students learn.

3) Online course design and teaching require a familiarity of learning theory unfamiliar to many instructors, for example, how to align student learning outcomes, assessments, and assignments, design effective online discussion questions or facilitate effective online group projects.

For many instructors, face-to-face and online, online faculty development training is their first formal introduction to teaching. According to the Educause Learning Initiative, a thought leader in higher education in the United States, the number one issue in teaching and learning in 2017 and 2019 was faculty development (Educause, 2017, 2019). With online learning here to stay, universities should now be turning their attention to preparing faculty to teach online with high levels of competence and quality. This paper describes the theory and practice behind one university's recognition that online courses need to be taught by

specifically trained instructors in order to improve and maintain quality, assure enrollment growth and student success, and solidify institutional brands through quality instruction.

Online faculty development (OFD) is a recently-emerging subset of higher education faculty development with a growing body of research to support its importance in online education and its best practices (for example, Allen & Seaman, 2008; Bigatel, Ragan, Kennan, May, & Redmond, 2012; Gregory & Martindale, 2016; McQuiggan, 2012; Palloff & Pratt, 2011). OFD accepts core assumptions about effective teaching and successful learning online:

1) While «good teaching is good teaching,» there are specific skills, understandings, and competencies required for online, asynchronous instruction that are not reliably intuitive and self-teaching for a face-to-face instructor new to online teaching.

2) Few face-to-face teaching techniques translate to the online space while many online practices positively inform and enhance face-to-face teaching.

3) Research is becoming settled on best practices for effective online instruction and student engagement.

4) Institutional commitment to OFD, including a dedicated and expert staff, consistent funding, and a university-wide long-term plan, is essential for preparing instructors for the present and future of higher education online learning.

Further, as a professional development practice, OFD is driven by and responsive to innovation. In American universities, faculty development for face-to-face teaching is rarely required of newly-minted assistant professors and newly-hired adjunct instructors. Higher education classroom instruction has a long history of assuming that subject area experts are teaching experts as well, a false assumption that can lead to ineffective instruction. In contrast, the movement among universities to require some type of formal preparation for online teaching is a major innovation in U.S. higher education. Pre-teaching training for online instruction is motivated by several factors:

1) The recognition that the asynchronous digital learning space is sufficiently different from the face-to-face classroom as to require specialized training.

2) The allocation of resources made available to the «team approach» of moving face-to-face courses and programs online.

3) The promise of new revenue through online enrollments.

4) The possibility of higher college rankings via extensive training to teach online.

With the normalization of training and credentialing for online instructors, we see a trend affirming the relationship between educational professional

development, quality instruction, and student success.

2. Best practices for online instruction

Chickering and Gamson (1987) identified seven principles for successful undergraduate teaching. They are expressed as instructor behaviors, identifiable as competencies and understandings:

1. Encourage contact between students and faculty.
2. Develop reciprocity and cooperation among students.
3. Encourage active learning.
4. Give prompt feedback.
5. Emphasize time on task.
6. Communicate high expectations.
7. Respect diverse talents and ways of learning.

These are not aspirational; each of the seven behaviors can be enacted with planning, guided training, practice, and a purpose intending to positively impact student learning and success. Underlying these behaviors are several key factors:

1) The importance of building relationships through teaching and learning.
2) An instructor positionality of «student-centeredness».
3) The value of student input into course design and management.
4) The need for tight alignment among the core components of a course: student learning objectives, assignments, assessments, and course design.
5) The importance of student engagement with the instructor, peers, and the course content and curriculum.

In online higher education instruction, these behaviors are still relevant but must be conceptualized and operationalized for a different demographic and learning space: the adult online learner and the traditional college age student learning asynchronously, in multiple time zones, and through a digital interface. The Chickering and Gamson (1987) instructor behaviors translated to online must leverage the affordances of online learning and innovate around the constraints inherent in the asynchronous digital space. For example, «encourage contact between students and faculty» and «respect diverse talents and ways of learning,» can be more productive online because, unlike the face-to-face lecture or discussion, *every student voice is heard* in discussion forums. Issues of race, ethnicity, class and physical accessibility are somewhat neutralized online, allowing for increased equality of contribution and sharing of diverse points of view and life experiences.

Research building on Chickering and Gamson found that these face-to-face

TABLE 1. Online Teaching Competencies.

Pedagogical	Technical	Administrative
Attend to the unique challenges of distance learning where learners are separated by time and geographic proximity and interactions are primarily asynchronous in nature.	Complete basic computer operations.	Log-in to the course and actively participate.
Be familiar with the unique learning needs and situations of both traditional age and adult learners, providing an educational experience that is appropriate for both.	Successfully log into the LMS and access the course.	Communicate to students when assignments and exams will be graded and returned.
Have mastery of course content, structure, and organization.	Successfully navigate the course space.	Provide a comprehensive syllabus that adheres to institutional syllabus policy.
Respond to student inquiries.	Set-up and manage student grades.	Mediate course-related student conflicts.
Provide detailed feedback on assignments and exams.	Effectively use course communication systems.	Adhere to the institutional policies regarding student educational rights, privacy and accessibility.
Communicate with students about course progress and changes.	Manage the course roster.	Revise course content and instructional materials based on student feedback.
Promote and encourage a learning environment that is safe, inviting and mutually respectful.	Manage student submissions.	Know where and when to get technical assistance and support for you and your students.
Monitor and manage student progress.	Manage the course files and folders within the LMS (when appropriate).	Communicate expectations of student course behavior.

Communicate course goals and outcomes.		Be aware of, inform students about, and monitor compliance to institutional academic integrity policies.
Provide evidence to students of their presence on the course on a regular basis.		Report grades to students and record grades to the University's grading system as required.
Demonstrate sensitivity to disabilities and diversities including aspects of cultural, cognitive, emotional, and physical differences.		

Fuente: The Pennsylvania State University, 2019.

best practices could be translated to online teaching best practices, generating multiple discrete skills and understandings relevant to asynchronous learning. Bigatel et al. (2012) confirmed three categories of online instructor competencies encompassing online teaching: pedagogical competencies, technological competencies, and administrative competencies (see Table 1). Each of these best practices was identified as having a positive association with student engagement and a reliable measure of student learning and success.

Diehl (2016) further includes instructional design as a teaching-related competency and updates the research on online teaching competency and the standards movement for online instruction for Quality Matters, a rubric-based standard for online course design.

While these best practices maintain an association with effective face-to-face instruction, the factors of distance, asynchronicity, rapidly changing technology, and demographics of online learners suggest the need for specialized training for the online instructor. For that purpose, Penn State established a dedicated faculty development unit in the World Campus organizational structure responsible for supporting all Penn State faculty who teach online. This initial support resulted in the development of a curriculum of online training courses made available to faculty free of charge. Along the way, the descriptor «online» was added to «faculty development» to distinguish the specific learning experiences necessary to develop the skills, understandings, and competencies necessary for effective online instruction.

3. A dedicated unit for online faculty development at penn state

The Online Faculty Development (OFD) unit of Penn State World Campus was established in 2008 to offer online, asynchronous courses designed to help Penn State faculty develop understandings and competencies in online teaching. OFD is a unit within the World Campus Academic Affairs organization along with Learning Design, Program Planning and Management, Academic Advising, Student Affairs, and Outreach Information and Technology. Established in the early days of World Campus and approved by the governance of Penn State Outreach as a formal support for quality online instruction, the OFD unit is funded through a tuition revenue share between World Campus (the platform provider) and the academic program and its college (the content and instruction provider).

One of the unique design features of Penn State's online initiative is the division of responsibilities between World Campus and the university's colleges. World Campus provides the online platform and technical support for the colleges to offer their academic degree programs. World Campus has no authority over the academic content, hiring, performance assessment of faculty, or course assignments of a program's faculty. World Campus can advise an academic program seeking to establish online degrees and can help market those programs, but retains only a support role in academic quality. The relationship between Penn State World Campus and the colleges can be thought of as a decentralized design, with the colleges retaining their academic authority. All World Campus courses are authored and taught by Penn State faculty. This design means that all degrees earned online through World Campus say «Penn State», and not «Penn State World Campus»[7].

Given this organizational context, World Campus Online Faculty Development has been given the support and freedom to be an innovative, researched-based leader for online teaching improvement across the university as well as contributing to the specialized field of higher education professional development. All of the unit's research-based online training courses, customized services, and one-on-one work with faculty is offered free of charge to programs and individual professors.

The Online Faculty Development (OFD) unit at Penn State World Campus offers all Penn State University faculty and graduate students a curriculum of over nearly 20 faculty training courses (designated as «OL courses»). Half of the curriculum consists of self-directed courses that take three to five hours to complete. The rest consists of four or five-week cohort-based, instructor-led courses designed to mimic an online academic course with graded assignments and due dates around topics related to best practices for online teaching. The courses take between three to five hours a week to complete and are taught by current Penn State faculty who have earned the World Campus OFD Foundations of Online Teaching Certificate.

The theory of action behind the OL course design is based on the idea that the best way for an instructor to learn to teach online is to gain knowledge and competencies through learning online. In an OL course, the faculty member, especially one new to online education, becomes a «student», gaining familiarity with the LMS, experiencing the social learning advantages of asynchronous discussions, understanding the online student perspective, and acquiring knowledge and expertise in teaching skills. In addition to content learning, OL course evaluations consistently report that faculty who start off a course resistant, fearful, or insecure about online teaching conclude the course with self-reports of increased confidence and competence, key factors in online teaching self-efficacy (Horvitz, Beach, Anderson, & Xia, 2015).

4. World campus ofd: organizational structure and scope

In the early 2000's, World Campus and university leadership understood that in establishing and growing an online initiative, it was necessary to make sure that faculty received formal and scaffolded preparation to teach in the new digital learning spaces in online education. The OFD unit was positioned inside the World Campus organizational structure rather than in a college or the Provost's office because it was designated as the primary support of faculty who taught courses offered through the World Campus. As part of the tuition revenue share between World Campus and the colleges, OFD was considered one of the services provided along with the student help desk support, learning design, undergraduate academic advising, IT support, and marketing. In recent years, services have expanded to include online student affairs.

All faculty who teach online at Penn State, either through World Campus degree programs or college-level web-based courses, receive training in online instruction. While some type of training is required of all faculty, the sources of training vary. Training can be provided at the academic program level, from within a college faculty development office, or through the World Campus Online Faculty Development unit. Increasingly in recent years, colleges and academic programs have mandated that their faculty who teach online be trained through OFD's OL courses.

Word Campus offers over 160 degree and certificate programs to 20,000 fully online students. In any given semester, approximately 1,200 Penn State instructors teach courses through World Campus. OFD's mission is to offer all instructors who teach trough World Campus initial preparation and ongoing instructional development. Despite this large scope, OFD is designed to be lean. The unit consists of four people with specific responsibilities: a director with a faculty appointment who oversees curriculum and OL course instructors, an assistant director with a doctorate and learning design experience, a program associate who advises faculty on professional de-

velopment planning, and an administrative support person who manages course enrollments and reporting back to colleges. The team manages the development of three to four new courses a year, the revision of current courses on a three-year timeline, the hiring and performance assessment of OL instructors, and the registration and reporting of over 1,000 faculty enrollments in an academic year. In recent years, the OFD unit has expanded its mission to support 150 graduate students a year who seek to establish and improve their online teaching skills. Since the unit's establishment in 2008, there have been over 5,000 faculty enrollments and 1,200 graduate student enrollments.

5. Mission

Fundamental to the World Campus OFD organizational unit is curricular, instructional, and budget decision-making informed by mission. The unit has evolved from focusing on course-taking, certificate-earning, and growing course enrollments to a longer-term vision: *to support online faculty throughout their teaching careers*. This big picture perspective is central to how the unit manages enrollments, expands course offerings, trains the Penn State faculty who teach the OL courses, and balances all of this with attention to quality and sustainability. The mission suggests that each individual faculty member who completes an OL course is potentially a long-term partner in his or her online teaching career. The mission also suggests that beyond competence, it is now possible to work with individuals and groups of faculty for genuine online teaching mastery.

6. Curriculum development of OL courses

The core curriculum focuses on basic competencies. OL course topics include essentials of online teaching, introduction to the World Campus, accessibility issues for online learners, Learning Management System (LMS) basics — in our case Canvas — and operating the LMS hands-on, assessment of online learners, teaching various student populations such as the adult learner, military learner, and the international learner, using groups and team in online learning, and course-authoring for accessibility. Ideas for new OL courses are created through various processes such as periodic faculty needs assessments, monitoring industry trends, and serendipities of cross-unit and academic collaborations. For example, a gamification course was developed and taught by partners in another area of the university. A teaching the military learner course originated with the military specialists in World Campus, and the Teaching the International Learner Course arose out of conversation with colleagues in the College of Education's Comparative and International Education Program. A course on academic advising (for faculty who advise) arose from the need for professional development for advisers. An OL course on using the online library, helping online students crisis, and conducting research with online students all came about because the

unit was responsive to the needs of our core constituents.

Individual OL courses and the whole curriculum are created with several purposes in mind:

1) To provide exposure to and practice with best practices in online instruction.

2) To familiarize faculty with the online course environment by mimicking an academic course in the OL course design and by treating faculty as students in the OL course with assignments to complete through each week.

3) To help faculty gain knowledge in important topic areas essential to online teaching.

4) To fulfill training needs in the faculty development community across the university.

Course development is supervised by the OFD unit, even when other subject area experts author the course. The process from design, authoring, piloting, and official launching usually takes two to three semesters or less if collaborators and partners can provide additional capacity. Standard intellectual property rights and agreements apply to OL courses as if they were for-credit academic courses, but the OFD unit has final decision-making authority over the creation, revision, or discontinuation of an OL course.

In addition to developing and maintaining a curriculum of courses, OFD bundles courses into online teaching certificates. The Foundations of Online Teaching Certificate is the four-course centerpiece of the certificate curriculum and focuses on developing understandings and competencies essential for online higher education instruction. The Instructional Practice Certificate includes OL courses aimed at improving pedagogy and online instruction. The Professional Practice Certificate clusters OL courses and experiences designed to improve teaching through ongoing professional development. The Learning and the Learner Certificate includes OL courses designed to teach faculty about the unique learning needs of online student populations. The Course Authoring Certificate bundles OL courses designed to help faculty understand the design fundamentals of the digital learning space.

7. Model of faculty instructors

An essential component of the OFD curriculum is instructor-led OL courses. These are courses of 20-25 participants (Penn State faculty who teach online) in a four- or five-week cohort model, taught by a currently practicing Penn State online instructor. This model of *faculty teaching faculty* is based on three assumptions:

1) Faculty, especially those who reluctantly enrolled in an OL course (but are required to by their program or college), prefer to be taught by a colleague rather than a non-faculty educational

developer. This is especially true for faculty who don't wish to be «students in an online class» but are required to gain training by their academic department or college.

2) Faculty who become OL instructors have already earned our basic Foundations of Online Teaching Certificate. However, teaching other faculty is an important step in their own professional development and teaching satisfaction as well as their effectiveness in their own online academic courses.

3) Faculty who teach OL courses come from all disciplines, providing OL course «students» (faculty participants) a broad range of experience and perspective.

OL instructors receive individual support from the Director and Assistant Director, including a discussion around the course evaluation (rating both the course and the instruction) and reflection on the experience of teaching the course. OL instructors also become part of a Faculty Learning Community, a virtual space in the LMS for communication, information sharing, and discussion around OL teaching and online teaching in general. In the Faculty Learning Community space — much like a course space with faculty *enrolled* in the LMS, OL instructors can chat asynchronously about challenges and successes in online teaching, share resources and examples of their teaching, and provide their colleagues with ongoing support and expertise. Both the director and the assistant director participate in this online Faculty Learning Community as leaders of the OFD unit as well as OL instructors themselves.

OL instructors are modestly compensated for their teaching through pay supplementals according to their employment status at the university. With approximately 45 sections of OL courses needing instructors each year, and increasing every year, the unit-level operating budget for OFD requires a growing line item for OL instructor compensation. It is a testament to the university's commitment to preparing faculty to teach online that these funds are allocated to the unit each year.

8. Customized services to programs, colleges, and campuses

Most of OFD's capacity is allocated toward maintaining the OL course curriculum and supporting the OL course instructors. A secondary function that fulfills the mission is the design of customized, face-to-face services to programs and colleges. These efforts include new faculty orientations, presentations at face-to-face and online faculty development meetings, individualizing certificates based on a college's goals for their online faculty, and working with academic program leads to train and support new types of online instructors. One remarkable example is a college with a large online portfolio of programs and courses. Administrators and lead faculty in this college created an on-campus, three-day workshop around faculty development for online faculty. The

college funded travel for over 50 online instructors nation-wide and some online students to gather on campus in order to talk about teaching and participate in presentations around best practices for online teaching and course design. OFD leadership worked on the event planning committee, presented an overview of OL courses and certificates to the whole group, and participated in breakout sessions on best practices.

9. Scholarship and research

The focus of OFD's research efforts is to determine the effectiveness of OL courses. At this point in time, academic autonomy and faculty culture prevent OFD from *sitting in* on an instructor's academic course. This would be the best way to observe the extent to which the instructor applied concepts and practices learned in the OL course — a credible measure of effectiveness. For now, instructor self-reports and additional course-taking are measures of program effectiveness.

10. Cross-university collaboration

Development of curriculum and support for instruction of OL courses (and related administrative functions such as enrollment tracking and reporting back to academic programs and colleges) are part of the customized professional development services that constitute OFD's main function to serve the mission of supporting online faculty throughout their careers. Another way the OFD unit serves is through Penn State's robust committee structure. OFD leaders serve on multiple formal standing committees, working groups related to the strategic plan, and on informal project groups that bring together the faculty development and learning design communities who would normally be siloed in a complex and multi-campus institution such as Penn State. The value of this service recognizes the vast online learning resources throughout the university are best used when coordinated through formal and informal networks.

11. Conclusion

The World Campus Online Faculty Development unit is unique among large and complex Research universities with a robust online initiative. The unit continues to evolve from a faculty development function focused only on OL course completion to a learning center with a robust curriculum of professional development courses, customized programs, and collaborations on new courses such as Universal Design for Learning, Integrative Thinking, and the Scholarship of Teaching and Learning. While funded through the World Campus revenue share, the unit serves any and all interested Penn State faculty, regardless of whether they teach through the World Campus or not. Additionally, the unit is now the main source of preparing graduate students to teach online for Penn State and their future universities.

The evolution of the OFD unit, its function within the university, and its contribution to the field of online faculty development in general suggest

that the decision years ago to create the unit and allow it to prosper through ongoing funding and political support helped position Penn State as a leader in online education. It can be tempting for universities new to online learning to focus on launching courses and degree programs while overlooking instruction. It is not unusual to miss the fact that teaching online is distinct from face-to-face teaching and requires specialized training. It is understandable that educators trained formally or informally and steeped in face-to-face instruction are mistaken when they believe their teaching skills translate to the online environment when, in practice, few do. What we now know is online instruction has significant transfer to face-to-face instruction, but less so the reverse. It can be easy to overlook the fact that quality online learning needs more than a well-designed course; it needs skilled and competent instruction to make a course come alive and to spark and sustain student engagement.

The university that chooses to emphasize and invest in preparation for online instruction addresses several critical issues simultaneously. One, preparation for online teaching makes possible a greater quality of student experience and success. Students who feel more engaged with their online professors may be more likely to persist through the course and their degree. Given the marketing cost of bringing a student from the prospect stage to the enrollment stage, online faculty development is a small investment to improve the chances of student retention through the direct impact of instructor quality. Two, online faculty development helps build sustainability of a program as faculty expand their teaching repertoire, achieve success and satisfaction in their online teaching, and remain on staff in order to build the quality and reputation of an online academic degree program. Three, an intentional online faculty development effort focuses on teaching and learning theory, not just pushing buttons and playing with the bells and whistles in the online learning space. As faculty learn about teaching online, for many perhaps their first formal instruction in how to teach, they are learning about best practices and principles of teaching and learning in general. Four, this knowledge on how online learning works and how online learners learn brings value added back to the face-to-face classroom. A common observation from those trained to teach online is that they become more effective and satisfied teachers in face-to-face classrooms. This is due in part to learning educational principles essential to online instruction such as designing clear instructions, aligning student learning objectives with relevant assignments and accurate assessments, and backward course design starting with outcomes and ending with readings, assignments, and grading methodologies. Preparation for online teaching can also result in greater degrees of faculty competency for and confidence in teaching, especially in the unfamiliar space of asynchronous distance learning.

The intentionality of online faculty development training, for example in formal courses such as Penn State's OFD OL courses, sends clear messages to colleges wishing to create online programs to capture new revenue and serve a wider student population:

1) Teaching is important and worth investing resources.

2) Reflective instructional practice and meaningful assessment of teaching performance are critical to online quality and student success.

3) Online teaching mastery is achievable but takes years of guided learning and practice.

4) Online teaching informs face-to-face teaching, improving overall instruction in all delivery modes. Such a permanent training initiative requires time to mature and achieve credibility within a university, and the patience for this may seem unrealistic given the velocity of change — especially in online education — that higher education is experiencing now.

However, as with all teaching, corners cannot be cut to achieve quality. Quality costs. Quality also makes an online initiative competitive. As online degree programs and courses have become mainstream, so should online faculty development as a core function of the university seeking a credible status meaningful purpose as an online learning provider.

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Shared team leadership for an online program

Liderazgo de equipo compartido de un programa online

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Abstract:

Leadership for online programs to date has mirrored the leadership style of traditional academic programs, however in the rapidly changing environment of online education, thorough solutions to issues need to be arrived at in a more rapid manner than traditional academic models currently allow. A newer model of leadership, shared team leadership, can help online education achieve those goals. This model can also increase the chances of program success by providing multiple perspectives on issues that allow the program to be more effectively managed. Additionaly, it empowers organisational leadership to rapidly respond as external demands change. This article will provide an example of a shared team leadership for a set of online programs that make them some of the most successful at a large institution with a major presence in U.S. online education. This model of online shared team leadership will be assessed, its pros and cons examined, and a brief summary of the impact it has had on the programs that it oversees will be provided.

Keywords: online program leadership, shared team leadership, online education.

Resumen:

Hasta la fecha, el liderazgo de los programas online ha imitado el estilo de liderazgo de los programas académicos tradicionales. Sin embargo, dado el entorno de rápida evolución que presenta la educación online, es necesario encontrar soluciones integrales a los problemas más rápidamente de lo que permiten

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actualmente los modelos académicos tradicionales. Un modelo de liderazgo más reciente, el liderazgo de equipo compartido, puede contribuir a alcanzar dicho objetivo en la educación online. Este modelo también puede aumentar las probabilidades de éxito del programa, ya que ofrece múltiples perspectivas de las cuestiones, lo que permite una gestión más eficaz del programa. También dota de recursos al liderazgo organizacional para responder rápidamente a medida que van cambiando las exigencias externas. En este artículo se muestra un ejemplo de un liderazgo de equipo compartido para un conjunto de programas online, circunstancia que los ha convertido en unos de los más exitosos de una importante institución con gran presencia en el ámbito de la educación online de EE. UU. Se evaluará dicho modelo de liderazgo de equipo compartido online, se examinarán sus ventajas y desventajas, y se hará un breve resumen de los efectos que ha tenido en los programas basados en él.

Descriptores: liderazgo de programa *online*, liderazgo de equipo compartido, educación *online.*

1. Introduction

Online education has been an innovation that has propelled modern education forward. Much of that innovation has come from initiatives from faculty and instructional designers. While those grassroots efforts have allowed for great creativity and best practices for teaching and learning at the course level, that has not always translated into overall program success. Part of the reason for this stagnation of progress is that traditional academic leadership models favour supporting the status quo, as opposed to the use of innovative and creative solutions to the challenges of teaching and learning in a virtual environment (e.g., synchronous online meetings). This maintenance of the status quo has also reduced response time vis-à-vis a rapidly changing environment (e.g., regulatory change, new technology, etc.). Shared team leadership provides a model that allows for and supports the progress of creativity and innovation, so that online education can adapt and respond in a thorough manner to modern challenges.

In this article, I will examine shared team leadership as a solution to three major problems faced by online education. I will then briefly explore traditional leadership as a comparison point. The article will then highlight the comparative advantage of shared team leadership to address the problems. Overall, shared team leadership can have both direct and indirect effects on program management. For example, a direct effect might be a case where a faculty member or student has a sensitive issue that they do not feel comfortable discussing with one team leader. With the shared team leadership model, they have the option to talk to a different

team leader about the issue. In a traditional hierarchy, the issue might never be brought up to the unit leader if the faculty or student is uncomfortable talking with that person. This lack of communication can have serious organisational ramifications. Shared leadership can also have indirect effects by creating a culture where individuals feel empowered to take responsibility. Again, continuing with the sensitive issue example, the team members may resolve the issue long before it becomes an issue for the organisation. Further examples of the shared team leadership model will be provided in order to highlight how the model works and document its impact on the organisation.

2. Online education issues

There are many problems that face higher education in the United States. These include increased enrolments (increasing threefold in just a decade to over 1.5 million students; Bettinger & Loeb, 2017); higher failure rates (particularly for the least prepared students, Bettinger, Foz, Loeb, & Taylor, 2015); the related issues of increased student debt and loan default rates (Looney & Yannelis, 2018); changing legislation governing online education (e.g., U.S. Department of Education, 2016); along with many others. While these broader trends effect higher education in general, they also have specific impacts on online education, such as expectations of blending of modalities of content presentation and training of skills by students (Agarwal, 2019) and changing and splitting attitudes towards higher education (Alexander, 2017).

Organisations must prioritize their responses when facing multiple demands from external environments. The above list of issues are just a snippet of the many challenges that face online education today. In the next section, I will focus on three issues that are highly relevant to online education and are at the root of many of the more nuanced problems identified by researchers and institutions. Shared leadership can have a significant impact on these three issues: rapid change, growing need for thorough solutions and being ahead of the competition.

2.1. Issue 1: rapid change

Change is a given in the modern world; higher education is not immune. This is particularly true for online education, as the infrastructure is nowhere near as developed as that of traditional residential education. The modern traditional residential higher educational system has evolved over the centuries, whereas online education has only a few decades behind it. As a result, much of the early days of online higher education have been highly experimental and university programs are still changing their structures. This constant change has been exacerbated by evolving local university policies as well as federal government regulations. For example, in 2006 the United States Congress made federal funding for online education available, which then required a change to ensure that funding was fair within the State Authorization Reciprocity Act (U.S. Department of Education, 2016). It is likely that the most influential changes came

from technology, where the rate of innovation is not constant and therefore hard to control. Among the many technological changes effecting online education are the transition from dial-up to broadband internet access as well as landlines to smartphones, and more recently the rise of artificial intelligence and virtual reality, to name just a few.

2.2. Issue 2: a growing need for thorough solutions

The corollary of rapid change is that there is also a need, more than ever, to arrive at answers to issues that are as thorough as possible. With rapid change comes the need to keep moving onto the next big thing rather than getting stuck dealing with the same issue repeatedly. Institutions that get bogged down may be left behind in the ever more competitive market for attracting students. «Thorough», in this instance, means coming to well-rounded solutions that do not need to be revisited. In other words, it means taking the time and energy necessary to arrive at a solution that addresses all perspectives (students, administration, educational, etc.) and avoids unintended consequences that may lead to spending more time on the issue at a later date. The classic example is creating a new form to make an administrator's job easier, but that form unfortunately ends up collecting redundant information from students. While it may resolve the initial problem for the administrator, it brings about the unintended consequence of creating more work for students and staff, which in turn may reduce enrolments, and eventually, the viability of a program. Even small solutions such as creating a new form can have ramifications that affect many other issues or processes in the organisation down the line.

In addition to bringing about unintended consequences later on, if an issue is not thoroughly considered from multiple perspectives, it may only be partially resolved and therefore need to be revisited. This can hinder an organisation's ability to both resolve the next concern and, even more importantly, focus on vision, mission and strategy.

2.3. Issue 3: strategic planning

Online education has created a boom in revenue for many institutions, but there are caveats. An institution's success truly only exists to the extent that they have embraced the aforementioned change notion as well as integrated online education into their overall strategy (Rovai & Downey, 2010). However, those two planned advantages are characteristic of successful early adopters of online education, rather than among late adopters. The advantage stems from having a head start in innovation to integrate high quality education into their organisations. Those institutions that have not made a conscious effort towards being on par, quality-wise, with their competition via strategic planning, often find revenue generation is not as great as anticipated, because they have focused on adding programs rather than improving them (Rovai & Downey, 2010). Unless universities push the boundaries towards the future via strategic planning that includes

innovation and improvement, rather than simply adding programs, they often find online education to be cost ineffective, as the grassroots efforts by individual faculties and instructional designers do not have a large impact on the organisation. If leadership does not implement effective strategic planning, enrolments may stagnate, or worse, as the institution will fall behind the competition.

However, the three previously mentioned issues (rapid change, need for thorough solutions, and strategic planning), have all been addressed by many successful online institutions. In particular, there is a leadership solution that addresses all three issues and can give an institution's online programs a much better chance at success: shared team leadership.

3. Shared team leadership

Shared team leadership is a relatively new leadership theory that has been adopted in many modern private sector and governmental organisations to help address the issues discussed previously, such as rapid change and thorough solutions (Morgeson, DeRue, & Karam, 2010; Sharma & Bajpai, 2014). Teams have obviously have been around for a long time, but the notion of putting them in charge of organisations has not. So, before we get into our higher education example, it will help to provide some context for understanding the specific mechanisms by examining the general principle more closely.

Shared team leadership (sometimes referred to by the more generic category of «team leadership» or just «shared leadership») is, at its core, an egalitarian, participative group of people who are empowered to make decisions for the organisation and decide democratically as a group[1]. In other words, it is a set of co-leaders who share power and are willing to go with the majority when their opinion is in the minority. It works best when the leadership team is diverse so that decisions are informed by many perspectives (Miles & Kivlighan, 2010).

3.1. Example: leadership philosophy

Let's now examine a specific example of an effective shared team leadership philosophy. The example provided is at the department level, although there are hints of the model at the university level, which forms part of the argument that this department could implement this model fully. At the Penn State University, the academic control of programs is at the department level. The university does set general rules for programs based on accreditation, graduate school policies, faculty senate, etc. Within these boundaries however, the department is free to operate based on what they see fit for the programs that they manage, with little direct influence from the university. Penn State is a large research university that has a tripartite mission of teaching, research, and service. Outreach has been part of that mission since 1855, starting with correspondence courses. The university was also an early adopter of online edu-

cation, starting in 1998. At that time, the decision was made to allow for academic control of online programs to fall to departments, rather than remaining at university level, so that programs would be able to create online equivalents of the same high quality as their in-residence programs. Many undergraduate and graduate programs are ranked among the best in the world year after year both in residence and online because of this decision to give academic control to departments.

The specific online team discussed here (one of many that exist across the university) oversees six degree programs (one graduate, four baccalaureate, and one associates degree). The department is located in the School of Labor and Employment relations, and these programs are among the largest at Penn State. These programs combined make up nearly a tenth of all online enrolments for the university. The success for these online programs can largely be attributed to the shared leadership enacted in this department.

The use of shared leadership occurred at a time when the in-residence versions of the programs (completely separate from the online degrees) were decreasing in size, and at one point were at risk of being cut from the college by the dean. Delving into online education, using a team leadership model to guide the new programs, resurrected the department. The department's broader academic field is a domain where shared team leadership is not only taught, but practiced in the field. As such, the department head puts these ideas into practice within the department, so that faculty are modelling the best practices that they are teaching. The leader chosen for the programs was also chosen because of his style of leadership. It should be noted that while shared team leadership is the proximal cause for success, there are also some distal causes that helped the programs succeed. As that is beyond the scope of this essay, it will suffice to say that prior to these programs being offered to help the team draw experience and resources, there was a good online infrastructure at the university as a whole.

I will now examine the major components that make this shared team leadership model effective: people, style, and communication. I will then look at the pros and cons of this model to examine how team leadership may or may not suit all universities.

3.2. Example: people

The team does have a designated leader, the director of online programs, along with several co-leaders who serve in various roles in the department: professor of practice, administration, teaching professor, and staff. Several of the members have also been online students previously. Team members with a range of titles and experiences were deliberately chosen, so that whenever an issue arises, multiple perspectives are considered and the team can arrive at a holistic solution that identifies all aspects of the problem. Since the team has access

to multiple viewpoints, they are able to identify the various challenges of implementing solutions as they present themselves in various aspects of the university (such as administrative processes, student experience, technology, etc.). This range of perspectives also allows access to a larger knowledge-base of resources available to implement solutions. This is a critical benefit of shared leadership because not only is the university large with a long history, but its resources are located in many different organisational domains, such as university level, college level, department level, technology, faculty development, and others.

The team is distributed across the United States with half of the team residing at the university, all in the same building. The other half of the team is geographically dispersed across the nation. Several travel on university business as part of their job duties, so occasionally the team is dispersed across the globe, or at the very least working from ever-changing locations. This dispersion adds another layer to the multiplicity of perspectives. Being in different locations and having to adjust meeting times and deadlines to cater to time zone differences, the team is forced to think about timeline issues differently.

One simple example of this is that it imitates the student distribution in the online programs. In these programs, students have to work in online groups and submit work by particular deadlines, requiring them to coordinate across significant time zone differences. To take that example further, the standard deadline for many online programs is midnight Eastern Standard Time on a Sunday. Even though many tutors are in the Eastern Time Zone and will therefore be sleeping for several hours after that deadline, a large portion of students live in other time zones. Such an artificial deadline can penalize working adult students who could theoretically have much more time to complete their assignments with a different deadline. As a result of the team's geographic dispersion perspective, the deadline in many classes was extended to 9 AM Eastern Standard Time on Monday to allow students to work more while also fitting with the instructors time schedules.

3.3. Example: style and consensus

The team is democratic, participatory, and shares power. In this case, «democratic» means that decisions are determined by majority rule; «participatory» means that everyone on the team contributes to each issue discussed, and «shared power» means that everyone is empowered to make the necessary immediate decisions. There is still a designated leader who generates most of the agenda for the team and serves as the main point of contact. That said, the majority of decisions are arrived at through consensus. This requires members to bend to the majority's will on occasion.

Consensus is usually reached through discussion, with all members contributing their perspectives and concerns. This is effective because

the director of online programs does not establish his perspective until all others have had their say first. If members do not reach a consensus themselves, he attempts to help combine of ideas with input from the rest of the team. On the rare occasion where ideas cannot be combined to form a solution, he will put the remaining options to a vote after non-viable suggestions have been eliminated. The voting needs to be truly democratic so that everyone's ideas have equal weight. The director has, on occasion, had his idea overruled by the rest of the team and the majority decision was implemented. This works well because the leader trusts all of the co-leaders and that their perspectives as a whole are greater than his alone.

3.4. Example: communication

Practically speaking, communication is essential for shared team leadership to work, even more so than other leadership styles, and particularly in this situation with a geographically dispersed team. Communication builds trust between the individuals and builds the rapport necessary to support each other when needed. In this situation, this is achieved with weekly video meetings and daily emails, along with video chats and/or phone calls as needed when immediate concerns arise. Additionally, the team regularly and actively participates in larger department and university meetings, both in person and virtually, so that the team is integrated with all aspects of the institution and therefore remains knowledgeable. As this is a team with members at a distance, a conscious effort has been made to connect with various aspects of the university, so that the online programs are included in the strategic goals for the institution. As you can see, rapid response to issues is built into the communication process thanks to the combination of weekly meetings and ad hoc comunications.

The content of the conversations also makes a big impact. As the team arrives at thorough solutions, they also have time in their weekly conversations to discuss future trends, as well as to develop strategic plans in relation to these. This is then built into the agenda as an item when time permits, for example «what should we be thinking about?».

4. Analysis

In the examples provided in this article, shared team leadership is credited with helping to resurrect a department that was on the verge of being eliminated. Results in other universities may not be this dramatic, but shared leadership has been found beneficial in many different circumstances (Morgeson, DeRue, & Karam, 2010; Sharma & Bajpai, 2014). It is not, however, a panacea. It will only work if the organisational culture truly adapt or embrace a more egalitarian, participative, communicative, and flexible leadership style that empowers all co-leaders to act on behalf of the organisation. There are many examples of organisations that have adopted «teams» in name only and have not found the same results (Hitt, 1992). University leaders can assess whether this

approach may be suitable for their organisation by assessing the pros and cons of this model. Several issues that have been faced by the university and this specific department are scaling innovations, redundancy in resources and complicated communication channels. Many of Penn State's issues stem from the size of the institution, which in total is 24 campuses and almost 100 thousand students.

5. Pros

The description of the use of shared leadership by a Penn State team shows that there are three main benefits of this model:

1. The team knows more than any one person, which allows for more thorough solutions that do not have to be revisited.

2. Empowering individuals and frequent communication lead to rapid response to issues as well as time freed up for strategic planning.

3. The team can look at issues from all angles and the debate/discussion leads to thorough examination and solutions to issues.

6. Cons

There are however some potential pitfalls of team leadership that any shared team leadership model will need to consider:

1. It is critical to identify the right people for the team; those who are both flexible, participative, and competent in their domains.

2. The team must be supported by tools and technology that allow for rapid response and communication.

3. The team requires an overall organisational structure that will allow for empowered individuals to enact decisions.

Let's review why these potential pitfalls exist. Not all people are willing to give up their power, particularly those who were managers in traditional hierarchical management systems. While the amount of power held by the leader does not actually change in shared team leadership model, the rest of the team gains power that they may not be used to. This can cause the manager to perceive that their own power is reduced or threatened (Zhang, Zhong, & Ozer, 2018). However, power is not a zero-sum game. Rather than taking power away from the leader, this leadership style affords power to others. Therefore, the leadership team needs to be prepared to help team members adjust to their newly-afforded power.

Not all organisations are set up for this type of power sharing; if the infrastructure of the organisation won't allow co-leaders to act in the place of the designated leader, the rapid response time is lost, and the leader becomes bogged down with managerial duties rather than being able to focus on vision and strategy that results from time gained by allowing others to lead. Finally, the

technology and tools that allow for rapid communication are critical for team success. For team leadership to be effective, each person must share their ideas with all other team members.. The technology can be as simple as using a designated meeting room to update each other on their individual projects, but if they are not in communication with each other, they cannot coordinate their efforts efficiently, which can lead to duplication of tasks, or worse, neglect of particular issues.

7. Conclusion

So how does an organisation create a shared team leadership model for their online programs? While the answer will depend on many aspects of an institution (e.g., size, general organisational philosophy, ability to change culture), there are a few general lessons to be learned from the example provided here: leader buy-in, knowledgeable and diverse teams, and institutional support.

First and foremost, the leader needs to truly believe in shared team leadership. The key to that belief is to put it into practice. If the leader says that they want shared team leadership but instead acts in an authoritarian manner, the rest of the team will not participate at the level needed for success as they will not be empowered to do what is necessary to alleviate the leader's many tasks. However, if the leader trusts the team to do what is needed and empowers them to do so both in team and individual decisions, much more will be accomplished.

Secondly, the team needs to be diverse and knowledgeable. Having members who serve in various functions at the university (faculty, various administrative and staff positions, potentially students) allows for issues to be examined from multiple perspectives, to provide holistic solutions. The problem with many current organisational «solutions» is that they solve the immediate issue for the administrator at hand, but do not consider the effect on other aspects of the university, which often creates more problems for the university, perpetuating a never-ending cycle of managing problems rather than truly being innovative. But for that to work, and for the previously aforementioned trust to occur, the team members must be experts in their particular fields. That way, when the team is coming to solutions, they can assess how their individual perspectives fit together to address the issues at hand.

Lastly, there needs to be institutional support for this model. Penn State has a long tradition of giving academic departments the autonomy to enact this type of leadership at the local level, because of a decentralized decision making process. This enables departments to approach their programs however best suits their field. Additionally, the University provides the resources necessary for the department to pursue the methods without a lot of operation restrictions, as along as the funds and tools are used appropriately. Trying to implement shared team leadership in a highly centralized bureaucratic organisation has a high risk of failure, as many localized decisions would be undermined,

therefore demotivating the team, as they would lose the power that this approach relies on. In sum, this is a good model of leadership for online education, but only if the conditions are right.

If properly applied, shared team leadership can be used to address several of the key issues that face modern online education. In particular, it can help with rapidity of response, thoroughness of response, and remaining competitive. It helps achieve these goals because it empowers people, frees up time for strategic planning, and encorporates multiple perspectives to arrive at holistic solutions. It can be applied at all levels of an organisation and works best if embedded in an organisational culture that is also egalitarian, participative, and diverse.

Note

[1] For a broader explanation of the general concepts and alternative models, please see Kolger Hill, 2019.

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Studies and Notes

Thinking together, living fully. Experiencing philosophy with children

Pensar en común, vivir en plenitud. La experiencia de la filosofía con los niños y niñas

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Abstract:

Philosophy with children is an ambitious pedagogical project based on a structured meditation on the conditions that make it possible and the object and aims of the educational process. This article presents a systematized overview of the main features of Philosophy for Children (P4C), considering it to be a multifaceted and plural approach that, despite the different theorizations proposed, still possesses some basic common traits. Starting from a review of the academic literature on the topic, this article presents some of the main conceptual and practical limitations of P4C, in relation to its theoretical insight and its practical implementation. These are potentially damaging criticisms, which, if not given serious consideration, could invalidate this educational approach. After a critical discussion of the weak points of P4C, this article shows the need to reframe clearly the nature of educational practice in general and how philosophical reflection in particular can contribute to it. Accordingly, educational experience is thought to be a radical process of creation of shared meaning by a community of inquiry involved in a shared rational and emotional search for truth. Consequently, this article proves the profound value of this educational approach, which can foster a well-rounded education of people and their full integration into the social and cultural context, enabling them to enjoy a flourishing and authentic life.

Keywords: educational philosophy, educational theories, educational methods, thinking, critical sense, moral education, social education.

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Resumen:

La filosofía con los niños representa una ambiciosa propuesta educativa que se basa en una articulada reflexión acerca de las condiciones de posibilidad, el objeto y las finalidades del proceso educativo. Este artículo presenta de forma sistematizada los rasgos principales de la filosofía con los niños, considerándola como una propuesta con múltiples facetas la cual, sin embargo, posee algunos elementos comunes a todas sus distintas vertientes. A partir de la revisión de la amplia literatura existente sobre el tema, se presentan algunos de los límites conceptuales y materiales más significativos de la filosofía con los niños, relacionados tanto con su marco teórico como con su implementación práctica. Se trata de unas críticas potencialmente demoledoras que, si no son tomadas en cuenta de forma adecuada, pueden poner en riesgo la validez misma de esta propuesta educativa. Después de una discusión crítica de los puntos débiles de la filosofía con los niños, el artículo demuestra la necesidad de replantear con claridad la naturaleza de la práctica educativa en general, y la aportación que a la misma puede ofrecer la reflexión filosófica en particular. Este replanteamiento abre el camino a una redefinición de la experiencia educativa, entendida como proceso radical de creación de sentido compartido por parte de una comunidad de indagación involucrada de forma conjunta, racional y emocionalmente, en la búsqueda de la verdad. Consecuentemente, el artículo demuestra la profunda actualidad de esta propuesta educativa, capaz de fomentar una educación integral de las personas, y su plena integración en el tejido social y cultural, haciendo posible el florecimiento de una vida auténtica.

Descriptores: filosofía de la educación, teorías de la educación, métodos educativos, pensamiento, sentido crítico, educación moral, educación social.

1. Introduction

It is 45 years since Matthew Lipman (1923-2010) published the second revised version of his book *Harry Stottlemeier's Discovery* (1974). This is a significant date, as in the same year, the Institute for the Advancement of Philosophy for Children was founded as part of Montclair State College, New Jersey. And so Philosophy for Children — and adolescents — (P4C) started to take shape as the result of a process of research this American philosopher and educationalist had been pursuing since the late 1960s (Naji & Hashim, 2017).

The basis of the P4C project was a profound and explicit theoretical reflection on the nature of the process and practice of education and the function of education for both the individual and society. Indeed, Lipman was convinced that schools should be concerned with ensuring children could think critically, both individually and as a group, rather than

teaching children specific content and evaluating them on the basis of how well they could reproduce it. In his own words, «education is the outcome of participation in a teacher-guided community of inquiry, among whose goals are the achievement of understanding and good judgment» (Lipman, 2003, p. 18). To achieve this aim and so lay the foundations for what he called the new «reflexive paradigm» in education, Lipman believed that there was no more effective tool than philosophy, as it could promote the development of true critical thinking. Based on this consideration, throughout the 1970s and 1980s Lipman dedicated himself to making a series of theoretical contributions and writing educational books that strengthened the principles and practice of philosophical work with children in the classroom. His aim was that of turning them into critical thinkers who can make productive judgements, being guided by rational criteria and standards, sensitive to context, and able to correct themselves (Lipman, 2003).

Since then, P4C has been constantly evolving thanks to the important work of Lipman's collaborators and the numerous contributions from its supporters and detractors. In the field of academia and in popular culture alike, especially thanks to the success of the documentary *Socrates for 6-Year Olds* broadcast by the BBC in 1990, P4C has become ever more important and is now a reality for students, education professionals, and researchers. P4C associations and centres have been formed in much of the USA, Europe, Australia, etc., and P4C programmes are in place in over 60 countries around the world, including Spain, where it is also known as *Filosofía 3-18* (3-18 Philosophy) because of the age range of the students it covers.

P4C has also caught the attention of international bodies thanks to its good results with regards to improved academic performance (García Moriyón, Robello, & Colom, 2004; Trickey & Topping, 2004, 2007; Gorard, Siddiqui, & See, 2015; Tian & Liao, 2016), capacity for critical reflection (Soter et al., 2008; Murphy, 2009), and transference of these skills to the social setting (Reznitskaya et al., 2012; Gorard, Siddiqui, & See, 2017). For all of these reasons, it is regarded as an educational practice that effectively cultivates democratic citizenry that is able to meet the demands of the times (Makaiau, 2015; Echeverría & Hannam, 2017). This is demonstrated by the fact that, as long ago as 2007, UNESCO recognised the importance of introducing philosophy into schools to encourage critical thinking, educate children about life in society, and promote genuine democratic education. At the same time, it offered to contribute to the development of a movement that was gaining ever more recognition and popularity (UNESCO, 2007).

However, despite the enthusiasm surrounding this pedagogical project, a more measured examination of P4C shows it to be a complex phenomenon with internal differences, something that is subject to criticisms and has possible incongruities, a proposal in a continuous process of creation and self-correction. All of this makes this approach a fertile ground for

philosophical and pedagogical experimentation, which is a very interesting area for exploration in order to question the meaning of educational practice at all levels. To define the basic aspects of P4C, the article first presents its different forms (§1), opting for a conceptual categorisation rather than a generational one. Next, it briefly sets out the criticisms directed at this movement, both in relation to its philosophical aspect (§2) and its pedagogical principles (§3). Taking these critical voices into account, some possible responses are profiled, from a theoretical and practical perspective (§4). These observations inspire a reappraisal of the function of education and philosophical reflection in the pedagogical sphere, where P4C is seen as an intellectual and emotional adventure, an experience of a fulfilled life, and a driving force for social changes that can create a more humane world, with a shared meaning (§5).

2. Philosophies and childhood

According to Reed and Johnson (1999) and Vansieleghem and Kennedy (2011), two different generations can be discerned in P4C. The first dates back to the works of Lipman and Sharp, and is characterised by being primarily interested in the development of children's critical thinking. It regards children as potentially rational beings who develop in a social setting where they can, if guided correctly, develop their capacity for critical judgement. The second generation, which started with the work of Matthews in the early 1980s, eschews this pure ideal of rationality and reflexivity to which Lipman partly aspired, instead seeing P4C as a creation of spaces for dialogue where the children's own voices could be heard (Matthews, 1982). Philosophy *for* Children thus becomes Philosophy *with* Children, giving more importance to the creative moment and no longer having a primarily instrumental role in developing reasoning. This second generation has a clear ethical intent, as children would be able to develop their moral reflection through dialogue. At the same time, the fact it defends the validity of philosophy done by children would open the path to a new way of conceiving the very meaning of philosophical practice. In Murris's words, «philosophy as a discipline could learn something from children engaged in philosophical enquiry» (Murris, 2000, p. 271).

According to Johansson (2018), a third generation can be seen in addition to these two generations. This third generation is characterised by hybridisation with critical pedagogy, thus foregrounding P4C's questioning of the social context in a more or less critical way (Kohan, 2014). In this regard, Jordi Nomen (2018) refers to the need to combine «careful thought» with speculative thought, which he defines as: «that thought which is concerned with the correctness of our thought from the point of view of our values, and which emphasises an active commitment between thought, word, and action» (Nomen, 2018, p. 77). The Catalan educator therefore proposes «opening up spaces for quality participation that empowers children and allows them to expand their comfort zone» (Nomen, 2018, p. 79). More radically, in

his recent studies of the value of P4C in multicultural contexts, marked by situations of violence and marginalisation, Arie Kizel (2016, 2017, 2019) turns the doubt children express into the basis for questioning reality and the motor that provides the impetus for action that is committed to the surroundings and so makes real change in society possible.

The generational divide can, however, cause misunderstanding if it is conceived as a contrast between different eras. In fact, this division cannot be understood as the expression of a progressive path or as a juxtaposition of watertight compartments. On the contrary, instead of generations we could speak of different sensibilities, which currently contribute unevenly to the composition of the complex prism P4C represents. To account for the diverse nature of this pedagogical perspective, it seems more appropriate to move from a chronological categorisation, suggested in various studies, to a conceptual division.

According to this perspective, within the diversity of P4C, different forms of philosophical discourse would coexist: a) logical-pragmatic; b) anthropological; c) moral; d) political. Clearly, none of these categories is exclusive in character, and from a philosophical and a pedagogical viewpoint alike, they can all, in principle, coexist within the same theoretical perspective and a specific educational practice. Nonetheless, it is easy to note the prevalence of some authors over others among the different ones associated with this pedagogical current.

Far from being a problem, this diversity seems to be a strength for P4C: a flexible proposal that is constantly open to listening to different contributions and seeks out convergences between perspectives without artificially reducing them to oneness. As José Ortega y Gasset argued, philosophical diversity is not a problem in itself, but becomes one insofar as: «It is a sign of the condition of disassociation, of insufficient cohesion in the social body», or reveals a radical «incompatibility» between different approaches (Ortega y Gasset, 2010). Therefore, analysing the criticisms aimed at P4C has a dual objective: on the one hand, understanding how far these derive from a radically different vision of the mission of education and, on the other, clarifying the possible internal incoherencies and aporias in P4C itself.

3. Criticisms of P4C

This section attempts to clarify some of the most problematic aspects of P4C in relation to the theoretical prerequisites that implicitly or explicitly form the basis of this educational proposal.

3.1. Self-referential play

One of the most noteworthy aims of P4C, according to the founder of this pedagogical movement, Matthew Lipman, is to offer children useful and appropriate tools to formulate a correct judgement (Vansieleghem & Kennedy, 2011). Philosophy is necessary to achieve this aim as, according to Wittgenstein's teachings, it is a struggle against the sorcery of the

intellect through language (Wittgenstein, 1971). In other words, clarifying the meaning of words and the logical relationships created between them would help clarify the meaning we attribute to the phenomena of which we speak. And so, clarifying the meaning of our common language creates the possibility of establishing criteria and standards that help determine the correctness and validity of one argument against another, rejecting discourses that do not respect these norms.

The criticism of this way of interpreting philosophy as a logical-argumentative resource that would be responsible for producing the correct discourse dates back as far as Plato. Plato was aware of the existence of the view of philosophy as a desire to defeat one's opponent by having the best argument, without truly wishing to understand, and he advised avoiding teaching philosophy to the young, for: «lads, when they first get a taste of disputation, misuse it as a form of sport, always employing it contentiously, and, imitating confuters, they themselves confute others. They delight like spies in pulling about and tearing with words all who approach them» (Plato, 1967-1979, VII, 539b). In this way, philosophy would become a mere word game, a sophistical struggle concerned only with being right and not with seeking a shared rationality. An activity that puts aside the existential requirement to escape from the linguistic game to take an interest in what is happening outside it. Quite the opposite of what Plato claimed true philosophy should be, namely a practice of shared conversation that creates vital energy and passion. As Plato wrote in his famous seventh letter: «As a result of continued application to the subject itself and communion therewith, it is brought to birth in the soul on a sudden, as light that is kindled by a leaping spark» (Plato, 1967-1979, 341d-e).

3.2. The impossibility of meta-cognition

The second criticism relates to children's cognitive development and so to the anthropological sphere of P4C, in the broad sense. Based on Piaget's observations on the developmental stages of human psychology, children would not have the capacity to reflect critically and self-critically on the actual content of their own thought. As philosophy is an eminently reflective activity, students' cognitive limitations will have a significant effect on the potential success of this practice (Kitchener, 1990; White, 1992). This criticism is based on a position that regards philosophy as the highest expression of human rationality, which is the capacity to abstract essences based on specific cases, achieve suitable generalisations, and reflect self-critically on the cognitive processes that lead discourse towards a certain conclusion (Pritchard, 1998). This is a criticism that mainly affects what is described as the first generation of P4C above, which is predominantly concerned with making children into perfectly rational beings, according to a perspective that apes adult rationality, turning children into the ideal «abnormal child» (Murris, 2015).

3.3. Relativism or absolutism

From the moral perspective, P4C has been subjected to conflicting but similarly harsh criticisms. A first criticism can already be detected in Aristotle's work. He claims that ethical knowledge differs from intellectual knowledge; the former is a type of practical knowledge, not theoretical, that is the product of experience and constant action (Aristotle, 2014, II, 1103a-b). Consequently, practical wisdom can only be fully developed in older people and not among children and youths, who would still be morally inexpert (Berti, 2015).

Furthermore, even accepting the possibility of acquiring a form of moral wisdom during childhood and adolescence, two important criticisms relating to the content of this moral education are directed at P4C. On the one hand, the open inquiry P4C sets out to perform with children without first presenting answers and without attempting to inculcate any type of prejudgement regarding the questions posed, would open the door to possible moral relativism (Coppens, 1998). In Lipman's own words, P4C «is concerned not to inculcate substantive moral rules, or alleged moral principles, but to acquaint the student with the practice of moral inquiry» (Lipman, Sharp, & Oscanyan, 1980, p. 60). And so a lack of positive ethical principles would seem to open the path to possible moral relativism. Relativism, according to Adela Cortina's definition (1998, p. 25), is the position that «states the impossibility of recognising a universality, whether it be formal or in terms of an aspiration», with regards to formulating value judgements. Therefore, claiming that P4C leads to moral relativism involves supporting the idea that subjecting our moral convictions to critical evaluation makes it impossible to judge their validity, to find an agreement on the foundation of our very knowledge.

Conversely, the constant attention P4C pays to the education of children as moral agents, individuals who are epistemologically responsible for their own actions (García Moriyón, 1999; Prichard, 2013; Gasparatou, 2017) has been the object of the opposite criticism. Namely, that trying to instil certain moral values in children usurps their parents' educational prerogative (Law, 2008; Gregory, 2011). The argument that it is necessary to question the validity of our beliefs and our cultural and moral taboos would make for an approach that is unquestionable, imposing a non-neutral compromise regarding the relationship between educational practice and its social environment. Furthermore, this hidden curriculum would exclusively reflect the dominant values of Western culture (Vaidya, 2017), as P4C only includes philosophical referents from the Western tradition, favouring a particular idea of philosophy, rationality, and morality, and excluding contributions from other cultures.

3.4. Oppression and conservatism, anarchism and activism

The criticisms above, relating to the logical-pragmatic and moral spheres, are also reflected in the political sphere. On the one hand, the risk of an excessively

guiding presence of teachers with the aim of controlling how the students think (so-called reasonableness), and the manipulation of the children's moral judgement owing to the hidden dogmatism that transmits a given value system, would result in limitation of the children's freedom of expression. Consequently, the vertical system of power that characterises traditional teaching, and which Lipman himself rejected, would be reproduced. So, philosophy would become a mere instrumental activity and not a vital endeavour, resulting in what Freire called «humanitarianism» which, ultimately, «maintains and embodies the oppression itself» (Freire, 2005, p. 54). From a political viewpoint this would therefore end up supporting the conservation of the *status quo*; if the aim of the philosophy of P4C is only to construct citizens who are rational, competent at a cognitive level, and morally educated in regards to some basic shared values, then the philosophy of P4C would be just another tool at the service of the effectiveness of the current educational system and of the social context in which it is positioned.

On the contrary, the risk of falling into moral relativism by promoting children's moral inquiry would, in the political field, lead to a possible rejection of traditional morals. This would still have significant consequences from the social perspective, even accepting the conclusions of Burgh (2010) and Sprod (2011; 2014), according to whom moral relativism would not in any way be a possible outcome of the debate in a community of inquiry (CoI), where what would actually take place would be a critique of the fallibility of the values themselves. That is to say, admitting possible fallibility would lead to the absolute validity of the social system being questioned and to criticism of obvious injustices and so would encourage a call for radical social transformation.

4. Criticisms of the pedagogy of P4C

Criticisms of P4C not only relate to its philosophical facets — in other words, the what, why and what for of that which this practice sets out to transmit or create — but also the method and the process through which this content is created, that is to say, the how. In other words, P4C also has some problematic aspects as a pedagogical practice, which are discussed below.

4.1. Instrumentalism

In relation to pedagogical discourse, the critique of self-referentiality typical of the philosophical logic of P4C has recently been interpreted by Gert Biesta (2017) as risk of instrumentalisation of the purpose of the actual educational process. According to Biesta, philosophical work with children would end up being of instrumental value in developing their critical thinking, but it would not truly reach their hearts and would not touch their souls (Biesta, 2017). Consequently, concentrating on logical aspects and the limited consideration of the experiential side of the educational process would conceal from children the complexity of their relationship with the world as human be-

ings who live in it and so prevent them from really questioning their own purpose (Biesta, 2017). In this way, from a pedagogical viewpoint, P4C would be a mere tool in favour of a concept of learning aimed at optimising success, achieving preestablished outcomes while minimising teachers' input and accomplishing the ideal of an intelligent system that continuously adapts to its environment. According to Biesta, education should have an existential value rather than an instrumental one and so lead towards an adult existence in which we critically ask ourselves, thanks to an induced suspension of the adaptative model, whether «what we desire is desirable for our own lives and the lives we live with others» (Biesta, 2019, p. 58).

4.2. Exclusion

Another open question relating to the pedagogical character of P4C is the possible risk of excluding people. P4C theorists maintain that thanks to the dialogue that takes place in CoIs during philosophy sessions, there is real inclusion of all students' voices. In particular, this relies on the fact that in CoIs, the voices of those people who generally speak least are heard (Grusovnik & Hercog, 2015), and an ideal of shared authority results in real democratisation of the learning process (Michaud & Välitalo, 2017). Thanks to all of these elements, those people who are in disadvantaged circumstances achieve better results in oral and logical comprehension (Gorard, Siddiqui, & See, 2015). However, the high logical-linguistic standard to which P4C aspires and the limited importance of the experiential aspect of educational practice could be a barrier for those students who have some kind of cognitive limitation on joining in with a dialogue of this nature. Consequently, P4C would separate those who can reflect and so be future rational citizens from those who are unable to take part in this practice because they cannot adapt effectively to this world. In other words, the distinction between persons and not-persons popularised by Peter Singer (1993) in relation to the anthropological and moral sphere would be reproduced.

4.3. Lack of integration in the curriculum

Another pedagogical problem relating to implementing P4C in schools derives from its own purpose in the curriculum. The question many P4C theorists raise is whether this educational practice should be promoted as an independent subject, obligatory or optional subject (Splitter, 2006), or if it should form part of the school curriculum as a whole in a spread-out and cross-sectional way (Kennedy & Kennedy, 2011; Lewis & Sutcliffe, 2017). In the first case, a possible conflict would open up with other subjects which have traditionally had a central position in the moral education of students (civic values or religion). In the second, the transversality of the discipline would be problematic both in relation to its content (would schools teach philosophy or, for example, would they teach mathematics through philosophy?), and in relation to the specific preparation that all teachers, without distinction, would need to implement a spread-out and interdisciplinary P4C practice.

5. Saving P4C. Dialogic thinking and communities of inquiry

As a result of this discussion about the limitations of P4C, it is clear that the criticisms directed at this didactic practice, at both a philosophical and pedagogical level, are sometimes very cutting, sometimes unproblematic, and sometimes even contradictory. It is significant that these contradictions coexist at present. This apparent incongruence is for two main reasons: 1) the different sensibilities of P4C's detractors; 2) the plurality and diversity that characterises P4C theorists.

For example, some supporters of P4C claim there is a need for inquiry directed explicitly at action and resisting social injustices, while others regard this political commitment as something that goes beyond the limits of actual P4C. Returning to Ortega y Gasset's invitation, it appears to be necessary to find out what the reason for this diversity is and how much of a problem it is. On the one hand, rather than reflecting a lack of coherence in the academic community engaged in discussing the principles and practice of P4C, this diversity of perspectives can be characterised as a distinctive feature of this pedagogical movement, which continues to develop through accumulation, taking different forms in different settings.

However, it also seems clear that this diversity can lead to aporetical incongruencies since privileging one position over another entails a radically different conception of both the role and the function of philosophy and the very aims of education. In light of this problem, this article argues that to be able to respond to all of the criticisms mentioned above, it is necessary first and foremost to articulate clearly the concepts of philosophy and education used when speaking of P4C and CoIs, taking care to avoid potential incongruencies between their content and aims.

This means, firstly, that philosophy cannot merely be understood as a logical-argumentative tool, but rather as an experience that involves each individual's thought and emotions, engaging human beings in a genuine search for meaning, not so much of the words that are outside of the individual but rather the ones the individual uses insofar as they serve to define him or herself. In other words, philosophy is primarily an attempt to understand ourselves, as rational, feeling, corporal beings by understanding our presence in the world. The *positionality* of philosophy (Reed-Sandoval & Sykes, 2017), is, therefore, existential rather than political, and this answers the logical-pragmatic criticism (§3.1). Furthermore, it is important to recall that philosophy is always born and carried out in relationship with others, for the simple reason that human beings are relational beings. Consequently, this dialogic relationship is not simply external, but rather it determines a change in the specific inner thought of each person and can never, therefore, be understood as a monologic process (Wegerif, 2018). Aristotle said that human beings live with the aim of being happy and so nothing gives greater happiness than spending time with friends and practising philosophy

together (Aristotle, 2014). Philosophical dialogue enables us to discover the world, illuminate it, experience it in our own flesh, imagine it, recreate it, and modify it (Wegerif, 2010, 2011).

For this reason, the P4C philosophy cannot be reduced to mere content, or to a working method, or to engaging in debate. It must be understood as a way of existing and of being in the world, with it and against it, as what is in play is the comprehension and realisation of our authenticity. In this context, there cannot be a condition of relativism or absolutism at a moral level (criticism §3.3), nor of passive conservatism or political anarchism (criticism §3.4). And this insofar as the real, responsible, and friendly interest (Reed & Johnson, 1999) that unites human beings who are involved in the search for meaning prevents them lapsing into a lack of ethical commitment to reality (relativism) and into a devastating criticism of socialisation itself (anarchism). In addition, the need to follow closely the road towards discovery of the moral basis of things prevents there from being some kind of external imposition (heteronomous morality), or a mere acceptance of the socio-political situation (conservatism). For this reason, CoIs would have to carry out a form of philosophising-together (*sumphilosophein*), which is primarily and above all an existential experience (Oliverio, 2017). It does not, therefore, matter if this *sumphilosophein* is done in a way that an external observer to the actual dialogue would have hoped. Of course, its success cannot be measured with an external tool, with an ideal of pure adult rationality (criticism §3.2). In other words, it does not make sense to concern oneself with the result regardless of the process going on in the head and the heart of each individual who participates actively in it and who does not have to share the same way of arguing as people who do not participate in this dialogue (Agúndez-Rodríguez, 2018).

This concept of philosophy, transferred to the pedagogical field of P4C, involves a specific way of understanding the role and function of education. In contrast with the instrumental vision, criticised by Biesta, the idea of education within which this practice is framed is an education that aspires to promote critical thinking among students, not as an end in itself but as a rational and experiential means of understanding reality. A critical comprehension that shakes their comfort zone (Shea, 2017), that pushes for action, and that takes charge of the radicality of human life as a life project to be sketched constantly, without conceiving it as a preestablished set of guidelines (criticism §4.1). Education must form people who are agents of their destiny and know how to take an interest in the destiny of others. There is, therefore, no possibility of excluding anyone from this joint path. Education must always be for everyone; its aim should not be to build people who are suited to the needs of society but to lay the foundations so that, together, it is possible to build a society that can respond to everyone's vital needs and existential questions (criticism §4.2). CoIs can be the practical realisation of this pedagogical ideal. Spaces where this shared

inquiry becomes an event that gives not just rational meaning but also emotional meaning to the lives of those who participate in it (Costa Carvalho & Mendonça, 2017). What is needed to promote this type of education is not therefore to find more or less space for P4C in the curriculum (criticism §4.3), but to oppose radically, coherently, and particularly an educational paradigm that focusses stubbornly on the efficiency of the system.

6. Living Philosophy. Conclusions

In conclusion, we should note that P4C has some important limitations. However, at the same time, from both the theoretical and practical perspectives, it is a potentially very productive reality as it relates directly to the most important problems that affect the educational process. In view of the considerations set out above, it is possible to highlight five particular important conclusions regarding P4C:

1) Discussing the different versions and nuances of P4C means discussing essential questions relating to philosophical reflection on the phenomenon of education. Indeed, some of the most controversial and highly criticised aspects of P4C reveal possible incongruities regarding the meaning given to the very concepts of philosophy and education, with little uniformity within the very academic community that is striving to define it. For this reason, it has been necessary first to clarify the meaning of these concepts, before responding to the main criticisms aimed at the content and educational process promoted by P4C. This path has made it possible to trace a theoretical framework that can give coherent meaning to this practice of thinking together.

2) Far from being just one didactic intervention among many, albeit one that is useful and effective for encouraging critical thinking in children and educating them to be responsible citizens in future, P4C has been shown to be more valuable when understood as a practice that can give anyone who takes part the experience of a true intellectual and emotional adventure, when it makes them savour the beauty of encountering the other, our own inner life, and the lives of others, when it enables each individual to be a constituent and indispensable part of building a shared sense of reality.

3) Experiencing philosophy in one's own flesh creates a force that pushes towards action, towards the realisation of possible social changes, thanks to the implementation of a process of awareness-raising in which the community of inquiry involved in this path of mutual comprehension plays the most important role. Consequently, CoIs are the appropriate space and time for significant educational moments to occur, in which each individual in their own individuality and each group as a group, tackle social problems that go beyond the walls of the classroom, seeking together the deep meaning of existence.

4) Since this activity is so intimately linked to human existence, philosophy and education cannot be directed solely at a specific group of people, namely school-age children and adolescents. On the contrary, P4C must be the starting point for a Philosophy for Society, starting by constructing moments of philosophical interchange within educational communities themselves, with collaboration between parents, pupils, and teachers. And so the search for meaning, the comprehension of existential and social *positionality*, should be the main preoccupation of not just children but all educational agents.

5) Schools currently have a great opportunity and a great responsibility: to offer each person the necessary tools to make sense of reality, to build a world where we can find ourselves and our authentic destiny. For this reason, P4C is undoubtedly a powerful invitation to redefine our educational paradigm.

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Profiles and functions of university tutors and their effects on students' tutorial needs

Perfiles y funciones del tutor universitario y sus efectos sobre las necesidades tutoriales del alumnado

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Abstract:

Large numbers of students on particular degrees and a progressive depersonalisation of the teaching and learning process are typical characteristics of higher education. This situation results in a need to analyse the tutorial activity processes currently in use. This work aims to investigate various factors associated with the main agents involved in this process: tutors (profiles and functions) and students (needs). It is based on a survey-type methodology creating an instrument for distribution among degree students at the Universidad de Huelva. This is first subjected to validation processes to obtain a theoretical reference model with which to evaluate interactions among the emerging factors.

Notable results include a theoretical model with correlations between tutor profiles and regressions, or influences of these profiles on functions and student needs. Furthermore, it reveals two types of university tutor: those who prioritise the academic aspects of tutoring, and those who prioritise personal aspects. Both profiles are associated with

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types of function that react to the needs students display throughout their time at university, and support the thesis that university tutoring is developing towards an integral model in which the personal dimension is especially relevant.

Keywords: educational guidance, tutoring, higher education, student guidance needs, competence profile of tutors.

Resumen:

La educación superior se caracteriza por una masificación de estudiantes en determinadas titulaciones y una progresiva despersonalización del proceso de enseñanza y aprendizaje. Esta realidad justifica la necesidad de analizar los procesos de acción tutorial que se desarrollan en la actualidad. Este trabajo tiene como objetivo indagar en varios factores asociados a los principales agentes implicados en dicho proceso: tutor (perfiles y funciones) y alumnado (necesidades). Se parte de una metodología tipo encuesta en la que se construye y se somete a procesos de validación un instrumento distribuido entre los estudiantes de grado de la Universidad de Huelva, con el objetivo de obtener un modelo teórico de referencia desde el que valorar las interacciones entre los factores emergentes.

Como resultados, cabe destacar un modelo teórico en el que existen correlaciones entre el perfil del tutor, y regresiones o influencias de estos perfiles sobre las funciones y las necesidades de los estudiantes; de la misma manera, se visibilizan dos tipologías de tutor universitario que priorizan los aspectos académicos y personales de la tutoría respectivamente. Ambos perfiles llevan asociados unos tipos de funciones que vendrán a dar respuesta a las necesidades que presentan los estudiantes a lo largo de su paso por la universidad y que apoyan las tesis del avance de la tutoría universitaria hacia un modelo integral en el que la dimensión personal cobra una especial relevancia.

Descriptores: orientación educativa, tutoría, educación superior, necesidades de orientación del alumnado, perfil competencial del tutor.

1. Introduction

Tutoring in higher education is regarded as a function that forms an integral part of the teacher's role. It is a personalised model for education that provides comprehensive support for students and helps to «reduce anxiety, encourage integration in the new institution, and improve conditions for learning» (Fernández-Salinero, 2014, p. 163). As well as these factors, there are other elements associated with 21st century university (a

diverse student body, curriculum diversification, uncertainty about the future and finding work, and constant social, educational, and professional changes) that lead to a need to integrate tutoring into the curriculum and for institutional policies to promote it (Álvarez González, 2017; Martínez Clares, Pérez Cusó, & González Morga, 2019).

Several definitions are currently used for tutoring action or tutoring (Álvarez González & Álvarez, 2015; Álvarez González & Bisquerra, 2012; Álvarez-Pérez, 2014; González-Benito & Vélaz de Medrano, 2014; Hagenauer & Volet, 2014; Pantoja, 2013; García Nieto, 2011; McFarlane, 2016; Yale, 2019), from which multiple dimensions of analysis derive. In this respect, works such as those by López-Gómez (2015, 2017), León (2018), and Martínez Clares, Martínez Juárez, and Pérez Cusó (2016) provide a broad review and clear vision of the future of the term in order to consider how it is understood and how it evolves. This allows us to find the definition of "tutoring" as an educational process university teachers, based on the premises of orientation that reacts integrally to students' needs (academic, social-personal, and/or professional) with the objective of fostering the optimal teaching and learning process.

On the basis of this conception, we can identify three clearly defining dimensions to which this work contributes, which relate to the tutor's work (profile and functions) and to students' tutorial needs.

2. Functions and profiles of the university teacher-tutor

At a regulatory level, section 8 of Spain's University Students' Charter (Royal Decree 1791/2010, of 30 December) establishes a right to «receive personalised orientation and tutoring to facilitate workplace integration, professional development, and, where applicable, the continuity of university education.» Section 20 expressly states that the teacher-tutor is responsible for this service and must provide it on three levels (when starting university, during university studies, and in the transition to the world of work). Based on this, multiple works consider and evaluate the tutor's professional activity with the aim of laying the foundations for appropriate tutorial action (Álvarez-Pérez, López, & Pérez, 2016; Arza, Salvador, & Mascarenhas, 2014; Bisquerra, 2013; Gaitán, 2013; García-Valcárcel, 2008; López-Gómez, 2017; Martínez Clares et al., 2016; Torrecilla, Rodríguez, Herrera, & Martín, 2013; Troyano & García, 2009; Urbina, de la Calleja, & Medina, 2017).

Having considered the focuses on tutorial action that derive from these works, we use the structure proposed by Lobato and Guerra (2016), which identifies seven categories of university tutoring, five of which are explicitly carried out by university teachers. In turn, following on from the work of Rodríguez Espinar (2004), complemented by Álvarez González (2013, 2014) and Álvarez González and Álvarez (2015), we believe that the set of duties of a university tutor are based on three models of tutorial action (Table 1).

TABLE 1. Types of tutoring in universities

Type	Definition of functions	Figure	System
Academic tutoring	Monitoring and supporting the learning process in a module or subject (dealing with problems that arise; making working methodologies more flexible; developing evaluation products; promoting the development of research work; establishing effective communication; making use of critical behaviour and engagement, etc.).	Teacher	Tutorial Action Plan (TAP) of the university or faculty.
Work placement tutoring	Advising students during their work placement period.		Work placement programme
Research tutoring	Individualised guidance for preparing a research project during undergraduate studies and all levels of postgraduate study.		Planned between teacher and student
Personal tutoring	Individualised and specialised attention to resolve personal difficulties that affect academic performance (helping students with the process of developing self-knowledge; guidance with the process of taking personal decisions; help with conflict resolution; encouraging the development of personal skills; etc.).	Specialist professional / teacher	At student's request
Degree or course tutoring	Intervention to support personal, academic, and professional development throughout the student's time at university (knowledge of the student's profile; supporting the student's process of integration; contributing to the student's academic-social integration; providing curriculum information and orientation; etc.).	Teacher	TAP
Peer tutoring	Experienced student who supports students on same course.	Student	TAP
Service tutoring	Support comprising academic and careers information and guidance for all of a university's student body.	Specialists	Institutional service

Source: Adapted from Lobato and Guerra (2016, p. 385).

To implement these functions, García Cabrero et al. (2016) suggest that the tutor must acquire skills while simultaneously being familiar with institutional information, as providing a service in line with the needs of students will largely require this level of professionalisation. Therefore, it is necessary to

consider the role adopted by university teachers (attitudes) with regards to the importance attributed to tutorial activities, being clear, as Más Torelló (2012, p. 303) notes, that «tutoring the student's learning process by facilitating actions that allow him or her greater autonomy» must be one of the basic competences in the tutor's professional profile.

In this regard, educational research (Fernández-Salinero, 2014; González-Benito & Vélaz de Medrano, 2014; González-Lorente & González-Morga, 2015; Herrera Rodríguez, 2017; López, González, & Velasco, 2013; Martínez Clares, Martínez Juárez, & Pérez Cusó, 2014; Martínez-Mínguez & Moya, 2017) has identified common features relating to this role and contributed to shaping recognisable professional profiles, which have specific attributes relating to competences that include «certain skills, appropriate knowledge, and a particular attitude, guided by ethical principles» (Giner, 2012, p. 28). This shapes a broad spectrum of approaches to tutorial activity in universities, synthesised in the paternalistic model (pastoral care) and a more distant model (*laissez-faire*) as the extremes from which different degrees of involvement, action, and commitment are assumed (Cid & Pérez, 2006).

In general terms, in accordance with works by Echeverría (2002), García Nieto, Asensio Muñoz, Carballo Santaolalla, García García and Guardia González (2004), and Lázaro (2003), we can establish a classification that considers the tutor's areas of activity and which, depending on how a given tutor is positioned on the continuum between the models identified, enables us to speak of a human profile and professional profile. The former includes the tutor's being and knowing how to be, encompassing desirable personal qualities such as:

a) A balanced healthy mature personality through which positive attitudes are developed and target actions are proposed to ensure equanimity and fairness in decisions (without apparent preferences or aversions in treatment).

b) A sensitivity that makes it possible to perceive and understand youth problems, fostering empathetic and affective behaviour patterns, creating an atmosphere of positive care, and making respect for the student apparent, accompanied by a calm attitude in the decisions taken.

c) The ability to establish friendly and cordial relationships with students from which the tutor can glean knowledge of the group and the individuals, making it possible to have a positive influence on their opinions and attitudes.

The professional profile relates to the tutor's knowledge and know-how in his or her command of this comprehension and exercise of the tutorial action. Regarding comprehension of the tutorial activity, it is desirable to have:

a) A subject knowledge that allows the tutor to explain competently the subjects he or she delivers.

b) Theoretical knowledge of education and related sciences. In particular, an in-depth knowledge of the general features of the university system (pathways, specialisms, career prospects, etc.) and also the characteristics of those academic fields that comprise it (psychology, teaching, philosophy, sociology, etc.) is desirable.

c) A theoretical-practical comprehension of interpersonal relationships and of leading and encouraging groups so that the tutor can identify structures, roles, factors, or forces that affect the development of the group of students.

d) A knowledge of techniques for educational diagnosis and intervention to provide more personal attention, foster motivation, and promote initiatives-programmes relating to attention to diversity.

With regards to the practical exercise of tutoring activities, it would also be desirable to implement techniques relating to evaluation, carrying out interviews, invigorating groups, promoting social skills, motivating, etc.

We believe that the best university tutor profile will combine a balance of the different competences, creating what Hagenauer and Volet (2014) call the support dimension or atmosphere of support, in which the student perceives a personalised process of accompaniment throughout his or her time at university and, at the same time, feels that his or her needs are being met.

3. Tutorial needs of university students

The orientation needs that university tutoring must meet could be analysed on the basis of the three phases associated with students' time at university (entry, performing their studies, and the transition to the world of work).

If we start by considering the moments when the student first comes into contact with university-level education, we find many studies (Da Re & Clerici, 2017; Esteban, Bernardo, & Rodríguez-Muñiz, 2016; García-Ros, Pérez-González, Pérez-Blasco, & Natividad, 2012; García, Carpintero, Biencinto, & Núñez, 2014; López Gómez, 2015; Lorenzo Moledo, Argos, Hernández García y Vera Vila, 2013; Manzano-Soto & Roldán-Morales, 2015; Pujol & Durán, 2013; Rebollo & Espiñeira, 2017; Soares, Almeida, & Guisande, 2011; Torrecilla et al., 2013). These studies can form the basis for a focus on the demands associated with three dimensions:

Academic (unfamiliarity with the institution; skills imbalances when faced with high demands; problems managing study time; stress in especially busy periods; etc.).

Personal (lack of self-regulation skills; shortcomings in the development of de-

cision making; lack of autonomy; strengthening metacognitive strategies; boosting motivation to study; etc.).

Social (difficulties creating new social networks; coping with separation from family ties; difficulties combining studying and work; improving social skills, and managing conflict in the classroom; etc.).

Some of the needs identified here might continue in later phases (carrying out studies and transition to the world of work) and other new needs can emerge (Figuera & González, 2014; Martínez Clares et al., 2019; Pérez, González, González, & Martínez, 2017; Solaguren-Beascoa & Moreno, 2016):

- At an academic level, demands focus on two main related areas for supporting the teaching-learning process (knowledge of study techniques; orientation in final degree projects; knowledge of the working dynamics-methodologies of teaching staff; better understanding of syllabuses, such as optional courses, characteristics of the modules, system of credits; problems with the range of evaluation systems, etc.) and for supporting professional development and social and job market inclusion (lack of knowledge of career prospects; guidance with decision making when facing the transition to the job market; the demand for opportunities for developing professional skills; better knowledge of postgraduate training, etc.).
- At a personal level, the need to build a consolidated identity intensifies (managing emotions; acquiring transversal competences; support with the process of personal maturation and in setting future goals; etc.).
- At a social level, it affects aspects pertaining to the development of interpersonal relationships (help-mediation with conflict management; improving communication skills; guidance in developing social skills; facilitating strategies for team working; etc.).

In summary, we believe that to offer an optimal response to these needs, university tutoring must be considered from a holistic and integral position which, at the same time, is adapted to the contexts in which the students find themselves (López & González, 2018).

4. Research approach, aims, objectives, and hypothesis

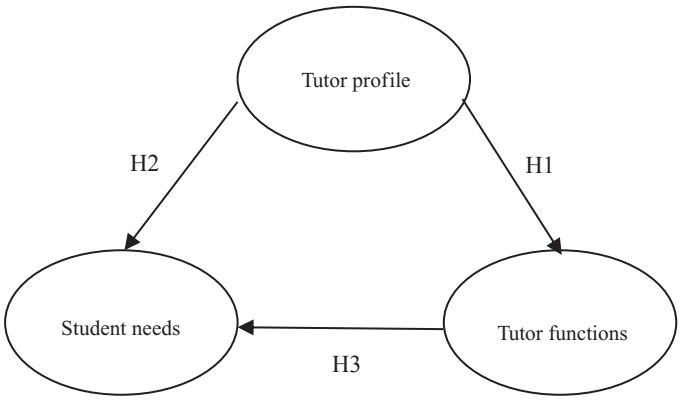
As a general aim, we intend to analyse the effect of the profile and functions of the tutor on higher-education students' tutorial needs. To achieve this, we propose the following objectives:

- Validation of a scale for evaluating tutoring in higher education.
- Validation of the construct of the interrelation of factors associated with tutoring in higher education (tutor profile, tutor functions, and tutorial needs).

– Confirmation of the positive influence of the factors associated with a tutor's profile on his or her functions and on the tutorial needs of higher-education students, and the influence of these tutor functions on the tutorial needs of the student.

In addition, based on the theoretical foundations, and as a consequence of the proposed objectives, we design a model which we subject to empirical evaluation (Graph 1):

GRAPH 1. Structural model to be confirmed.



Source: Own elaboration.

Following the reference model, the proposed hypotheses are:

– Hypothesis 1 (H1): the tutor profile predicts the type of functions he or she performs (Álvarez González, 2013, 2014; Cid & Pérez, 2006; Rodríguez Espinar, 2004).

– Hypothesis 2 (H2): the tutor profile predicts the effect he or she has on students' tutorial needs (García Nieto et al., 2004; López & González, 2018; Martínez Clares, et al., 2019).

– Hypothesis 3 (H3): the tutor functions have a direct influence on the effect on the tutorial needs of the students (Amor Almedina, 2016; López & González, 2018; Urbina et al., 2017).

5. Methodology

This research uses a survey-type methodological design intended to verify a theoretical model of the interrelation of different factors associated with tutoring in higher education. We used the structural equation technique for this purpose, using the Amos 18.0 program.

5.1. Participants

We carried out convenience non-probability sampling on the study population (students enrolled on undergraduate

degree courses at the Universidad de Huelva) in which we identified the representativeness of students enrolled on courses in different areas of knowledge and gender diversity as quotas. We performed this procedure on a sample of 581 students (49.1% male; 50.9% female, mean age 22.94 years) enrolled in various academic years (35.5% in the first year; 27.5% in the second year; 28.1% in the third year; 9% in the final year) in 30 different degree courses (arts and humanities [4.13%], sciences [3.09%], health sciences [8.77%], social and legal sciences [61.27%], and engineering and architecture [22.71%]). This size is sufficient (95% confidence level; 5% sampling error), although it is not optimal for initial validation.

5.2. Instrument

For data collection we used an *ad hoc* scale (see Table 2) with three dimensions (Tutor Functions [TF], Tutor Profile [TP], and Students' Tutorial Needs [TN]) with 26, 13, and 21 items respectively, set out on a Likert-type scale with values from 1 to 7, with 1 being not at all important and 7 very important. We prepared the instrument based on the reference theoretical foundations from the literature we consulted (Álvarez González, 2013, 2014; Amor Almedina, 2016; Cid & Pérez, 2006; Echeverría, 2002; García Nieto et al., 2004; Lázaro, 2003; López & González, 2018; Martínez Clares et al., 2019; Rodríguez Espinar, 2004, among others) and which sketch out the profile of the tutor and the functions he or she performs as factors associated with satisfactory tutoring. From this, we can establish the tutorial needs of university students and react to them.

TABLE 2. Scale for evaluating tutoring in higher education.

I. Tutor (and tutoring) functions for students (TF)
F1. Informing students about institutional academic questions (administrative organization, syllabus, modules, regulations governing progression, pathways, etc.).
F2. Providing institutional support to newly enrolled students.
F3. Guaranteeing personalised academic attention.
F4. Orientation and guidance on teaching-learning strategies.
F5. Orientation and guidance on learning styles, intellectual working techniques, and study habits.
F6. Orientation about developing individual study plans.
F7. Orientation about developing generic competences.
F8. Monitoring and evaluation of students, giving them information and guidance on their results and performance.
F9. Guidance on preparing course work.
F10. Guidance on and recommending bibliographies for the subject in his or her specialist area.
F11. Guidance on taking part in university life.
F12. Mediation in cases of conflict (teacher/student; student/student; student/institution).
F13. Orientation about social and communication skills.

F14. Orientation about interpersonal competences.
F15. Orientation about solving personal, family, health, social, etc. conflicts.
F16. Guidance on affective relationships.
F17. Orientation about decision making.
F18. Orientation about career prospects, workplace integration, and the job market.
F19. Guidance on developing professional skills.
F20. Providing professional references.
F21. Orientation and guidance about social questions (housing, grants, cultural context, etc.).
F22. Diagnosing and evaluating individual and group educational needs.
F23. Coordinating or liaising with the teaching team.
F24. Coordinating with faculty/university authorities and with support staff (administration and service staff, scholarships assistants, etc.).
F25. Supporting students with Erasmus/Socrates grants.
F26. Coordinating and supervising students' work placements in businesses/institutions.
II. Human and professional profile of the tutor (TP)
P1. Affectivity.
P2. Empathy.
P3. Personalisation (personally knowing each student).
P4. Fairness, equanimity (no preferences or aversions).
P5. Calm authority (ability to control a group, command respect, not authoritarianism).
P6. Respect for students.
P7. A personality that can positively influence and convince.
P8. Capacity to relate to others.
P9. Ability to listen.
P10. Receptive attitude and willingness to dialogue.
P11. Subject knowledge (academic knowledge).
P12. Knowledge of educational sciences (knowledge of teaching).
P13. Knowledge of social relationships and group dynamics.
III. Tutorial needs of students (TN)
N1. Orientation for the transition from secondary education to university.
N2. Orientation on arrival at university (first year).
N3. Helping students combine work and studying.
N4. Orientation for exams.
N5. Reviewing exams.
N6. Orientation after evaluations.
N7. Orientation during the progress of modules.
N8. Assistance with doubts about the subject.
N9. Orientation about improving academic performance.

N10. Orientation about factors linked to age (young people, adults, older people, etc.).
N11. Orientation about questions of cultural diversity (ethnicity, country, social group, etc.).
N12. Orientation about questions of linguistic diversity.
N13. Orientation for gifted and talented students.
N14. Orientation about special educational needs.
N15. Orientation about visual, auditory, motor, etc. disabilities.
N16. Orientation and evaluation of aptitudes (capacities).
N17. Orientation and evaluation of attitudes and personality.
N18. Orientation and evaluation of learning styles.
N19. Orientation and evaluation of cognitive strategies.
N20. Orientation and evaluation of professional interests.
N21. Orientation and evaluation of motivation.

Source: Own elaboration.

To collect data, we distributed the instrument to students individually for a duration of approximately 15 minutes. We informed the students that participation was voluntary and explained the instructions and objectives of the survey to them. We also told them it was confidential. We used the cross-sectional bands of tutorials so that we could access the population without having to interfere in academic rhythms. Finally, we used the SPSS 23 computer program for statistical analysis of the data obtained.

6. Results

6.1. Validation of the instrument

As mentioned above, we designed the instrument specially for this piece of research based on the works cited. We then submitted it for expert evaluation (six academics specialising in education at the Universidad de Huelva). This enabled us to evaluate the pertinence and clarity of the items. Modifications to the initial version were minor. Both processes contribute to the theoretical validity.

6.1.1. Reliability

Applying Cronbach's Alpha to estimate the internal consistency of the scale, which has 60 variables and a sample of 581 subjects, showed a high level of reliability (α = .953) for the complete scale. We also found high partial correlations for each dimension (TF, α = .919; TP, α = .889; TN, α = .921). Next we identified the less consistent items to revise the scale (items F6 and item N1) and improve it for future applications. When we excluded these, the total alpha value was .958 and two of the three dimensions also improved (TP, α = .928; TN, α = .929).

6.1.2. Construct validity

We performed an exploratory factor analysis (EFA) with the aim of concentrating the relevance of the items on one factor and so better discriminating between factors. We performed a factorial reduc-

tion applying an orthogonal rotation using the varimax method. Furthermore, in view of the high KMO values for the scales — between .908 and .937 — and the level of significance of < .001 obtained in the Bartlett sphericity test, we can confirm that factor analysis is relevant, suitable, and applicable.

The results for each of the dimensions considered are set out below:

D1. Tutor's functions regarding students: we identified three factors that explain 53.33% of the variance in the set of items (Table 3):

– Factor 1: general guidance and orientation functions. The items saturated by this factor include: those relating to orientation about skills, competences, career prospects, conflict resolution, decision making, social questions, and learning styles; and those that refer to guidance in professional competences, affective relationships, teaching — learning strategies, and university participation. They also include functions regarding evaluating and diagnosing educational needs and functions related to coordinating the teaching team and coordinating with authorities (faculty/university).

TABLE 3. Factorial analysis of tutor functions.

Items	Components		
	F1	F2	F3
F13	.741	-.276	-.140
F14	.722	-.352	-.063
F19	.716	-.200	-.069
F20	.710	-.183	-.075
F18	.704	-.115	-.192
F7	.692	-.038	.056
F15	.691	-.471	-.050
F11	.675	-.107	-.196
F16	.669	-.382	.054
F23	.666	-.094	.248
F2	.653	.049	-.026
F12	.639	-.123	-.175
F22	.635	-.038	.261
F21	.634	-.256	.049
F17	.627	-.041	-.217
F5	.590	.304	-.129
F24	.578	-.118	.544

F4	.541	.472	-.208
F1	.514	.436	-.041
F10	.466	.403	-.118
F9	.384	.667	-.114
F8	.422	.590	-.163
F3	.480	.523	-.033
F26	.452	.287	.561
F25	.417	.360	.498
Variance explained by factor	37.236	10.892	5.210

Rotated component matrix (KMO = .917; Bartlett. Sig = .000).

Source: Own elaboration.

– Factor 2: personalised student monitoring functions. This factor saturates variables that illustrate the functions of the tutor such as guidance on coursework, monitoring and evaluation of students, and personalised academic attention.

– Factor 3: functions relating to work placements and Erasmus grants. This factor saturates variables that illustrate the coordination and supervision of work placements and support for students with Erasmus/Socrates grants.

D2. Tutor profile: we identified two factors that explain 56,254% of the variance in the set of items (Table 4). Namely:

– Factor 1: professional profile. This factor illustrates variables relating to the capacity to listen and relate to others, characteristics such as empathy, leadership, equanimity, and authority, while also showing knowledge of education and subject knowledge.

TABLE 4. Factorial analysis of the tutor profile.

Items	Components	
	F1	F2
P6	.783	.177
P9	.763	.182
P11	.759	.038
P12	.736	.030
P4	.710	.314
P5	.692	.159
P7	.641	.242
P10	.570	.374

P2	.540	.439
P8	.497	.457
P1	.051	.882
P3	.100	.873
P13	.435	.459
Variance explained by factor	44.591	11.663

Rotated component matrix (KMO = .908; Bartlett. Sig = .000).

Source: Own elaboration.

– Factor 2: human and social profile. This factor characterises a sensitive tutor profile, concerned with getting to know each student individually and knowledge of social relationships and group dynamics.

D3. Students' tutorial needs: three factors are identified that explain 61.029 % of the variance in the set of items (Table 5). Namely:

– Factor 1: needs that focus on personal and/or professional aspects. This factor brings together a group of items that emphasise the importance of needs for orientation and guidance on learning styles, attitudes, and personality, cognitive strategies, motivation, and professional interests and aptitudes.

TABLE 5. Factorial analysis of students' tutorial needs.

Items	Components		
	1	2	3
N18	.763	.180	.176
N17	.733	.371	.113
N19	.717	.254	.220
N21	.707	.394	.093
N20	.698	.330	.146
N16	.615	.465	.133
N12	.259	.795	.169
N11	.197	.761	.053
N13	.328	.716	.100
N10	.410	.626	.012

N3	.312	.585	.279
N15	.462	.575	.246
N14	.506	.554	.154
N2	.359	.483	.402
N5	.037	.129	.802
N8	.067	.158	.770
N6	.157	-.020	.743
N7	.264	-.006	.743
N4	.047	.225	.736
N9	.309	.353	.536
Variance explained by factor	43.446	12.588	5.001

Rotated component matrix (KMO = .937; Bartlett. Sig = .000)

Source: Own elaboration.

– Factor 2: needs that focus on attention to diversity. This factor illustrates needs that relate to attention to diversity: linguistic, cultural, age, disabilities, and special educational needs.

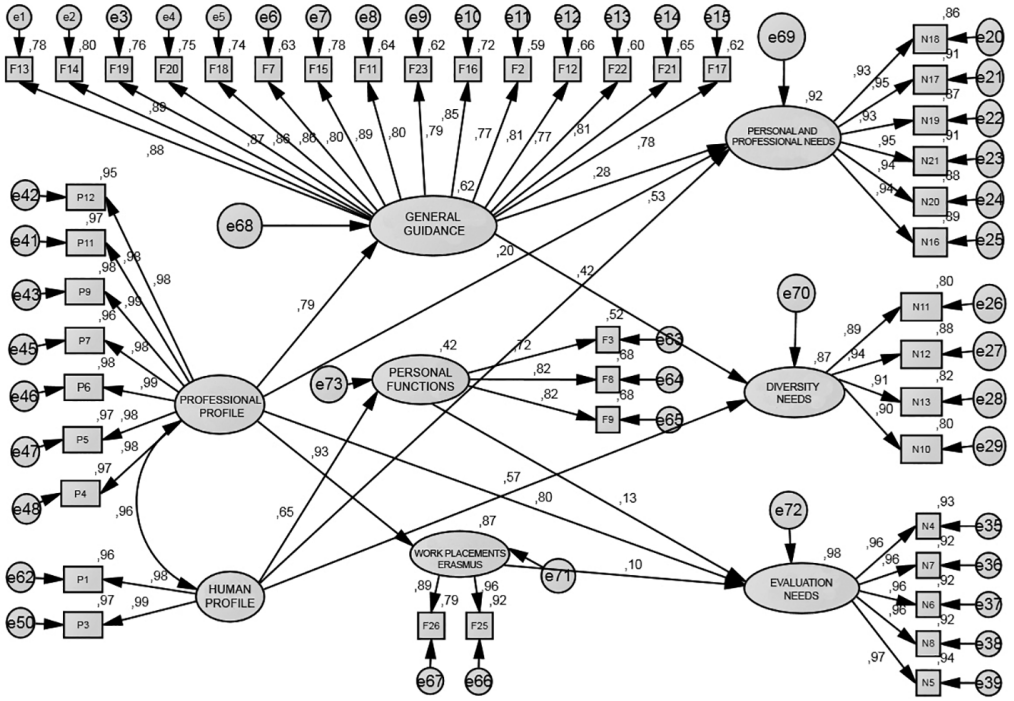
– Factor 3: needs that focus on evaluation and performance in modules. This factor saturates a series of needs whose importance centres on reviewing exams, doubts about the subject, and needs for orientation focussing on the evaluation processes (before, during, and after) with orientation for improving academic performance.

6.2. Confirmation of the model

After the preliminary reduction of the number of factors, we attempted to empirically test the factors extracted. To model the structural equation, we took as reference points the hypotheses stated in the theoretical model that guides the research (Graph 1).

The high rates of variance explained in the factors relating to the general orientation and guidance functions (62%), personalised student-monitoring functions (42%), functions relating to work placements and Erasmus grants (87%), needs centred on personal and/or professional aspects (92%), needs centred on attention to diversity (87%), and needs centred on evaluation and performance in modules (98%), and the regression and correlation indexes between the factors included in the equation allow us to accept the model (Graph 2).

GRAPH 2. Structural Equation Model.



Source: Own elaboration.

The goodness of fit indexes (Table 6) indicate that the model fits the data reasonably well (Chi-square/df = 4.76; p > .01; CFI = .93; IFI = .93; NFI = .98; RMSEA = .04).

TABLE 6. Fit indices of the model.

Fit indices		Recommended values	Observed values
Absolute fit index	χ^2/df (Chi-squared/df)	≤ 5.00	4.76;p < .001
Comparative fit index	IFI (incremental fit index)	≥ .90	.93
	NFI (normalised fit index)	≥ .90	.98
	CFI (comparative fit index)	≥ .90	.93
Error of approximation	RMSEA (Root Mean Square Error of Approximation)	≤ .06	.04
Sample fit	HOELTER .05	>200	480

Source: Own elaboration.

In the model we can see three groups of elements: firstly, the independent factors that relate to the tutor profile (social and professional); secondly, as dependent variables, the functions tutors perform measured in three types (general orientation and guidance, personalised orientation and guidance, and orientation and guidance relating to work placements and Erasmus/Socrates grants); and thirdly, the tutorial needs of the students (regarding personal and/or professional aspects; focussed on attention to diversity; relating to evaluation and performance in modules).

The model proposes correlations between the tutor profile, and regressions of the influences of these profiles on the functions and needs. Therefore, starting with the correlations between the independent factors, we identified a strong correlation between the human and social profile and the professional profile ($r = .96$; $p \leq .01$) and, analysing in more depth the regression indices between factors, we found the following results:

Depending on the type of profile associated with the tutor, we can predict the type of functions he or she performs, as well as the tutorial needs of the students he or she looks after; accordingly, in the model we can see how a more professional tutor profile has a significant positive influence on the general guidance and orientation functions ($\beta = .79$; $p \leq .01$) and Erasmus placement function ($\beta = .93$; $p \leq .01$), and reacts to a type of needs focussed both on personal/professional aspects ($\beta = .20$; $p \leq .01$) and on the students' needs relating to evaluation and performance ($\beta = .80$; $p \leq .01$). We also see how a more human/social profile predicts more personalised functions relating to the monitoring of students ($\beta = .65$; $p \leq .01$) and taking care of personal, professional ($\beta = .53$; $p \leq .01$) and diversity needs ($\beta = .57$; $p \leq .01$).

With regards to functions, we can see how, depending on the typology developed, their influence on tutorial needs is positive, and on a different level, these needs are also shaped by the profile that defines the tutor. In this way, we can see how the general orientation and advising functions have a positive and significant influence on needs that centre on personal and/or professional aspects ($\beta = .28$; $p \leq .01$), and on those connected to attention to diversity ($\beta = .42$; $p \leq .01$).

Furthermore, the needs that focus on evaluation and monitoring of modules are predicted by personalised functions relating to monitoring students ($\beta = .13$; $p \leq .01$) and, at a lower level, by functions relating to work placements and Erasmus grants ($\beta = .10$; $p \leq .01$).

Finally, regarding the measurement model, for those factors that saturate a large number of indicators, we decided to include the items with factor loadings above .6 as a better fit is achieved (Table 7):

TABLE 7. Factor loadings of the measurement model.

Indicator	Estimate
GENERAL ADVICE	
F13	.885
F14	.893
F19	.870
F20	.863
F18	.858
F7	.796
F15	.886
F11	.801
F23	.785
F16	.851
F2	.768
F12	.813
F22	.772
F21	.806
F17	.785
PERSONAL AND PROFESSIONAL NEEDS	
N18	.926
N17	.955
N19	.935
N21	.952
N20	.937
N16	.942
DIVERSITY NEEDS	
N11	.893
N12	.938
N13	.906
N10	.896

EVALUATION NEEDS	
N4	.965
N7	.959
N6	.957
N8	.961
N5	.972
PROFESSIONAL PROFILE	
P11	.983
P12	.977
P9	.987
P7	.979
P6	.990
P5	.983
P4	.985
HUMAN PROFILE	
P3	.987
P1	.980
PERSONAL FUNCTIONS	
F3	.720
F8	.824
F9	.824
ERASMUS PLACEMENTS	
F26	.888
F25	.960

Source: Own elaboration.

7. Discussion and Conclusions

The aim of this work was to analyse how tutor profiles and functions impact the tutorial needs of higher education students. To this end, we identified two specific objectives that constrained the validation of an instrument and of the construct being studied, in order to achieve a valid and reliable analysis of the results obtained, which the EFA confirmed. The model was then confirmed using the structural equations procedure, which leads us

to identify the existence of correlations between the tutor profile, and regressions or influences of these profiles on their own functions and on the needs of the students.

By specifying the objectives and examining the stated hypotheses, the results allow us to confirm these hypotheses through various demonstrated correlations. The following conclusions stand out:

a) There is a university teacher *professional profile* that prioritises the *academic area* of the tutorial activity with the aim of meeting students' needs that relate to academic evaluation and performance; this requires the tutor to demonstrate certain *professional competences* (the ability to listen and relate to people, and to display knowledge of education and the subject he or she delivers) and personality traits (empathy, leadership, equanimity, and authority) which are also illustrated in other pieces of research (Fernández-Salinero, 2014; García Cabrero, et al., 2016; Martínez Clares et al., 2014; Más Torelló, 2012; Torrecilla et al., 2013). This tutor profile is also linked to performing functions that are personalised and relate to monitoring of students (guidance with coursework, monitoring and evaluating the student body, and personalised academic attention), and to those functions linked to guidance in work-placement periods and/or on grant programmes (Erasmus/Socrates).

b) There is also a *humanitarian profile* of a university teacher who carries out the *personal and social area* of the tutorial activity more intensely, in order to react to student needs that are closely linked to highly personal aspects of their personality, taking professional decisions, and ensuring attention to diversity; this requires the tutor to display sensitive behaviour, an interest in the personalisation and individualisation of teaching, and also to be involved in the social and dynamic relationships of groups. This tutor profile carries out functions relating to orientation and general guidance (orientation about skills, competences, career prospects, conflict resolution, decision making, social questions, learning styles, guidance on professional competences, affective relationships, teaching-learning and university participation strategies). Although this profile does not have the same long history in Spain as it does in some other places like the English-speaking world (Cashmore, Scott, & Cane, 2012, analysed the importance of the role of the tutor in creating a feeling of belonging to the institution and avoiding early university leaving), it is currently emerging as one of the central functions in university tutoring, and so it is necessary to consider in greater depth the principles that should guide its implementation (Haya, Calvo, & Rodríguez, 2013; Herrera Rodríguez, 2017; López & González, 2018; López et al., 2013; Manzano-Soto & Roldán-Morales, 2015; Martínez Clares et al., 2019; Yale, 2019).

Two models of tutorial action are apparent: academic-professional (teaching) and

personal (counselling). These are defined by the needs students display, which polarise the work and profile of university tutors, and so this piece of work supports the existing theoretical theses that shape the different classifications of university tutoring models (Álvarez González, 2013, 2014; Álvarez González & Álvarez, 2015; Lobato & Guerra, 2016) and it also underlines the need to take students' needs into consideration as a starting point from which to design and implement the tutorial practices included in the different services and/or programmes offered by the university.

To meet this challenge, the study presented here agrees with other recent works (Martínez Clares et al., 2019; Waltz, 2019) on the importance of providing teachers with information and practical training to create a «professional awareness» that can form the basis for acquiring a commitment to a function that is inherent to teaching practice and «must not be based solely on technical and methodological aspects, but also on the personal and participatory competences that tutoring demands» (Martínez Clares et al., 2016, p. 95). Faced with crowded settings that can tend to depersonalise the process of teaching and learning, students clearly express concerns about this, and works such as those by Amor Almedina (2016), Cashmore et al. (2012), López Gómez (2017), and Pérez et al. (2017) show that tutors being *closer* to the students results in a process whereby students better adapt to the university, develop a sense of belonging at the institution, and increase their expectations of academic success and achievement.

In short, the proposed integral tutorial activity (Álvarez González, 2017) must be incorporated into the work of the university tutor, something demonstrated in much of the theory which acts as a foundation for the present study and in the results obtained in this study.

8. Limitations and future lines of research

Among this study's limitations, we should note the need to compare the opinion of students with that of the university tutor to achieve a better fit between, and significance of, the proposed objectives. Also, increasing the size of the final sample in some of the subject areas would make for more generalisable information that starts from a concrete reality but is similar to other contexts analysed in the rationale for the study.

Looking to the future, this work supports the need to continue to investigate the needs of university students and teachers' work as tutors, to create a meaningful teaching and learning context for both actors. We can contribute to this through the construction and validation of instruments that relate to constructs and variables associated with tutorial activity in higher education, as well as by transferring information deriving from other international settings that have long experience of implementing university tutoring.

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Book reviews

Luri, G. (2019).
The conservative imagination: A passionate defence of ideas that have made the world a better place (Enrique Alonso Sainz).

Quigley, C. F., & Herro, D. (2019).
An educator´s guide to STEAM. Engaging students using real-world problems (Juan Luis Fuentes).

Prince T. (2019).
Mindfulness exercises for the class. 100 practical ideas (José V. Merino Fernández).

Book reviews

Luri, G. (2019).
La imaginación conservadora: una defensa apasionada de las ideas que han hecho del mundo un lugar mejor [The conservative imagination: A passionate defence of ideas that have made the world a better place].
Barcelona: Ariel. 344 pp.

At the present time, saying you are a conservative or support conservatism is not easy, especially in Spain. To do so is an act of bravery and a statement of intent, which exposes you to being considered illiberal by a society that is, in many cases, both libertarian and very vociferous.

Conservatism is nothing less than the fruit of history, of the passage of time and of the events that have a special significance in the life of the people of a country. A conservative is someone who chooses not to forget the past, who wants to learn from what has gone before to be able to face up to the present and build a future with more certainty and strength.

Some revolutionaries and reactionaries see this as a backwards step, as a regression of society, something that is neither true nor objective. Conservatism has a close relationship with revolutions. Indeed, it exists thanks to revolutions; it is the counterrevolution to revolutions. While revolutionaries seek to change everything that is established and fight against power, conservatives prefer to feel that they are the heirs to tradition and shape the modern world from a past.

Gregorio Luri's book, reviewed here, revolves around these questions, as the author, who is aware of the current paradigm in which we live, has decided to attempt a well-argued defence of this position.

Circumspection is a vital term for understanding this idea. Changing what is established is of no use to us; we have to travel to the past to understand what we see and name, and what better way of travelling to the past than reading great books?

There is a tendency to believe that innovation is the future, that we must innovate to move forwards and that this is a clear sign of progress, but innovation and progress do not always go hand in hand. The conservative, Luri states, believes in progress but not innovation. While progress flourishes in parallel with the advance of our intelligence and focuses on content, innovation runs ahead of intelligence and focuses on the speed of improvements. We might tend to think that conservatives spend their lives anchored in the past, but this is not the case. Conservatives are also modern (accepting that the modern does not necessarily have to be *innovationist*), but they refuse to be only that. They want something more; they want to enrich tradition, to feed it, to continue making it.

This discourse often runs into the ideas of the left, who claim that they are the progressive parties, the parties of change, when on too many occasions, all that they achieve is to be innovationists, revolutionaries, and afraid of losing their connection with the world.

In contrast, conservatism is not just a lifestyle, as some people call it; it is an ideology like any other. It interprets the world, it has a view of nature, a moral outlook, the outlines for a programme of government, rhetoric, and coherent criteria.

The great enemy of this ideology is nihilism, which appears when people put aside the prudence that is characteristic of conservatives and give way to science as the sole reference point for thought, something which subsequently leads to nihilistic thinking.

These ideas cannot be separated from the political, and so a large part of the work reviewed here revolves around the *polis* and everything surrounding it. In particular, the concept of *politeia* has a privileged place. *Politeia*, as the author states, is the reciprocal coordination between all of the people of a city that enables them to act. It is not a law; it cannot be written down (if it could, it would be a constitution). *Politeia* includes the desire and need to live that the inhabitants of the *polis* have, the thing that unites them and makes them different from others. This inalienable *politeia* is the fruit of the past, of good examples, of a tradition shaped by a slow process of change. It is clear why renouncing this is not good, since concentrating on *politeia* can teach us a great deal, but in Spain, for some time now, this conscience has gradually been disappearing. The *politeic* is lost when the great writers of antiquity are forgotten, when we forget what has shaped us, when we stop paying homage to the «illustrious dead», as Ramón y Cajal put it, something that leads us ever more towards political backwardness.

Maintaining the health of the *polis* is no easy task, but people must live in a community and this involves being subject to laws. Laws are a need as natural as sexual desire. The law does not seek to express the nature of the human being, but rather to govern human conduct in order to create political animals. Human beings, like the animals we are, tend to give in to our passions and instincts, but we must repress and overcome them. As the author notes: «The law represses our animal side and allows us to aspire to be

political» (p. 113). Therefore, it is vitally important to create institutions to mediate between the individuality of people and the state. We cannot permit ourselves to be completely autonomous; this would be impossible. For individuals to be fully autonomous, they would each need their own particular language, science, and critical self-distance. Attempts at anthropotechnology to free human beings from the political have been in vain. Although individuals cannot stop being political, they can allow themselves to be political to a greater or lesser extent. That is to say, there can be degrees of being political. Being more or less political largely depends on the collective education people receive. Without a suitable collective education, people become degraded, turning into wild animals.

Centuries ago, Plato warned us of the dangers of ignoring these laws, going beyond natural limits and creating a *feverish city*. To prevent this, it is necessary to impose limits, laws that govern the political health of the city and make it a theatocracy where the viewers of the *polis* and of themselves are the people themselves.

In the last section of this book, Luri dedicates a series of chapters to analysing the current socio-political situation of Europe, as the *politeia* we form part of, and of Spain.

Freedom is one of the most recurrent themes in the social and political panorama. We all advocate moral freedom to undertake actions, but the freer we seem to be, the more we are slaves. In Europe, we have gone from a moral authority belonging to the Church, to a moral authority of therapists, Luri observes. We demand more of ourselves morally than we can bear. This causes us shame and, as there is no established morality and everything is valid, nothing surprises us. Making something morally and socially accepted is relatively simple; one simply has to show that there is victimisation, to show that something or someone is suffering because of what is being demanded, this being the best way of making a case.

Something else that has been turned into a burning stigma in modern society, and which is considered in depth here, is belonging to the elite, something that must be hidden at all costs. The meritocracy that exists in our society, is something that, according to some politicians, must be eradicated; hence the class-based diatribes against the rich… But this argument is relatively new. Until relatively recently even a socialist like Fernando de los Ríos, defended aristarchy, the selection of the best for the highest posts. Nevertheless, just as it is important to facilitate the advancement of those who have earnt it through their effort and work, it is also necessary to facilitate the demotion of those who have not honourably reached the pinnacle.

Citizens sometimes do not seek what is politically neutral but rather seek out what they want to hear, the power of persuasion and lies. We trust in democracy to solve the problems of citizens without them being fully aware of what is really happening. People live a constant healthy

lie, but without these lies, no democracy would exist at all. For a *polis* to maintain itself, it is necessary to create an emotional superstructure that makes all citizens part of a common truth, even if this does have an element of democratic lie.

Finally, analysing the question in Spain, Luri notes this country's distinctiveness as a nation. After a brief historical overview, in which he cites numerous politicians and thinkers, he shows how Spain has gradually been losing its feeling of nationhood, if indeed it ever really had one, as «there are countries that know how to love themselves … but in contrast we are either inflamed with passion for ourselves or we are scourging ourselves» (p. 297); Spain is perhaps one of the only countries that does not love its homeland. Every nation has an unchangeable DNA despite changes in political and social fashions, but over a period of 20 years we have completely changed our nature. In my view, this point should perhaps be developed more in the book, given the current situation, to seek the reasons that have led Spain to have this feeling.

Every country has its defects, no patriotism is perfect, but to compensate for this, they make an idealised version of patriotism; this is how to demonstrate self-love. It is important to remind a country of the reasons it should feel pride in itself, without forgetting the grounds for it to feel shame.

As Luri says in his last paragraph, «this book has turned out to be a book of echoes» (p. 329) and the fact is that, like the good conservative and teacher he is, he has attempted to draw on numerous authors of all types to support his position, and we cannot but think that he «preaches by example».

As well as its great philosophical, historical, and analytic weight, this book is able to outline the importance, once again, that education has in any *polis*, to preserve tradition and educate collectively and so make us political creatures rather than savages. Educating about the past does not have to mean being a reactionary, but simply increasing one's field of vision, enabling the circumspection that can help us avoid repeating past mistakes.

Enrique Alonso Sainz ■

Quigley, C. F., & Herro, D. (2019).
An educator´s guide to STEAM. Engaging students using real-world problems.
New York: Teachers College Press. 153 pp.

I can clearly recall the day I really learned about the concept of the *circle*. This shape, which is apparently easy to draw, by hand or with a compass if you want greater accuracy, has much deeper implications if we pay it the attention it deserves and attempt to understand it to its full extent. One day, when I was a child, the art teacher was off ill and another teacher who was covering for him took a piece of chalk tied to a length of string and made us see clearly the full meaning of the circle. That teacher did not teach us to draw circles — we had already known how to do that for some time. Instead, he helped us touch the circle with our own hands, manipulate it, transfer it, look at it from different pers-

pectives. The circle stopped being a simple drawing on the board or on paper and became a relevant concept, not just for art as a subject, but also for mathematics, as it gave meaning to the formulas we were studying and associated concepts like radius, diameter, and perimeter, for biology as we came to understand why many organisms are round, for physics in relation to the distribution of forces, and for aesthetics in relation to the perfection inherent to drawing itself. This simple transdisciplinary experience changed our perception of the circle and also of other content. It helped us understand that what different teachers talked about was not just relevant to their subjects, but could actually help us to better understand what we were studying in other apparently different subjects. Our perception of reality changed, becoming less narrow and clumsy and more interconnected and complete. That lesson made us a bit more intellectually mature.

This anecdote seems to me to illustrate one of the fundamental objectives of what is known as STEAM education (Science, Technology, Engineering, Arts, and Mathematics), which is the central topic of the book reviewed here. In brief, STEAM education tries to confront the challenge of disconnected learning, both between different fields and in relation to the students' social surroundings. It is a transdisciplinary method that sets out to teach areas of content and the relationships between them in a way that makes it possible to transcend the content itself and develop a broader and deeper view of reality.

The authors of this book are two university professors from Pittsburgh and Clemson (USA) who, in recent years, have carried out a significant amount of research into this topic, research that is the result of work closely linked to educational centres and considers education, assessment, and development tasks from STEAM programmes. This is apparent both in some of their previous publications and in this book, which has a clear descriptive and practical as well as argumentative character in the contributions to its objective.

The origin of STEAM is fairly recent and within it we find a clear intention to complement the STEM methodology by integrating the arts, understood in a broad sense. However, as the authors of the book note, it is not just a matter of adding a new concept, but also of giving this methodology a more social and humanistic character. The aim of including the arts is to achieve a more creative vision of potential solutions to social problems, which habitually involve scientific questions. It is also intended to help acquire an awareness that, as Eisner noted, problems do not always have a single solution, the solution is not known from the start, and it is not achieved by following strictly a set series of steps, but rather it is gradually created through the process of learning itself. Although, as with any recent concept, there is not a consensus on its definition between different authors, this book specifically focusses on the link between the sciences, arts, and humanities, as a strategy that avoids a narrow vision of the sciences.

In addition to this, STEAM aims to give the concept a more inclusive character so that students who are often not motivated by scientific disciples, for example, girls and students from ethnic minorities, are more likely to be attracted to them, as STEM is often implemented as part of extracurricular activities with advanced teaching designs, which are not accessible to everyone and lead to very unequal representation in scientific professions.

It is worth noting that, while the result is novel, its various elements are common in the pedagogical innovations of recent years, such as problem-based learning, meaningful learning, or service-learning. Nonetheless, it contributes an aspect that to me seems very significant and that refers to teaching that is transdisciplinary and connected to reality. Methodologies like service-learning have often been criticised for focussing more on service than on learning. Accordingly, while STEAM is aimed at working on social problems in close interrelation with them, something that helps motivate students, it emphasises the classroom more than service, in other words, the intellectual dimension of the problem.

The first chapters of this book explain how this methodology works, and set out the key points for developing STEAM modules. However, this book is not a user manual with specific instructions, but rather a guide with reflections that, in many cases, are rooted in testimonies by teachers who are implementing these proposals. Ultimately, it is a book for teachers, which is closely linked to practice, as is often the case with pedagogic output from the USA, and it introduces constant allusions to classroom situations and reaches theoretical conclusions based on them to configure a specific teaching and learning model.

As Quigley and Herro explain, students face a situation designed by the teacher in which a problem is posed that they must solve through various tasks. These tasks combine different disciplines naturally and sometimes require excursions from the school and visits by experts in the different areas as a source of information and guidance. As these are real problems, it is not a case of giving a single response, as happens with teaching that focusses on content, but of suggesting reasoned options for solutions based on what has been studied in different subjects.

Along with the more practical chapters that define strategies for introducing this methodology in a school and ways of elaborating scenarios or of evaluating STEAM units, the authors make interesting reflections on the transversality and introduction of the arts. With regards to transversality, they distinguish it from multi- and interdisciplinarity owing to the ease with which the disciplines integrate in the proposed scenarios, occupying the same spaces to prompt new ideas. This transdisciplinarity stems precisely from the reality of the problems, which means that students work on the disciplines without thinking about distinctions between them. That is to say, they use the required knowledge and apply it to come up with a solution. This way of solving problems is what really makes it possible to discover the interconnections between different

disciplines. In regards to the inclusion of the arts in STEAM, the authors warn that they cannot be considered solely in their aesthetic dimension or how they might contribute to beautifying products, but they also play a significant role in design, expressing emotions, and solving problems.

In essence, STEAM is a new example of active pedagogy with important contributions for in-class teaching that promotes more rounded, interconnected, and integrated learning in the context of the educational centre. That said, there are some aspects with regards to the proposal and to the book itself that should be considered.

First of all, reading between the lines in the text, it is not a matter of making all teaching STEAM, but of including this type of activity in the dynamic of the academic year, in a way that complements other activities. The time required to implement it, the resources that have to be mobilised, the timetabling flexibility it demands, among other things, make it difficult to combine with other activities, and so while it might reasonably have a place in the curriculum, this is a particular place alongside other tasks.

Secondly, STEAM supposes various problems that are inherent to its very nature. First of all, transdisciplinarity in content requires teaching staff that react appropriately to it, whether as a team of teachers from different disciplines who work together — something which is not always available — or a teacher who specialises in different subjects, which is difficult in higher years. Furthermore, there is a significant problem matching social needs with the school curriculum, as it is not always easy to find common elements that involve various subjects and make it possible to design STEAM scenarios.

Finally, with regards to this book, we should note that, while its degree of contextualisation is in many ways positive, it does focus on the US educational system, and so it is necessary to transfer its structures to the reader's setting to understand its problems, procedures, and recommendations. Also, in the first chapters, a more thorough theoretical foundation of the principles underpinning STEAM would be welcome. When familiar with this methodology, it is easy to discern principles from Newman's proposals regarding transdisciplinarity; from Dewey relating to experiential learning and contact with social problems; and from Gardner regarding multiple intelligences which are worked on through a range of tasks, and so a connection with these authors would help to shape a more solid proposal in this promising methodology.

Juan Luis Fuentes ■

Prince T. (2019).

Ejercicios de mindfulness en el aula. 100 ideas prácticas [Mindfulness exercises for the class. 100 practical ideas].
Madrid: Narcea. 136 pp.

This book is both innovative and traditional. It is traditional because it recovers and activates a series of ideas and proces-

ses that were forgotten by the cognitivists and academicism. It is also innovative because it adapts those ideas and dynamics and turns them into specific exercises for the classroom.

Mindfulness (generally translated to Spanish as *atención plena* o *plena consciencia*), is it a fashion? Is it a conceptual trend? Perhaps, as the analysis conducted by Ronald Purser suggests, it is a market manoeuvre disguised by the idea of a new spirituality, focused on living in the present moment regardless of the past or future. Is it a simple word to emphasise traditional processes that were neglected for years such as concentration, meditation focussed on self-conscience, emotional education, integral education, etc.? Is it a psychotherapeutic and educational resource needed to regain the internal balance and drive away dysfunctions and other vital issues (stress, existential dissatisfaction, anxiety, pain, sickness, etc.) caused by the dizzying speed of events in the current world? A speed that forces people and communities to change their life into a sort of accelerated existential race as though we were in permanent competition.

Whatever the answer to these questions, and without falling into the naivety of those who claim mindfulness is a revolution that is going to save the world from a catastrophe, it is true that currently there is a need for channels and tools to stop us being swept away by floods of information that appears as quickly as it disappears. This tempestuous and dizzying feature of today's world creates situations that affect the normal development of childhood, producing stress, anxiety, emotional tantrums or attention deficit to mention just some of the disfunctions that nowadays affect not only children but also the rest of the population.

Mindfulness has been shown to improve the wellbeing of people who practice it because it supports the development of positive socialisation processes that help people just to be instead of to have. These processes are necessary in order to activate in each of us skills to defend ourselves from the thoughtlessness associated with the stressful race to have more, no matter how and immediately. In summary, when faced with this disposable culture which uses and throws away knowledge, information, relationships, things, etc., mindfulness offers ideas and tools to avoid being swept along by this torrential current. This is because it helps us to observe and use for ourselves not just our personal internal potential and our own experience of the present, but also to transform external elements into positive energy that is valuable for the personal processes of humanizing self-realization, and to act consciously of everyday life.

The book presents 100 mindfulness exercises for use in the classroom. These exercises are arranged in ten blocks or chapters that include: breathing, guided meditation, active meditation, gratefulness, yoga, emotional intelligence, mindful colours and scrawling, calming down and relaxing, mindful walking, and mindfulness for teachers.

How is the book used? To answer that question, it is important to consider the

implications of its subtitle: *100 practical ideas*. The mindfulness exercises developed in the book are specific and directly applicable but at the same time they are a source of ideas and processes that make it possible to adapt them to other situations. Indeed, at the end of each exercise there are two sections: a) practical tips; b) further ideas.

The students themselves, the education professionals and teachers, the parents, and anyone who is willing to learn the ideas, dynamics and strategies of mindfulness, will find this book a valuable and versatile resource. This works for both active learning and for managing emotional issues. However, regarding this book only as a handbook would be a mistake, as the practical ideas of each exercise are as useful or more useful then the exercise itself. This is why the book has a double value:

a) Practical: it develops specific exercises applicable in the classroom.

b) Theoretical/practical: extracting the ideas and strategies from each exercise and adapting them to new situations of self-observation, knowledge, experimentation, and calm self-control, so that we know and control ourselves and our environment, and it is not the environment that controls us.

There are many voices that denounce the educational shortcomings of the school, as it has been kidnapped by the dominant academicism, expressed in endless curricula. This book takes a step beyond mere denunciation, offering tools for personal development that can easily be integrated into the school day, as students can adopt and carry them out in an enjoyable and effortless way.

José V. Merino Fernández ■

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This is the English version of the book reviews published originally in the printed Spanish edition of issue 275 of the **revista española de pedagogía.** For this reason, the abbreviation EV has been added to the page numbers.

Call for papers for a monographic issue of the Revista Española de Pedagogía on: "Controlling time and personal and social development"

In the collective imagination of the liberal mindset, the myth of progressing from functional autonomy to total autonomy — in other words, the aspiration to become the legislators of our destiny, nature, and lives — has recently become especially strong.

Experience soon shows us that this desire to have complete control is utopian or even Faustian. However, it is one thing to attempt to control our whole life and another to stop struggling to control numerous areas of our existence, which can be directed in accordance with our desires and which we must make an effort to dominate, without allowing ourselves to be subjugated by anything or anyone.

Clearly, we can control some areas of our existence to a greater or lesser extent, inasmuch as we are able to control them. Here we find something that is as old as humankind and is so very difficult to control: the question of how we use our time.

At first sight, we might believe that nothing more specifically belongs to the individual or is more egalitarian than time; we all have the same twenty-four hours in a day, unlike the personal gifts or social capital we are born with, where there are many differences between individuals.

However, complaints about the time we have are very common. On this matter, it is very interesting to turn to Seneca's work, *On the Shortness of Life*, which is deeply rooted in Spanish culture and which starts by saying:

Most mortals complain with one voice of the malice of nature as we are born for but a brief period, for the time we are given passes so rapidly, so quickly that, with the exception of a few people, almost all others find that their lives end just as they are preparing to live them. .... We do not have a short space of time, but we waste much of the time we do have. *Life is long enough and is given to us generously so that we may do the most important things, if we use it well.* But if we waste it in ostentation and laziness, *when we do not use it for anything good,* when in the end the unavoidable final moments draw near, we realise that a life has gone by that we did not realise was passing. It is thus: we do not have a short life but rather we make it short; we are not lacking it but rather we waste it.

These ideas suggest that while current studies into time management might help us solve certain problems, it is more important to examine the meaning of our existence, as Socrates said, so that we can spend our time in the quest to attain this full life, the characteristics of which we have uncovered.

Furthermore, in former eras, the time people spent earning a living was so great that it was hard for them to do other things. But our present society of plenty means more of our time is available to us, and so it is more important than ever to ensure "we do not use it for anything good", as Seneca said.

Therefore, part of the mission of educators is to teach people to control the 24 hours in each day correctly and not waste them. Furthermore, opportunities for mistakes have increased enormously, both because of the passion that certain activities inspire that drives us to do them to excess, and because of the large number of misguided activities that can be done, many of which subjugate us so that we effectively cease to be the masters of our own behaviour.

Work, for example, certainly favours a full life. But working to excess, becoming a workaholic who ignores everything that is not an occupational task and ends up with weekend melancholy is no small error. Of course, there are greater mistakes at present, such as becoming a drug addict or an alcoholic, or becoming addicted to video games, gambling, fitness, sex or pornography, social networks, or television series.

In short, educators must concern themselves with teaching us how to use our time so that at the end of the day we can feel that we have looked after all aspects of our personality and have always tried to control our behaviour. Educators are not like sociologists who limit themselves to provide statistics about misguided behaviour, but instead are a lighthouse, making it possible to follow the paths that lead to personal and social development.

The aim of this monographic issue is to bring together studies with this focus, revealing the errors present in contemporary society and showing how to counteract them, as well as showing positive opportunities to achieve the plenitude to which we aspire. In other words, its aim is to examine how we approach work, professional relationships, friendships with people and God, the family, education and caring for children, reading and pastimes, and so on. Seneca said life is not short; we must know how to spend the appropriate amount of time on each thing, in accordance with the meaning of a full life, without letting ourselves be led by other motivations.

Submissions can be sent until 10 May and after the blind review process, successful ones will be published in a monographic issue in September 2020. The Guest Editors will be **Prof. Ana María Ponce de León Elizondo** and **Prof. María Ángeles Valdemoros San Emeterio**. Submissions should follow the Instructions for authors of the **revista española de pedagogía** and be sent to the email addresses: ana.ponce@unirioja.es and director.rep@unir.net