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PEDAGOGICAL DYNAMICS IN CONTEXT: UNDERSTANDING TEACHERS' VIEWS ON THEIR WORK ENVIRONMENT

Fatima Zahra El-Hadji and [2]Lucas Emmanuel da Costa
Department of Research Methods and Diagnosis in Education, Faculty of Education, University of Granada, Spain

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ABSTRACT
A quality learning space provides students with an optimal environment for social relations, collaborative work and participation, thus fostering innovation and incorporating active methodologies. The aim of this study is to analyze whether the design of existing learning environments is suitable for incorporating innovation in classrooms. The methodology carried out in this study was quantitative and divided into two phases to carry out the analysis. The approach consisted of collecting data from a sample of 245 teachers using a questionnaire designed and validated by the researchers. The teachers perform their educational activity between the 3rd and 6th grades of primary school and are in educational centres in the autonomous city of Ceuta (Spain). The findings highlight the relevance that teachers believe the design of educational spaces should have in the teaching-learning process. Thus, the results show that there are significant differences with respect to age and professional experience in relation to the teacher's perception of infrastructure. Therefore, it is important to conclude by highlighting the consideration of the educational space as an essential element for the incorporation of methodological renewal in the classroom.

1. Introduction

In the 19th and 20th centuries, the design of school educational spaces had a significant impact on the teachinglearning process which stimulated the interest of many architects and professionals from various fields of study (Urda & Laredo, 2017).

It is important to highlight how educational spaces must become environments with a design that adapts to the present and future needs of students who demand an innovative educational environment just as architecture has evolved over the centuries to adapt to the society that inhabits it and to meet its needs. Such environments should foster collaboration between students and teachers and be conducive spaces for innovation and the incorporation of active methodologies (Park & Choi, 2014).

In this sense, the general objective of this research is to analyse teachers' perceptions of their workspace and the use of active methodologies taking into account the substantial research opportunity that exists. In addition to this general objective, the following specific objectives are set out: analyse whether the demographic and occupational variables of teachers influence their assessment of the classroom space, investigate whether the teachers surveyed find it easy to occupy and move freely within the classroom space and examine whether classroom design influences the methodologies employed by teachers.

2. Literature Review

Although classroom design has evolved over time (Park & Choi, 2014) it is common to find educational spaces whose design has remained unchanged for years. Classrooms whose "traditional" spatial arrangement undermines the social and pedagogical dynamics that take place.

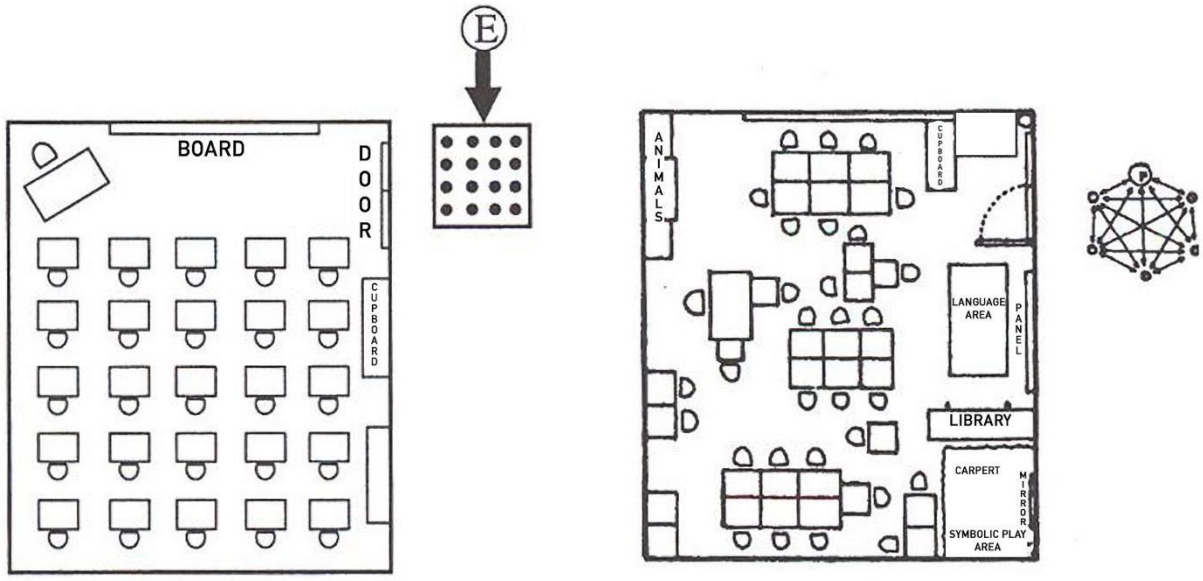

Figure 1. Example of traditional vs. active spatial organisation.
Source: Cano and Lledó (1995).

Transforming traditional classrooms into innovative, accessible, aesthetic, safe, comfortable and interactive spaces (Castro Pérez & Morales Ramírez, 2015) that promote the incorporation of active methodologies in classrooms, with a design, features and equipment that make them all active learning classrooms (Park & Choi, 2014).

Currently, in numerous locations across Spain, classrooms for the future (*Aulas del Futuro* - AdF) are being introduced as innovative spaces to embed methodological change (González & Robles, 2019). These classrooms are equipped with flexible furniture organized into different spaces allowing freedom of movement and full integration of technology to meet the needs of both teachers and students (INTEF, 2022). However, there are few classrooms for the future currently in operation, coexisting with numerous traditional classrooms as educational institutions have limited resources for their implementation. Figure 1 illustrates the diagrams made by Cano and Lledó (1995) through which an analysis of the relationship between the organization and layout of the classroom space and its impact on the

classroom can be carried out in social and pedagogical dynamics.

Presently, actions are being taken at numerous centres to transform existing spaces in favour of methodological renewal. This transformation of current educational spaces as mentioned by Desbrow and Domínguez (2020) is carried out to adapt educational spaces to the modern world and thus ensure that education has a significant impact on students, thereby forming resourceful individuals. According to Figure 2, these educational spaces are becoming settings that allow for the organisation of time and space (Balongo González & Mérida Serrano, 2016) enabling pedagogical versatility and freedom of movement.

Figure 2. Recently renovated classroom at a primary education centre in the autonomous city of Ceuta.

Transforming students into active participants in their learning process (Parra-González, Segura-Robles, Cano, & López-Meneses, 2020; Valdivia, 2010) will be the main ingredient to achieve real methodological innovation in classrooms. This educational innovation relies on the educational space as an essential tool in the teaching-learning process providing students with an educational environment that fosters social relationships, a productive climate and actively involves all members of the educational community.

In this regard, the best way to do so is unquestionably to consult those who inhabit classrooms, hallways and playgrounds daily to understand the current state of educational spaces. Alonso-Sanz (2017) concluded from various studies that posed questions to teachers and students about their perception of the educational environment. It was found that students often did not feel comfortable and demanded greater comfort in their classrooms. Thus, if students and teaching staff do not feel comfortable in the space, it will be impossible to use that educational space as a tool for innovation. It may hinder the teaching-learning process rather than facilitate it (Romaña Blay, 2004).

Therefore, this research seeks to understand the perception of educational spaces on the part of those who inhabit them daily. It aims to explore the thoughts of teachers and propose possible future actions, if necessary, to improve existing spaces and facilitate the incorporation of active methodologies that promote innovation in classrooms.

The child needs to replicate the intimacy and independence they experience at home as closely as possible in the classroom and throughout the school. The natural or man-made environment, the home, the school, the city forms a vital part of the child's education (Ramos-Carranza, 2017).

3. Materials and Methods

3.1. Research Design

The research presented has been carried out through a quantitative investigation divided into two phases. To begin with, an initial descriptive correlational analysis was conducted to understand response trends of the variables analysed based on the concurrence between the researchers' perception of reality as stated in a hypothesis and reality as a phenomenon to confirm a theory (Del Canto & Silva, 2013). An inferential analysis will then allow for more specific and exhaustive results.

3.2. Research Population

The research was conducted at various infant and primary education centres in the autonomous city of Ceuta. The invited centres consisting of 17 public and 6 private (charter) schools comprise all primary education centres in the city. The sample was selected through cluster random sampling. These educational centres are located in different parts of the city and cover a very heterogeneous population in terms of their demographic situation. The centres that participated were as follows: Pablo Ruiz Picasso Infant and Primary School (public).

- Andrés Manjón Infant and Primary School (public).
- Ciudad de Ceuta Infant and Primary School (public).
- Federico García Lorca Infant and Primary School (public).
- Ortega y Gasset Infant and Primary School (public).
- Lope de Vega Infant and Primary School (public).
- Maestro José Acosta Infant and Primary School (public).
- Juan Morejón Infant and Primary School (public).
- Príncipe Felipe Infant and Primary School (public).
- Ramón María del Valle Inclán Infant and Primary School (public).
- Reina Sofía Infant and Primary School (public).
- Rey Juan Carlos Primero Infant and Primary School (public).
- Rosalía de Castro Infant and Primary School (public).
- Santa Amelia Infant and Primary School (public).
- Santiago Ramón y Cajal Infant and Primary School (public).
- Vicente Aleixandre Infant and Primary School (public).
- Beatriz de Silva Charter School.
- La Inmaculada Charter School.
- San Agustín Charter School.
- San Daniel Charter School.
- Severo Ochoa Charter School.

This research included a sample of 245 teachers distributed across different schools involved in educational activities from 3rd to 6th grade. Access to the infant and primary schools of the autonomous city of Ceuta was granted with prior permission from the Provincial Directorate of Education and with the support of the University of Granada. The teachers surveyed are distributed among public and private (charter) schools with 69% teaching in public schools and 31% in private schools (see Table 1). Regarding gender distribution, the sample consists of 71.4% women and 28.6% men as shown in Table 2.

Table 1. School management.

School management		Frequency	Percentage	Percentage valid	Cumulative percentage
Valid	Public	169	69.0	69.0	69.0
	Charter	76	31.0	31.0	100.0
	Total	245	100.0	100.0	---

Table 2. Gender of the sample.

Gender		Frequency	Percentage	Percentage valid	Cumulative percentage
Valid	Male	70	28.6	28.6	28.6
	Female	175	71.4	71.4	100.0
	Total	245	100.0	100.0	---

Additionally, it is important to highlight that out of the total number of surveyed teachers (N=245), 45.7% do not act as class tutors while 54.3% do. This information could be highly relevant for the analysis and drawing of conclusions (see Table 3).

Table 3. Performance of class tutor duties among teachers surveyed.

Performance of class tutor		Frequency	Percentage	Percentage valid	Cumulative percentage
Valid	No	112	45.7	45.7	45.7
	Yes	133	54.3	54.3	100.0
	Total	245	100.0	100.0	---

The employment status of the surveyed teachers shows that 20% are on interim contracts, 46.9% have public employee status and 33.1% have long-term contracts. Additionally, the teachers surveyed were classified into different age ranges (see Table 4) which may provide relevant information for the subsequent reading and analysis of the results. Thus, 6.1% are under 30 years old, 26.1% are between 30 and 39 years old, 34.3% are between 40 and 49 years old and 33.5% are over 50 years old out of all the teachers surveyed.

Table 4. Age ranges of the teachers surveyed.

Ages ranges	Group	Frequency	Percentage	Percentage valid	Cumulative percentage
Valid	< 30	15	6.1	6.1	6.1
	30 - 39	64	26.1	26.1	32.2
	40 - 49	84	34.3	34.3	66.5

	> 50	82	33.5	33.5	100.0
	Total	245	100.0	100.0	---

Additionally, information was obtained as to the professional experience of the teachers surveyed showing that 16.7% have under 5 years of experience, 17.1% have between 5 and 10 years of experience, 25.7% have between 11 and 20 years of experience, 28.6% have between 21 and 30 years of experience and finally, 1.8% have more than 30 years of teaching experience (see Table 5).

Table 5. Professional experience of the teachers surveyed.

Professional experience	Group	Frequency	Percentage	Percentage valid	Cumulative percentage
Valid	Under 5 years	41	16.7	16.7	16.7
	5 to 10 years	42	17.1	17.1	33.9
	11 to 20 years	63	25.7	25.7	59.6
	21 to 30 years	70	28.6	28.6	88.2
	More than 30 years	29	11.8	11.8	100.0
	Total	245	100.0	100.0	---

3.3. Data Collection Instrument

The questionnaire used was designed by the authors of this research; its validation process is currently pending publication. This instrument consists of 28 items organised into 3 dimensions. The three dimensions of this questionnaire are: Spatial Distribution Model Adapted to Teaching Methodology (SDMATM), Freedom of Movement in Classroom Space (FMCS), and Impact of Infrastructure and Educational Space on Teaching-
Learning Methodology (IIESTLM). Appendix 1 illustrates the designed and validated questionnaire that has been used for this study.
9 items divided across the different dimensions will be analysed to address the objectives of this research. These items provide insights from the teachers surveyed regarding their workspace and the use of active methodologies. The questionnaire uses a 5-point Likert scale where 1 represents the most negative response and 5 the most positive. The following issues will thus be analysed to better align the dimensions and items with the objectives of this study:

- Dimension 1: Spatial Distribution Model Adapted to Teaching Methodology (SDMATM).
- Item 1.1: Furniture can be moved to adapt to the teaching methodology employed.
- Item 1.2: Desk arrangement varies according to the method used by the teacher.

- Item 1.3: There is a space for group work or reading area.
- Dimension 2: Freedom of Movement in Classroom Space (FMCS).
- Item 2.1: The space allows movement around the classroom.
- Item 2.2: Students can, if necessary, move comfortably around the classroom to complete tasks.
- Item 2.3: You vary your location in the classroom according to the activity being conducted.
- Dimension 3: Impact of Infrastructure and Educational Space on Teaching-Learning Methodology (IIESTLM).
- Item 3.1: Classroom design directly influences student academic performance.
- Item 3.2: Classroom design promotes the use of active methodologies.
- Item 3.3: Classroom design directly influences the methodology you use.

3.4. Validity and Reliability Test of the Instrument

The design of the instrument was carried out in the following stages:

- The original questionnaire is made up of 30 items and is divided into 4 dimensions.
- The content validity was evaluated by a group of experts in the field of education. After the expert review process, the questionnaire was made up of 28 items and divided into 3 dimensions.
- Finally, the final questionnaire will be composed of 26 items and 3 dimensions following the exploratory factor analysis. The response options that make up the questionnaire are of the 5-point Likert type with 1 being the most negative value and 5 the most positive.

The reliability of the questionnaire used with N=28 was analysed using Cronbach's alpha (α=.862) indicating that the instrument is considered good.

3.5. Research Design and Procedure

The research presented here was conducted in several stages. The designed questionnaire is printed and personally delivered to the management teams of participating educational centres allowing for an explanation of the study's objectives and a preliminary reading to address any questions. The results are entered into the SPSS statistical analysis program following categorisation and selection of the valid sample.

4. Results

The analysis of results is divided into two sections: the first section aims to understand teachers' perceptions of the dimensions studied while the second section seeks to determine if different demographic and personal variables affect teachers' perceptions of the study variables. Table 6 (teacher perception analysis) shows the mean (M) and standard deviation (SD) of teachers' overall perception regarding the classroom spatial distribution model. The overall assessment of teachers regarding spatial distribution is high (M=3.67, SD=0.945). Specifically, teachers rate existing classroom furniture (item 1.1, M=3.84, SD=1.079) and its distribution according to teaching methods (items 1.2, M=3.91, SD=1.104) more positively. Conversely, they have a lower perception regarding the existence of space for group work (item 1.3, M=3.67, SD=0.945).

Table 6. Spatial distribution model adapted to teaching methodology.

Item Nº	Items	M	DT
It 1.1	The furniture can be moved to adapt to the teaching methodology employed.	3.84	1.079
It 1.2	Desk arrangement varies according to the method used by the teacher.	3.91	1.104
It 1.3	There is a space for group work or a reading area.	3.25	1.385
Total	Overall, assessment of the teacher regarding the spatial distribution model.	3.67	0.945

Table 7 shows the general assessment of teachers regarding mobility in the classroom. It may be observed that the overall assessment is high (M=3.89 ± 0.845). Generally, the items referring to overall mobility within the space (items 2.1, M=3.85 ± 1.106) and the possibility of student movement (item 2.2, M=3.58 ± 1.166) provide a positive perspective from teachers. Particularly noteworthy is the very positive assessment teachers give to students' ability to move around the classroom constantly to adapt to the activity being carried out (item 2.3, M=4.24 ± 0.845).

Table 7. Dimension 2. Freedom of movement in the classroom space.

Item Nº	Items	M	DT
It 2.1	The space allows you to move around the classroom.	3.85	1.106
It 2.2	Students can, if necessary, move comfortably around the classroom for tasks.	3.58	1.166
It 2.3	You vary your position in the classroom to adapt to the activity being carried out.	4.24	0.943
Total	Overall assessment of the teacher regarding mobility in the classroom.	3.89	0.845

Finally, Table 8 shows the evaluation of the impact of infrastructure on teaching-learning methodology regarding the overall assessment by teachers. This assessment, although the lowest among the three dimensions analysed still reflects moderately high values (M=3.61 ± 0.674). Generally, teachers positively assess how classroom design influences student academic performance (item 3.1, M=3.78 ± 0.942) and more directly, the selection of methodologies used (item 3.3, M=3.48 ± 0.890).

Table 8. Dimension 3. Impact of infrastructure and educational space on teaching-learning methodology.

Item Nº	Items	M	DT
It 3.1	Classroom design directly influences student academic performance.	3.78	0.942
It 3.2	Classroom design promotes the use of active methodologies.	3.56	1.029
It 3.3	Classroom design directly influences the methodology you use.	3.48	0.890
Total	Overall assessment of the teacher regarding infrastructure.	3.61	0.674

4.1. Influence of Different Variables

Three ANOVA tests were conducted to determine whether various demographic and occupational independent variables (IVs) affect the perception or assessment of the different dimensions being studied (DV). The first ANOVA aimed to assess whether the independent variables (IVs) influence teachers' assessment of the model of spatial distribution adapted to teaching methodology (DV1). The second ANOVA focused on investigating whether the IVs influence teachers' assessments of freedom of mobility in the classroom (DV2). Finally, the third ANOVA sought to provide insights into teachers' assessment of the impact of infrastructure and school space on teaching-learning methodology (DV3). Table 9 presents the different independent variables used in this study specifying the measurement level of each.

Table 9. Definition of variables.

Description	Type	Measurement level
Teacher's overall assessment of the spatial distribution model.	DV1	Scale
Teacher's overall assessment of mobility in the classroom.	DV2	Scale
Teacher's overall assessment of infrastructure.	DV3	Scale
School management	IV1	Nominal (Public /character)
Age	IV2	Ordinal (<30, 30-39, 40-40, >50)
Gender	IV3	Nominal (Male or female)
Tutor role	IV4	Nominal (No or yes)
Professional experience	IV5	Ordinal (<5, 5-10, 11-20, 21-30, >30)

4.2. Inferential Analysis

The sample distribution is assumed to be normal due to its size (>200). Additionally, tests for variance homogeneity yielded correct results allowing for appropriate use of ANOVA analysis.

4.3. Dimension 1: Model of Spatial Distribution Adapted to Teaching Methodology (SDMATM)

According to Table 10, the ANOVA results indicate that the independent variables used do not significantly affect teachers' overall assessment of the model of spatial distribution.

Table 10. ANOVA. Teachers' assessment of a model of spatial distribution adapted to teaching methodology.

VI	F-value	Significance
School management	0.404	0.525
Gender	1.577	0.210
Age	1.562	0.199
Tutor role	1.895	0.170
Professional experience	2.218	0.068

Note: Analysis of variance (ANOVA) indicates significant differences in the model of spatial distribution adapted to teaching methodology (DEAME).

The ANOVA results shown in Table 10 indicate that none of the independent variables significantly affect teachers' overall assessment of the spatial distribution model for dimension 1 which evaluates the Model of Spatial Distribution Adapted to Teaching Methodology (SDMATM). Specifically, school management (F=0.404, p=0.525), gender (F=1.577, p=0.210), age (F=1.562, p=0.199), tutor role (F=1.895, p=0.170) and professional experience (F=2.218, p=0.068) do not show significant effects on teachers' assessments. This suggests that these factors do not influence how teachers evaluate the spatial distribution model.

4.4. Dimension 2: Freedom of Mobility in the Classroom (FMCS)

The ANOVA results (see Table 11) show significant differences in teachers' assessment based on whether they perform tutoring duties as regards freedom of mobility in the classroom (F=7.020, p=0.009). Specifically, teachers who serve as class tutors have a higher mean score (M=4.02) compared with those who do not (M=3.74), indicating that tutors perceive greater freedom of mobility. Other independent variables such as school management (F=2.016, p=0.157), gender (F=0.382, p=0.537), age (F=1.161, p=0.325) and professional experience (F=1.410, p=0.231) do not show significant differences. This highlights that the tutor role is the only variable that significantly impacts teachers' perceptions of mobility in the classroom. No significant differences were identified regarding other independent variables analysed.

Table 11. ANOVA. Teachers' assessment of mobility in the classroom.

VI	F-value	Significance
School management	2.016	0.157
Gender	0.382	0.537
Age	1.161	0.325
Tutor role	7.020	0.009*
Professional experience	1.410	0.231

* =Significant (p<.05)

Note: Analysis of Variance (ANOVA) indicates significant differences in teachers' assessments.

4.5. Dimension 3: Impact of Infrastructure or School Space on Teaching-Learning Methodology (IIESTLM)

Finally, the ANOVA for dimention 3 (see Table 12) which evaluates the Impact of Infrastructure/School Space on Teaching-Learning Methodology (IIESTLM) revealed significant differences based on age (F=3.152, p=0.026) and professional experience (F=3.700, p=0.006). Teachers' assessments vary significantly by age with younger teachers under 30 years old giving a more positive assessment (M=4.00) followed by those aged 30-39 (M=3.69), 40-49 (M=3.59), and over 50 years old (M=3.48). Similarly, assessments vary by professional experience with teachers having under 5 years (M=3.88) and 11-20 years (M=3.78) of experience rating the infrastructure more positively than those with 5-10 years (M=3.48), 21-30 years (M=3.47), and over 30 years (M=3.45) of experience. Additionally, post hoc tests indicate significant differences between teachers with under 5 years of experience and those with 11-20 years of experience (p<0.05). This suggests that both age and professional experience significantly influence how teachers perceive the impact of infrastructure on teaching and learning methodologies.

Table 12. ANOVA. Teachers' assessment of infrastructure.

VI	F-value	Significance
School management	1.140	0.287
Gender	0.001	0.976
Age	3.152	0.026*
Tutor role	0.060	0.806
Professional experience	3.700	0.006*

* =Significant (p<.05)

*__Note:__ Analysis of variance (ANOVA) indicates significant differences In the impact of infrastructure or school space on teaching learning methodology (RIM).

Regarding teachers' assessments by age, significant differences were found with teachers under 30 years old (M=4) giving a more positive assessment followed by those aged 30-39 (M=3.69), 40-49 (M=3.59) and over 50 years old (M=3.48). Significant differences were also found based on professional experience where teachers with under 5 years (M=3.88) and 11-20 years (M=3.78) of experience rated infrastructure more positively. In contrast, teachers with 5-10 years (M=3.48), 21-30 years (M=3.47) and over 30

years (M=3.45) of experience perceived lower satisfaction with infrastructure. Additionally, post hoc tests indicated significant differences between teachers with under 5 years of experience and those with 11-20 years of experience ($p<0.05$).

5. Discussion

The reality of the educational centres will be understood by those who inhabit them daily and those who make them living and learning spaces. Protecting the work and motivation of the teaching team (López & Gutiérrez, 2002) will be essential to achieve quality education and a comfortable educational environment. Educational spaces are designed to meet the needs of those who inhabit them, facilitating the habitation of spaces for their intended function like other architectural elements.

The results obtained in this research show that the teachers surveyed positively value the spatial distribution model although no significant differences were found in the first dimension for the independent variables used. In general terms, the teachers surveyed agree that the arrangement of desks can vary according to the method that they employ. According to Cano and Lledó (1995) this result is important because there is a direct relationship between the organisation and layout of classroom space and the social and pedagogical dynamics that take place within it. It will thus be important for both teachers and students to inhabit a space that promotes communication and the possibility of engaging in a variety of activities, thereby facilitating the opportunity to incorporate innovation within the classroom to create a conducive learning environment.

Regarding the teachers' overall assessment of mobility in the classroom, positive responses were found. The teachers surveyed believe that students can move freely around the classroom if necessary, and they highly value the mobility of teachers during the teaching-learning process. Additionally, it is significant that those teachers surveyed who serve as class tutors rate the freedom of movement in the classroom more positively. Authors such as Izadpanah and Günçe (2014) suggest that teachers' involvement in the continuous transformation of educational space, the ability to adjust their position in the classroom and the flexibility of furniture all contribute to creating a quality educational environment that enhances the interaction between teachers and students and promotes positive attitudes towards learning.

Furthermore, as an approach for future research, it will also be necessary to know the perception of the students who inhabit the classrooms of the teachers who were previously surveyed. A comparison of their responses, perceptions and attitudes towards the place they share daily will potentially offer great advances in the design of quality educational spaces. According to Walden (2015) students would participate in the process of designing their workspace and hence create a quality space for learning.

On the other hand, the surveyed teachers' assessment of infrastructure received the lowest rating among the aspects analysed. Although the assessment of infrastructure is not negative with an average score of 3.61, it is noteworthy that younger teachers have a more positive perception of infrastructure compared with older teachers. This indicates differing opinions on the current infrastructure of educational institutions, reflecting partial dissatisfaction with its suitability and its relationship with the pedagogical dynamics carried out. According to Alonso-Sanz (2017) it is important to highlight that if the educational infrastructure does not generally meet the needs of the educational

community, it may fail to create an educational environment where the relationship between student well-being and the physical classroom space is palpable (Izadpanah & Günçe, 2014) and where the classroom space serves as a supportive tool in improving the quality and innovation of education.

Lastly, a very high percentage of teachers indicated that the design of the classroom space directly influences the methodology they use. According to López-Belmonte, Segura-Robles, Fuentes-Cabrera, and Parra-González (2020) it will be important for our educational institutions to have quality spaces so that teachers perceive their working environments as welcoming and conducive to incorporating active methodologies which require a quality educational environment for their proper development.

6. Conclusion

It is crucial to emphasise that the results obtained in the research as reflected in previous sections provide interesting conclusions for analysis from the perspective of improving the quality of education and incorporating more innovative practices in the classroom. In this sense, as members of the educational community, we must utilise this type of research to benefit teaching practices.

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