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Article

Evolving higher education: Socioformation impact on quality assurance in the knowledge society era

Verónica Aguilar-Esteva[1], Adán Acosta-Banda[2,*], Miguel Patiño Ortiz[3], Ricardo Carreño Aguilera[4]

[1] Ingeniería en Diseño, Universidad del Istmo, Santo Domingo Tehuantepec, 70760 Oaxaca, Mexico
[2] Instituto de Estudios de la Energía, CONAHCYT-Universidad del Istmo, Santo Domingo Tehuantepec, 70760 Oaxaca, Mexico
[3] Sección de Estudio de Posgrado e Investigación de la ESIME Zacatenco, Instituto Politécnico Nacional, 07738 Ciudad de México, Mexico
[4] Ingeniería en Computación, Universidad del Istmo, Santo Domingo Tehuantepec, 70760 Oaxaca, Mexico
*** Corresponding author:** Adán Acosta-Banda, adan.acosta.b@gmail.com

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Abstract: This study assesses the implementation of socioformation in Public Higher Education Institutions (HEIs) in Mexico, exploring its impact on the quality of education in the knowledge society. With a sample of 150 educators, gender-balanced (44.7% female, 55.3% male), and an average age of 43.7 years, the research employed a validated socioformative rubric. Significant progress was observed in analytical and creative thinking, while areas related to living conditions and entrepreneurship education showed slower development. The findings highlight the advancements in socioformation but advocate for further research, including classroom observation and student evidence collection. Gender differences, communication, and leadership emerged as critical factors influencing socioformation implementation. Women demonstrated deeper comprehension of the educational model, willingness to adopt innovative strategies, and emphasis on socioformation axes. As educators gain experience, their adaptability to new pedagogical approaches increases. The study underscores the universal relevance of effective communication, leadership, and stakeholder involvement in successful educational model implementation. The research contributes valuable insights, emphasizing the importance of openness to new approaches and collaboration to prepare students for the challenges of the evolving knowledge society.

Keywords: analytical thinking; creative thinking; educational models; entrepreneurship; socioformation

1. Introduction

The global educational landscape is in constant evolution, driven by significant changes in the social, economic, political, and cultural environment (Arbo and Benneworth, 2007; Backman et al., 2019; Pace, 2023; Sabol, 2013). Historically, Higher Education Institutions (HEIs) have assumed two fundamental roles: the transmission of knowledge through teaching and the creation of knowledge through research (Berchin et al., 2021; Lilles and Rõigas, 2017; Salas-Velasco, 2014; Valenzuela, 2016). However, amidst this evolutionary and transformative process in educational systems, a third mission emerges, known as the "knowledge society" (Frank and Meyer, 2007; Henríquez-Aravena et al., 2021; Ndibuuza et al., 2021; Tobón et al., 2015).

The knowledge society represents a new stage in social interaction (Holmner, 2008; Luckmann, 2008), where knowledge plays a central role in economic and social development (Büyükbaykal, 2015; Du Plessis, 2007; John-Steiner and Mahn, 1996;

Prihadyanti and Aziz, 2023). This dynamic environment has been shaped by the proliferation and evolution of Information and Communication Technologies (ICT) (Nieto et al., 2019; Shyshkina, 2013; Van der Wende and Beerkens, 1999), which have facilitated the transfer of knowledge and ushered in an era where access to and dissemination of information are more accessible than ever (Berkowsky, 2013; Krüger, 2006; Shyshkina, 2013; Wang, 2014).

In this context, the knowledge society presents significant challenges that require an active response from the educational sector (Bodorkós and Pataki, 2009; Krüger, 2006; Kishun, 2007). HEIs are called upon to play an integral role in addressing challenges related to economic, social, political, and technological development (Badillo, 2015; Morawska-Jancelewicz, 2022; Mtawa et al., 2016). This evolution implies a fundamental transformation in how HEIs perceive their mission and operate in a constantly changing world (Alenezi, 2021; Martin and Etzkowitz, 2000; Teixeira, 2021; Valdés, 2021).

Educational models, as theoretical constructs that synthesize the elements of an educational program, play a critical role in adapting HEIs to the changing demands of society (Oude-Vrielink, 2019; Tovkanets, 2020). In the pursuit of enhancing the quality of higher education, it becomes imperative to align these educational models with the evolving needs of the knowledge society, ensuring that they contribute effectively to the assurance of education quality (Priyono et al., 2020; Quiroz-Niño and Murga-Menoyo, 2017; Savickas et al., 2009). Ultimately, educational models provide the policies and guidelines that guide the daily actions of teachers and academics in the classroom, and therefore, their design must align with the priorities of contemporary society (Caena and Redecker, 2019; Cross, 2009; Kim et al., 2007).

In response to the imperative need to adapt to the knowledge society (Alenezi, 2021; Nikolou-Walker and Garnett, 2004; Simões et al., 2020), new approaches to higher education have emerged. Among these approaches are “invisible learning” (Cobo and Moravec, 2011; Rosenfeld, 2015), “conceptual pedagogy” (Kilgour et al., 2019; Lotz-Sisitka et al., 2015; McGregor, 2017; Walker-Gleaves, 2019), “complex thinking” (Morin and Pakman, 1994; Ramírez-Montoya et al., 2022; Tobón and Luna-Nemecio, 2021a;), and “socioformation” (De la Oliva et al., 2015; Tobón et al., 2015), among others. The Socioformation stands out for its collaborative origins in Latin America and its focus on continuous training through collaboration to address contextual challenges in the knowledge society (Parra, 2022).

This socioformative approach promotes not only the acquisition of skills and knowledge but also the development of critical, systemic, and analytical thinking skills, as well as the fostering of an entrepreneurial spirit and the planning of ethical life projects. Additionally (De la Oliva et al., 2015; Prado, 2018; Tobón et al., 2015), it places special emphasis on sustainability in social, economic, and energy-related areas (Acosta-Banda et al., 2021; Gómez, 2018). Socioformation represents an ambitious approach aimed at achieving broad and far-reaching goals, making it essential to promote its dissemination and application in various contexts.

The socioformative approach has been progressively implemented in various universities, exhibiting varying degrees of depth, ranging from curricular integration of competency development to the comprehensive educational model, and extending to the transformation of classes, teaching methods, evaluation, mentoring, research,

and university management (Federighi et al., 2015; Kim et al., 2007; Morawska-Jancelewicz, 2022; Martin and Etzkowitz, 2000; Ndibuuza et al., 2021; Tobón and Luna-Nemecio, 2021a; Teixeira et al., 2021). In the context of quality assurance in higher education, the different levels of socioformation application addressed in this research are crucial for understanding how these approaches contribute to elevating the overall educational experience:

a) The first step towards implementing the socioformative approach involves integrating the concept of competencies proposed by socioformation into the conceptions of what university education should be (Olivos et al., 2016; Tobón and Luna-Nemecio, 2021a).
b) Progress in socioformation implementation is observed as the integration of socioformative competencies within the educational model of universities continues. This entails a more formal incorporation of socioformative principles into the educational structure (Cardona et al., 2011; Irigoyen et al., 2011).
c) A moderate degree of socioformation implementation has been achieved. This is evidenced by curriculum redesign that articulates the concept of socioformative competencies and the implementation of training processes based on this approach, resulting in noticeable changes in teaching methods and evaluation techniques (Fernandes et al., 2016).
d) An advanced level of socioformation integration has been attained. The construction of the university's educational model is grounded in socioformative principles, with particular emphasis on monitoring and enhancing teaching practices (Alonso-García et al., 2019; Aguilar-Esteva et al., 2023; Estai and Bunt, 2016; Jiménez-Galán et al., 2013).
e) Socioformation has been comprehensively integrated into the entire university culture. Its scope extends beyond teaching to encompass research, community engagement, and university management. This stage reflects an unwavering commitment to socioformative principles and their influence on all aspects of the academic institution (Chavira at el., 2022; Mancero and Fabián, 2021; Solano et al., 2023).

Despite these varying levels of progress in socioformation implementation, it is essential to note that there is a lack of comprehensive studies assessing the extent to which teachers apply socioformation principles and their alignment with the university's educational model. Some prior research has addressed specific aspects, such as the evaluation of pedagogical practices (Rodríguez, 2019), curriculum review, and comprehensive evaluation of the educational process (Hernández-Mosqueda et al., 2016; McGourty at al., 1998).

With the aim of contributing to research efforts that promote further advancements in the adoption of socioformative models and their application in shaping a better world, this diagnostic research has been undertaken. This study is specifically designed to bridge the gap in understanding how socioformation principles contribute to the assurance of quality in higher education. The primary objective of this research is to assess the extent to which institutional higher education models have advanced in the implementation of socioformation principles to address knowledge-related challenges. Additionally, it seeks to analyze potential differences based on years of teaching experience to understand if this factor influences the

integration of socioformative principles and the acceptance or rejection of new educational models.

Through this research, valuable insights will be provided to enhance higher education continually and promote an enriching socioformative approach within the academic context.

2. Materials and methods

2.1. Study design

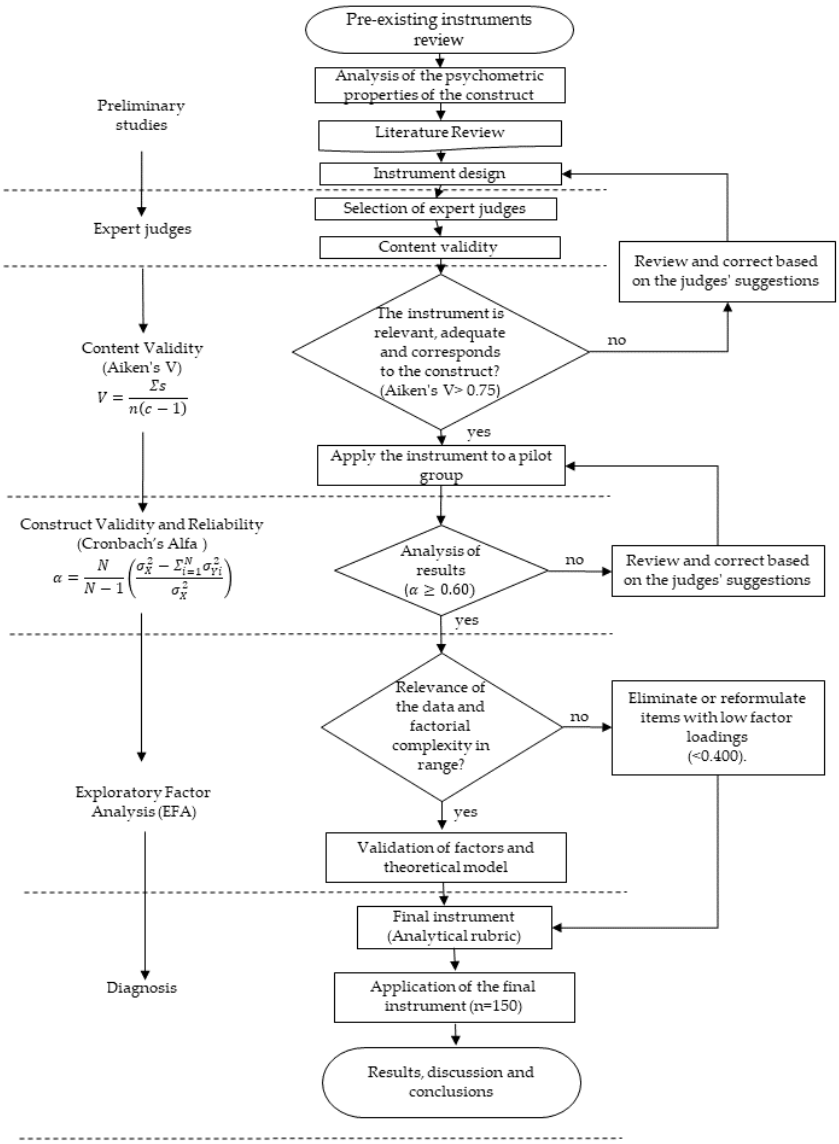

Figure 1. Flowchart of the methodology for the design, validation and reliability of the instrument.

This study is a descriptive cross-sectional investigation (Morzinski et el., 1996; Wang and Cheng, 2020) aimed at acquiring specific data concerning the progress of the institutional higher education model towards the knowledge society in public universities in Mexico. The sample selection was non-probabilistic, resulting in the voluntary participation of 150 educators from various higher education institutions.

To reach out to these educators, we initiated contact via email, providing information about the research's objectives and including a link to the Google Forms instrument in each email. It's worth noting that the research instrument had previously received a positive evaluation during the validation process (Aguilar-Esteva et al., 2019). Furthermore, it underwent construct validation and reliability assessment, with Cronbach's Alpha (Agbo, 2010; Cronbach, 1951), Kaiser Meyer Olkin (Kaiser, 1974), and Bartlett's sphericity (Tobias and Carlson, 1969) test indicating the suitability of the data for Exploratory Factor Analysis (EFA) (Gaskin and Happell, 2014). The results revealed that all items align with the socioformative work model (Aguilar-Esteva et al., 2021). **Figure 1** illustrates the rigorous process to which the instrument was subjected before administering it to the educators.

2.2. Content validity, construct validity, and reliability

The proposed instrument's content validity, construct validity, and reliability were assessed by an expert panel, which evaluated its coherence, writing quality, and relevance to the construct. Subsequently, a pilot test was conducted with a selected group, followed by an evaluation using the expert judgment method, which produced Aiken's V (Aiken, 1970) values to validate the instrument's consistency and content quality. Additionally, construct validity and Cronbach's Alpha (Cronbach, 1951) were evaluated to assess reliability, starting with a correlation matrix. The results of this instrument validation phase are presented in **Table 1**.

Table 1. Results of content validity, construct validity and reliability.

Type of analysis		**Results**
Content validity	Aiken V	>0.80
Construct Validity and Reliability	Cronbach's Alpha	0.930
	Kaiser Meyer Olkin	KMO:0.907
	Bartlett's sphericity	X2: 997.351Gl: 36; $p < 0.000$
Exploratory Factor Analysis	Correlation matrix	positive values ≥ 0.440

Instrument

The proposed instrument is an analytical socioformative rubric designed to assess the degree of progress in public HEIs in Mexico regarding the challenges of the knowledge society (**Table 2**). It is based on the socioformative taxonomy and the guiding axes of socioformation (Tobón et al., 2015; Tobón, 2017). The rubric comprises 9 items, and for the evaluation of the questions, five response levels were provided (very low level = preformal, low level = receptive, medium level = resolutive, medium-high level = autonomous, and very high level = strategic). Each level is accompanied by a descriptor that provides clarity regarding what each level signifies within the context. It possesses content validity (Aguilar-Esteva at al., 2019), construct validity, and a reliability coefficient of 0.930 (Aguilar-Esteva at al., 2021).

Table 2. Socioformative analytical rubric for assessing the institutional educational model's progress in addressing the challenges of the knowledge society.

Question		Answer options
Q1.	To what extent do your classes aim to address contextual issues?	Preformal (Very Low Level): In classes, topics are worked on consistently. Receptive (Low Level): In classes, topics are covered, and occasionally, games, challenges, dynamics, and some applications are introduced. Resolutive (Basic Level): In classes, specific environmental problems are addressed based on particular needs. Autonomous (High Level): In classes, the goal is for students to learn how to identify, interpret, argue, and solve contextual problems. Strategic (Superior Level): In classes, the objective is for students to achieve learning goals by solving contextual problems, ultimately leading to the improvement of living conditions.
Q2.	To what extent is collaborative work promoted to achieve problem resolution in your classes?	Preformal (Very Low Level): Collaborative work is not addressed during classes. Receptive (Low Level): In classes, group work is conducted, but without proper training. Some contribute while others do not. There is no management of roles within teams. Resolutive (Basic Level): In classes, there are some collaborative actions where students work towards a common goal with contributions from all. Autonomous (High Level): In classes, the achievement of common goals is sought through the coordinated contributions of all students. Strategic (Superior Level): In classes, collaborative work is carried out with mutual support among students to achieve learning goals. Conflicts are resolved, and teams remain united despite difficulties.
Q3.	To what extent is the aim to foster entrepreneurship, meaning to generate projects with an impact on environmental issues, pursued?	Preformal (Very Low Level): Classes are traditional and focused on content learning. There is no training for entrepreneurship. Receptive (Low Level): Classes are content-centered, but sometimes support is provided to help students learn to solve problems and achieve goals. Resolutive (Basic Level): In classes, students are supported to plan and execute projects that contribute to solving environmental problems. Autonomous (High Level): In classes, students are encouraged to self-evaluate projects and implement continuous improvements. Strategic (Superior Level): In classes, students are supported to learn how to overcome difficulties that arise in any project and face uncertainty with flexible strategies and a positive mindset.
Q4.	To what extent is the aim to develop critical analysis skills pursued in your classes?	Preformal (Very Low Level): Classes focus on the presentation and reception of topics and content. There is no emphasis on developing critical analysis skills in students. Receptive (Low Level): Some elements of critical analysis, such as identifying needs and issues in the environment or assessing problems in public policies, the professional field, and society, are addressed in the classes. Resolutive (Basic Level): During the classes, students learn to compare ideas, approaches, and models to identify commonalities and differences. Autonomous (High Level): In the classes, students learn to critique different approaches, models, methodologies, and ways of addressing issues in the environment. Strategic (Superior Level): During the classes, students learn to question and critique impartially, considering both the positive aspects and areas for improvement.
Q5.	To what extent is the development of systemic thinking pursued in your classes?	Preformal (Very Low Level): Students and teachers are unaware of the application of the systemic approach during the classes. Receptive (Low Level): The topics of each content area are addressed during the classes as separate and distinct from the environment. Resolutive (Basic Level): During the classes, efforts are made to relate some topics to the environment. Autonomous (High Level): During the classes, topics are addressed by linking various systems that interact with each other. Strategic (Superior Level): Throughout all classes, the emphasis is on the interaction of topics as systems that interact with other systems.

Table 2. (*Continued*).

Question		Answer options
Q6.	To what extent is the development of analytical thinking pursued in your classes?	Preformal (Very Low Level): During the classes, the focus is solely on memorizing content. Receptive (Low Level): Some students take the initiative to explain to others what they have understood during the classes. Resolutive (Basic Level): During the classes, the teacher encourages students to apply their knowledge to real cases without following up on the results. Autonomous (High Level): During the classes, the teacher creates activities that involve processes of analysis and synthesis. Strategic (Superior Level): Analytical thinking is applied in all classes through established processes and activities that are planned and prepared in advance to facilitate different types of reasoning.
Q7.	To what extent is the development of creative thinking pursued in your classes?	Preformal (Very Low Level): During the classes, the topics are approached repetitively and are content-based. Receptive (Low Level): Some students contribute original ideas during the classes. Resolutive (Basic Level): During the classes, the contribution of original ideas through reasoning is positively evaluated. Autonomous (High Level): In some classes, students are encouraged to contribute original ideas to solve problems. Strategic (Superior Level): Well-defined processes of creative thinking are established during the classes, where original ideas are developed to solve contextual problems.
Q8.	To what extent is metacognition encouraged in classes, meaning continuous improvement towards achieving goals?	Preformal (Very Low Level): Improvement activities are not encouraged during classes. Receptive (Low Level): Students may engage in improvement processes during classes without a structured approach. Resolutive (Basic Level): Mechanisms for evaluating improvement processes are in place, following traditional assessment methods. Autonomous (High Level): Classes primarily emphasize continuous improvement processes to achieve goals. Strategic (Superior Level): In addition to encouraging continuous improvement activities and evaluation during classes, continuous improvement is monitored and recognized.
Q9.	To what extent is the improvement of living conditions through the application of values emphasized in your classes?	Preformal (Very Low Level): Classes do not consider living conditions or the application of values as they are not part of the curriculum. Receptive (Low Level): Traditional cultural values are applied in class activities without a strong emphasis on living conditions or their outcomes. Resolutive (Basic Level): The importance of environmental conservation is acknowledged during classes. Autonomous (High Level): Projects aimed at improving the environment are developed during classes. Strategic (Superior Level): Classes include monitoring processes to enhance the environment and quality of life based on acquired knowledge and the resolution of context-related problems.

Concerning the diagnostic assessment of the weighting of factors influencing the implementation of educational models in the knowledge society, the instrument seeks to explore educators' perceptions regarding the influence of communication, the leadership of rectors or directors of public HEIs, and funding in the process of implementing new educational models, based on the findings of prior documentary research (Aguilar-Esteva, 2019; Anastasiou and Garametsi, 2021). This research highlights that leadership, actor communication, and funding are three pivotal elements for the implementation of educational models in HEIs.

2.3. Ethical considerations

Participant consent was obtained in writing in accordance with Articles 7 and 8 of Chapter II of La Ley Federal de Protección de Datos Personales en Posesión de los Particulares (LFPDPPP) (Cámara and Congreso, 2010) (L.E.D.P., 2010). Each participant's understanding of the study's purpose and their voluntary agreement to participate in this research were documented in writing on the instrument before responding to each of the items (Noreña et al., 2012).

3. Results

The sociodemographic data of the teachers who participated in the instrument are presented in **Table 3**. The teachers were grouped by gender, age, marital status, number of years of professional teaching experience, economic conditions, residential area, the type of institution where they completed their studies, and their highest academic degree. As it can be observed in **Table 2**, male teachers accounted for 55.3%, while female teachers comprised 44.7% of the sample. Their average age was 43.7 years with a Standard Deviation (S/D) of 8.97 years. Notably, 72% of the teachers were married, and they had an average of 14.9 years of active professional teaching experience. The majority of the teachers (82%) reside in urban areas, indicating acceptable economic conditions.

Table 3. Sociodemographic data of 150 teachers from public higher education institutions in Mexico.

Sociodemographic Data	**Variables**	**Results**
Gender	Male (M)	55.3%
	Female (F)	44.7%
Age	Average	43.7
	S/D	± 8.97
Marital Status	Married	72.0%
	Single	15.3%
	Divorced	10.7%
	Widowed	2.0%
Number of Years of Professional Teaching Experience	Average	14.9
	S/D	± 8.75
Economic Conditions	Excellent	0.7%
	Good	32.0%
	Acceptable	62.0%
	Low	5.3%
Residential Area	Urban Area	82.0%
	Semi-Urban Area	11.3%
	Rural Area	6.7%
Type of Institution Where They Completed Their Studies	Public Institution	63.3%
	Private Institution	11.3%
	Both (Public and Private)	25.3%

Table 3. (*Continued*).

Sociodemographic Data	Variables	Results
Highest Academic Degree	Complete Bachelor's Degree	12.0%
	Incomplete Master's Degree	4.0%
	Complete Master's Degree	51.3%
	Incomplete Doctorate	15.3%
	Complete Doctorate	16.0%
	Complete Postdoctoral	1.3%

Regarding their highest academic qualifications, 51.3% of the teachers held a complete master's degree, followed by 16% with a complete doctorate, 15.3% with an incomplete doctorate, and 12% with a complete bachelor's degree. A smaller proportion had an incomplete master's degree at 4%, and only 1.3% had completed a postdoctoral program.

Table 4. General diagnosis of the institutional educational model.

Comprehensive Assessment of the Institutional Educational Model				
1. Do you know the current educational model of your university?				
I don't know it	I know it a little	I know some aspects	I know it in most aspects	I know it excellently
8.7%	16%	24.7%	40.7%	10%
2. To what extent are you satisfied with the current educational model of your university?				
No satisfaction	Low degree of satisfaction	Acceptable satisfaction	Good degree of satisfaction	High satisfaction
0%	11.7%	35.8%	42.3%	10.2%
3. Have you heard the term 'knowledge society'?				
Never	Rarely	Occasionally	Frequently	Very Frequently
12.8%	15.5%	25%	19.6%	27%
4. What is your willingness to implement new didactic and assessment strategies in your classes that address the knowledge society?				
I have very little willingness	I have little willingness	I have some willingness	I have a good amount of willingness	I have a high willingness
0.7%	3.4%	20.9%	43.2%	31.8%
5. Which of the following definitions of an educational model do you find most suitable?				
It is a way of working at the university	It is a list of rules that apply to education	It is the regulations and authority that govern the education system	It is a concept and philosophy applied to the educational process	It is a conceptual pattern through which the elements of a program are developed
18.3%	15.8%	13.4%	29.4%	23.1%
6. Based on your own experience, how necessary is communication among participants in the implementation of new educational models?				
Unnecessary	Moderately necessary	Indifferent	Very necessary	Absolutely necessary
0%	1.4%	6.1%	32.4%	60.1%
7. To what extent are you involved in the implementation of new educational models at your university?				
I do not participate	I participate very little	I participate occasionally	I participate very frequently	I always participate
8.1%	18.9%	30.4%	28.4%	14.2%

Table 4 presents the percentage frequency of each level for each item of the general diagnostic instrument regarding the institutional educational model. It is observed that 65.4% of the respondents are familiar with some aspects and most aspects of their university's educational model. None of the teachers reported being dissatisfied with the educational model, achieving a satisfaction level between acceptable and good, at 78.1%.

The term "knowledge society" is not commonly heard by the majority of the respondents, with 28.3% indicating they have either never heard of it or have rarely heard of it. Regarding the willingness of teachers to implement new didactic and assessment strategies in their classes that address the knowledge society, there was a strong willingness, with a cumulative 75% of favorable responses.

Communication in the implementation of educational models is considered necessary and very necessary by 92.5% of the respondents.

The **Table 5** displays the quartiles of the results from the general diagnostic instrument regarding the institutional educational model, with results separated by gender to observe variations.

Table 5. Quantitative analysis of the Instrument: general diagnosis of the institutional educational model.

Gender	Data	Item						
		1	2	3	4	5	6	7
Male	PROM	3.15294	3.42308	3.03529	3.81176	3.32441	4.45882	3.12941
	S/D (+/−)	1.08568	0.93308	1.36667	0.89302	0.95884	0.74886	1.1628
Female	PROM	3.50000	3.64516	3.62121	4.22727	3.68276	4.56061	3.27273
	S/D (+/−)	1.05612	0.72647	1.3216	0.81892	0.72767	0.63558	1.15752

Table 6 presents the range analysis of the years of experience of the participants in this research, along with the mean and standard deviation for each range. The table combines data for both men and women.

Table 6. Analysis of teachers' years of experience.

Years of teaching experience by ranges	Frequency	Data	Item						
			1	2	3	4	5	6	7
0–3	9	PROM	2.89	2.86	3.00	3.56	3.12	4.33	2.56
		S/D (+/−)	1.36	0.69	1.32	0.88	0.87	0.71	1.24
4–7	15	PROM	2.80	3.57	2.87	3.67	3.15	4.20	3.07
		S/D (+/−)	1.08	0.65	0.83	0.49	0.69	0.56	1.10
8–11	40	PROM	2.98	3.69	2.83	3.78	3.49	4.28	3.05
		S/D (+/−)	1.05	0.79	1.50	1.05	0.73	0.88	1.15
>11	87	PROM	3.59	3.49	3.61	4.20	3.41	4.68	3.34
		S/D (+/−)	1.10	0.92	1.37	0.97	0.84	0.86	1.17

Table 7 displays the diagnosis of the weighting of factors involved in the implementation of educational models in the knowledge society. Notably, 36.5% of the participants are at the autonomous level, 31.1% of them actively seek relevant

information to achieve their objectives and apply acquired knowledge independently for a successful implementation, while only 1.4% are at the receptive level in terms of their attitude towards implementing new educational models. The leadership of the institution's rector is absolutely essential for the implementation of educational models (49.3%), just as funding is (48.6%).

Table 7. Factors influencing the implementation of educational models in the knowledge society.

Assessment of the Weighting of Factors Affecting the Implementation of Educational Models in the Knowledge Society				
1. My attitude toward the implementation of new educational models when I am informed about their characteristics and objectives is:				
Receptive	Inquisitive	Investigative and Problem-Solving	Autonomous	Strategic
1.4%	7.4%	31.1%	36.5%	23.6%
2. The leadership of the rector and/or director of the educational institution in the implementation of educational models, based on my work experience, is:				
Unnecessary	Moderately necessary	Indifferent	Very necessary	Absolutely necessary
0.7%	4.1%	7.4%	38.5%	49.3%
3. The financing in the implementation of new educational models is:				
Unnecessary	Moderately necessary	Indifferent	Very necessary	Absolutely necessary
0%	4.7%	4.7%	41.9%	48.6%

Table 8 provides a quantitative analysis of the instrument, where we can observe that the respondents highly prioritize leadership, financing, and communication in the process of implementing educational models.

Table 8. Quantitative analysis of the diagnostic instrument for weighing factors influencing the implementation of educational models in the knowledge society, grouped by gender (men and women).

Gender	**Data**	**Item**		
		1	**2**	**3**
Male	PROM	3.70588	4.24706	4.35294
	S/D (+/−)	1.04453	0.92461	0.8122
Female	PROM	3.72727	4.37879	4.31818
	S/D (+/−)	0.83289	0.73934	0.78758

In **Table 9**, the results of the diagnostic assessment are presented, grouped by ranges of years of experience, to observe whether the factor of experience is a determinant of the outcomes. It is evident that the mean score increases as the number of years of experience rises for item 1. However, for item 2, there is a less consistent increase, particularly in the second and third age ranges. In the case of item 3, the mean score decreases as years of experience increase.

Table 9. Quantitative analysis of the diagnostic instrument for weighing factors influencing the implementation of educational models, grouped by years of experience.

Years of teaching experience by ranges	Frequency	Data	Item		
			1	2	3
0–3	9	PROM	3.333	4.000	4.778
		S/D (+/−)	0.707	1.000	0.441
4–7	15	PROM	3.400	4.067	4.333
		S/D (+/−)	0.828	0.704	0.617
8–11	40	PROM	3.55	4.025	4.150
		S/D (+/−)	1.061	0.947	0.921
>11	87	PROM	3.885	4.506	4.287
		S/D (+/−)	1.012	0.953	1.070

In **Table 10**, the means and standard deviations of each of the items are presented in a manner that allows for the observation of which aspects are of greater importance to teachers regarding the use of the guiding axes of socioformation (Tobón, 2017) in their classes.

Table 10. Descriptive analysis of the analytical rubric for assessing the progress of the institutional educational model in relation to the challenges of the knowledge society, ordered by weighting.

Item	Questions	Prom.	S/D (+/−)
6	To what extent is the development of analytical thinking pursued in the classes?	3.93	0.93
7	To what extent is the development of creative thinking pursued in the classes?	3.91	0.96
8	To what extent is it sought in the classes that students are metacognitive, meaning they continuously improve until they achieve their goals?	3.75	0.97
5	To what extent is the development of systemic thinking pursued in the classes?	3.72	1.04
4	To what extent is it sought in the classes that students develop critical analysis?	3.68	1.08
2	To what extent is collaborative work promoted to achieve problem-solving in the classes?	3.65	1.00
1	To what extent in the classes is there an effort to solve context-specific problems?	3.61	1.09
9	To what extent is the improvement of living conditions pursued in the classes through the application of values?	3.46	1.21
3	To what extent is there an effort to educate for entrepreneurship, i.e., to generate projects with an impact on environmental issues?	3.43	1.08

The analysis of the instrument revealed that the items with the highest scores were: the pursuit of analytical thinking and the development of creative thinking, while the items with lower scores were the pursuit of improving living conditions through the application of values and the pursuit of education for entrepreneurship, generating projects with an impact on environmental issues.

Table 11 provides a gender-based comparison to examine whether there is a difference in the results.

Table 11. Quartiles and standard deviation by gender for the analytical rubric on the progress of the institutional educational model regarding the challenges of the knowledge society.

Gender	Data		Item								
			1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Male	Quartile (Q)	1	3	3	3	3	3	3	3	3	3
		2	3	3	3	4	4	4	4	4	3
		3	4	4	4	5	5	5	5	5	5
	PROM		3.15294	3.54118	3.48235	3.36471	3.69412	3.83529	4.02353	3.82353	3.70588
	S/D (+/−)		1.08568	1.16039	1.12981	1.17359	1.16521	1.04480	0.92552	1.05983	1.04453
Female	Quartile (Q)	1	3	3	3	3	3	3	4	4	3
		2	4	4	4	4	4	4	4	4	4
		3	4	4	4	4	4	4	4.75	4	4
	PROM		3.50000	3.69697	3.84848	3.51515	3.65152	3.57576	3.81818	4.00000	3.80303
	S/D (+/-)		1.05612	1.00720	0.78920	0.94860	0.96860	1.02370	0.94310	0.82280	0.88090

Finally, in **Table 12**, it can be observed that, in general, the number of years of teaching experience does have an influence on the responses, showing a higher mean as the range of teaching experience years increases.

Table 12. Analysis of the results obtained grouped by ranges of years of professional teaching experience in the analytical rubric on the progress of the institutional educational model regarding the challenges of the knowledge society.

Years of teaching experience by ranges	Frequency	Data	Item								
			1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
0–3	9	PROM	3.11	3.44	2.89	3.00	3.44	3.56	3.67	3.56	2.89
		S/D (+/−)	0.93	0.88	0.93	1.12	0.73	1.01	1.22	0.88	1.17
4–7	15	PROM	3.40	3.47	3.47	3.53	3.80	3.87	4.13	3.93	3.73
		S/D (+/−)	0.74	0.92	0.52	0.83	0.68	0.83	0.35	0.88	1.03
8–11	40	PROM	3.45	3.63	3.28	3.75	3.73	4.03	3.95	3.70	3.40
		S/D (+/−)	1.01	0.90	1.04	0.87	0.99	0.86	0.93	0.88	1.26
>11	87	PROM	3.77	3.70	3.55	3.74	3.74	3.94	3.86	3.76	3.49
		S/D (+/−)	1.13	1.06	1.12	1.12	1.09	1.00	1.03	1.03	1.22

4. Discussion

This research has illuminated the extent of progress in implementing the socioformation approach within the educational model of Public Higher Education Institutions (HEIs) in Mexico. Notable distinctions in behavior between women and men were observed, and the participants' years of experience were found to be consequential for the observed outcomes. Participants exhibit a depth of understanding and satisfaction with their university's educational model, with women displaying a superior comprehension of the current model compared to men (items 1 and 2, **Table 5**). Quantitative analysis suggests that knowledge of the model increases with the

number of years of experience, with a markedly higher trend among women (items 1 and 2, **Table 6**).

Regarding the term "knowledge society," a general lack of awareness prevails, with only 27% stating they have heard it frequently. Additionally, it became apparent that as years of experience increase, teachers have a diminishing awareness of the term (Item 3, **Table 6**). This might be attributed to newer generations being more acquainted with terms defining the new social era. Sánchez and Esteban (2018) emphasizes the importance of integrating the concept of the knowledge society and improving educational models, focusing on aspects such as citizenship, emotional education, and digital competencies.

Concerning the willingness to implement new didactic and evaluative strategies, women also exhibit a greater inclination compared to men (item 4, **Table 5**). Concerning years of experience, it was observed that experience influences a heightened willingness to implement new strategies (item 4, **Table 6**). The significance of communication in the implementation of educational models is deemed more critical for women than for men, as is the importance of participating in the implementation of new educational models at their university (items 6 and 7, **Table 5**). Regarding years of experience for these same items, communication is regarded as a significant factor for all, with the mean fluctuating from 4.20 to 4.68 across the four observed experience ranges. The participation of teachers in the implementation of new educational models slightly increases as the years of experience range goes up.

In this context, the research provides additional insights into the study by Hamdan et al. (2013), which explored the implementation of the flipped classroom model. They noted that one of the criticisms of this innovative educational model is that teachers must be well-prepared to handle the new information technologies available to provide students with access to learning from anywhere. This could be one of the factors influencing the responses in this research.

Furthermore, communication between participants is of paramount importance, underscoring the significance of student, teacher, and administrative involvement to achieve effective communication, a strong willingness for change, and clarity in the goals and methods of the model. It underscores the importance of the implementation process of educational models because, even though they may be very promising, the outcome will be positive only if all participants are willing to modify their habits and methods.

On the other hand, the instrument that analyzed the factors of communication, leadership, and funding in the implementation of educational models in the research revealed the following: the quantitative analysis of the instrument, grouped by gender, shows that women consider these factors more relevant compared to men (**Table 8**). Concerning years of experience, it can be observed that communication (item 1) and leadership (item 2) increase as the years of experience increase, but the funding factor (item 3) is considered slightly less relevant as the teacher gains more experience.

Regarding the application of the essential axes of socioformation in the current educational model of the university under study, the following findings were made (**Table 11**): 1) Women apply the following socioformation axes more than men: solving context-specific problems, promoting collaborative work, training for entrepreneurship, developing creative thinking, metacognition, and improving living

conditions. In all these cases, there is an upward trend concerning years of experience; 2) Men apply the following axes more than women: fostering critical analysis, systemic thinking, and analytical thinking. However, only systemic thinking shows an upward trend in men in relation to years of experience. Overall, including both men and women, there is an upward trend in the application of the essential axes listed above, with a slight decrease in items 5 and 7, which correspond to systemic thinking and creative thinking, respectively (**Table 11**).

In Secretaría de Educación Pública (2016), there is an emphasis on considering the timing of the implementation of modifications to the educational model in Mexico. It underlines the need to strengthen the integral formation of individuals to address the challenges of the 21st century. However, this does not mean starting from scratch or attempting to discover entirely new methods. From the socioformation perspective, the ethical life project is an essential part of integral human formation.

It also addresses crucial points for the implementation of the proposed model in Mexican educational reform, including continuous improvement and enrichment of the model, supported by authorities, and respecting the principle of inclusion. They stress the importance of broad participation of experts and teaching staff from across the country, respecting diversity and implementing changes gradually. This aligns with the importance of communication and the role of leadership in the implementation process, as discussed by Rodríguez (2016).

In Morze and Strutynska (2020), there is a discussion of the implementation of educational models based on their experiences in evaluating the results of using competencies for the training of students in the field of Digital Systems and Robotics Engineering (ISDR). Their study outlines the progress achieved in defining the model and its advantages over previous models, focusing on promoting comprehensive student formation and pedagogical practices to operationalize the model, along with the necessary resources.

The findings of this research offer valuable insights to strengthen the quality of higher education. Attention to gender differences, consideration of experience in implementing new strategies, the importance attributed to communication and leadership, and the application of socioformation principles reveal key areas for improvement. By addressing these aspects, educational institutions can not only enhance the current quality of higher education but also establish a solid foundation for future innovations and continuous improvements. Gradual implementation, adaptation to changing needs, and active participation of all stakeholders are essential to ensure that these findings not only contribute to educational theory but also translate into tangible practices that enhance the educational experience for all involved.

5. Conclusion

This research has shed light on the extent of progress in implementing the socioformation approach within the educational model of Public Higher Education Institutions (HEIs) in Mexico. Several key findings have emerged from this study. Firstly, there are notable gender differences in the understanding and perception of the current educational model. Women participants demonstrated a more profound comprehension of the educational model, showing a significant increase in knowledge

as their years of experience grew, especially in comparison to their male counterparts. Moreover, the awareness of the term "knowledge society" was found to be generally low, with just 27% of participants reporting frequent encounters with the term. Notably, women displayed a greater familiarity with this concept, and as years of experience increased, participants, particularly newer generations, displayed less awareness of the term.

Furthermore, this research underscored the willingness of educators to embrace innovative pedagogical strategies and assessment methods in their classrooms. Women, in particular, exhibited a greater enthusiasm for adopting these new strategies. This inclination to adapt was found to increase in tandem with years of experience, indicating a growing willingness to innovate and adapt among educators. Effective communication, leadership, and active involvement in the implementation of new educational models were recognized as significant factors by participants, with women, in particular, placing a higher emphasis on these factors. Notably, the number of years of experience did not significantly affect the perceived importance of communication and leadership, demonstrating their universal relevance in the educational context. However, there was a slight increase in the participation of professors in the implementation of new educational models as their years of experience progressed.

The research instrument that assessed communication, leadership, and funding as crucial factors in the implementation of educational models also yielded notable results. Gender differences were evident, with women ranking these factors as more relevant compared to men. As years of experience increased, communication and leadership were deemed more important; however, funding was considered less critical among experienced educators.

The study also explored the application of socioformation's essential axes within the current university's educational model. Notably, women were more inclined to emphasize the importance of context-specific problem-solving, collaborative work, entrepreneurial training, creative thinking, metacognition, and improving living conditions. These tendencies increased with more years of experience, particularly among women. In contrast, men tended to emphasize critical analysis, systemic thinking, and analytical thinking, with only systemic thinking showing increased emphasis with greater years of experience. Overall, there was an upward trend in the application of these essential axes across both genders, indicating a positive direction in terms of integrating these components into educational practices.

Ultimately, this research contributes valuable insights into the challenges and opportunities related to the implementation of socioformation in educational models in Mexico. While there are evident gender differences, the study demonstrates that increasing years of experience can enhance educators' willingness to adapt to new pedagogical approaches. Moreover, the study emphasizes the importance of effective communication, leadership, and the active involvement of all stakeholders in the successful implementation of educational models.

As education continues to evolve in response to the demands of the knowledge society, it is crucial for institutions and educators to remain open to new approaches, foster collaboration, and adapt to the changing educational landscape. By doing so, they can effectively prepare students for the complexities of the 21st century and instill

in them the skills, knowledge, and values necessary for success in a rapidly changing world.

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References

Acosta-Banda, A., Aguilar-Esteva, V., Patiño Ortiz, M., & Patiño Ortiz, J. (2021). Construction and Validity of an Instrument to Evaluate Renewable Energies and Energy Sustainability Perceptions for Social Consciousness. Sustainability, 13, 2333. https://doi.org/10.3390/su13042333

Agbo, A. A. (2010). Cronbach's alpha: Review of limitations and associated recommendations. Journal of Psychology in Africa, 20, 233-239. https://doi.org/10.1080/14330237.2010.10820371

Aguilar-Esteva, V. (2019). Modelos Educativos en el Nivel Superior en México: Factores que favorecen y obstaculizan su Implementación. Atenas, 3, 18-33.

Aguilar-Esteva, V., Acosta-Banda, A., Carreño Aguilera, R., & Patiño Ortiz, M. (2023). Sustainable Social Development through the Use of Artificial Intelligence and Data Science in Education during the COVID Emergency: A Systematic Review Using PRISMA. Sustainability, 15, 6498. https://doi.org/10.3390/su15086498

Aguilar-Esteva, V., Juárez Hernández, L. G., & Acosta Banda, A. (2021). Validez de constructo y confiabilidad de un instrumento para evaluar la integración del enfoque socioformativo en las prácticas docentes en instituciones de educación superior en México. Revista Fuentes, 23, 178-189. https://doi.org/10.12795/revistafuentes.2021.12905

Aguilar-Esteva, V., Tobón-Tobón, S., & Juarez-Hernandez, L. G. (2019). Construcción y validación de instrumento para evaluar el avance del enfoque socioformativo y adopción de nuevos modelos educativos en el nivel superior en México. Revista Espacios, 40. https://shorturl.at/jmoA4

Aiken Jr, L. R. (1970). Attitudes toward mathematics. Review of educational research, 40, 551-596. https://doi.org/10.3102/00346543040004551

Alenezi, M. (2021). Deep Dive into Digital Transformation in Higher Education Institutions. Educ. Sci, 11, 770. https://doi.org/10.3390/educsci11120770

Alonso-García, S., Aznar-Díaz, I., Cáceres-Reche, M.P., Trujillo-Torres, J.M., & Romero-Rodríguez, J.M. (2019). Systematic Review of Good Teaching Practices with ICT in Spanish Higher Education. Trends and Challenges for Sustainability. Sustainability, 11, 7150. https://doi.org/10.3390/su11247150

Anastasiou, S., & Garametsi, V. (2021). Perceived leadership style and job satisfaction of teachers in public and private schools. International Journal of Management in Education, 15, 58-77. https://doi.org/10.1504/IJMIE.2021.111817

Arbo, P., & Benneworth, P. (2007). "Understanding the Regional Contribution of Higher Education Institutions: A Literature Review", OECD Education Working Papers, No. 9, OECD Publishing, Paris. https://doi.org/10.1787/161208155312.

Backman, M., Pitt, H., Marsden, T., Mehmood, A., & Mathijs, E. (2019). Experiential approaches to sustainability education: Towards learning landscapes. International Journal of Sustainability in Higher Education, 20, 139-156. https://doi.org/10.1108/IJSHE-06-2018-0109

Badillo Vega, R., Buendía Espinosa, A., & Krücken, G. (2015). The Leadership of Rectors in Universities'" Third Mission": Global Visions, Local Views. Revista mexicana de investigación educative, 20(65), 393-417. https://shorturl.at/hlswI

Berchin, I. I., de Aguiar Dutra, A. R., & Guerra, J. B. S. O. D. A. (2021). How do higher education institutions promote sustainable development? A literature review. Sustainable Development, 29(6), 1204-1222. https://doi.org/10.1002/sd.2219

Berkowsky, R. W. (2013). When you just cannot get away: Exploring the use of information and communication technologies in facilitating negative work/home spillover. Information, Communication & Society. 2013, 16(4), 519-541. https://doi.org/10.1080/1369118X.2013.772650

Bodorkós, B., & Pataki, G. (2009). Linking academic and local knowledge: community-based research and service learning for sustainable rural development in Hungary. Journal of cleaner production, 17, 1123-1131. https://doi.org/10.1016/j.jclepro.2009.02.023

Büyükbaykal, C. I. (2015). Communication technologies and education in the information age. Procedia-Social and Behavioral Sciences, 174, 636-640. https://doi.org/10.1016/j.sbspro.2015.01.594

Caena, F., & Redecker, C. (2019). Aligning teacher competence frameworks to 21st century challenges: The case for the European Digital Competence Framework for Educators (Digcompedu). European journal of education, 54, 356-369. https://doi.org/10.1111/ejed.12345

Cardona, S., Velez, J., & Tobón, S. (2013). Towards an adaptive system based on competences. In 2013 IEEE Colombian Conference on Communications and Computing (COLCOM) (pp. 1-6). IEEE.

Chavira, J. A. P., Acosta, H. P., López, A. G., Loya, J. L., Sánchez, C. R. C., & Acosta, A. K. N. (2022). The socioformative rubrics in the OSCE to assess the level of achievement of the competencies comprising the profile of the physician graduate. Educación Médica, 23, 100740. https://doi.org/10.1016/j.edumed.2022.100740

Cobo, C., & Moravec, J. W. (2011). Aprendizaje invisible. Hacia una nueva ecología de la educación. Publicacions i Edicions Universitat de Barcelona, Universidad Internacional de Andalucía. España.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. psychometrika, 16(3), 297-334.

Cross, D.I. (2009). Alignment, cohesion, and change: Examining mathematics teachers' belief structures and their influence on instructional practices. J Math Teacher Educ, 12, 325–346. https://doi.org/10.1007/s10857-009-9120-5

De la Oliva, D., Tobón, S., Pérez, A. K., & Romero, J. (2015). The social inclusion process from the socioformation: Conceptual analysis to disability and Special Educational needs. Paradigma, 36, 49-73.

Du Plessis, M. (2007). The role of knowledge management in innovation. Journal of knowledge management, 11, 20-29. https://doi.org/10.1108/13673270710762684

Estai, M., & Bunt, S. (2016). Best teaching practices in anatomy education: A critical review. Annals of Anatomy-Anatomischer Anzeiger, 208, 151-157. https://doi.org/10.1016/j.aanat.2016.02.010

Federighi, P., Torlone, F., & Boffo, V. (2015). Educational Jobs: Youth and Employability in the Social Economy: investigations in Italy, Malta, Portugal, Romania, Spain, United Kingdom. Educational Jobs, 1-203. https://shorturl.at/cikJM

Fernandes, D. J., Sotolongo, M., & Martínez, C. C. (2016). La evaluación del desempeño por competencias: percepciones de docentes y estudiantes en la educación superior. Formación universitaria, 9, 15-24. https://shorturl.at/cftGX

Frank, D. J., & Meyer, J. W. (2007). University expansion and the knowledge society. Theory and society, 36, 287-311. https://doi.org/10.1007/s11186-007-9035-z

Gaskin, C.J., & Happell B. (2014). On exploratory factor analysis: A review of recent evidence, an assessment of current practice, and recommendations for future use. Int J of Nurs Stud, 51, 511–521. https://doi.org/10.1016/j.ijnurstu.2013.10.005

Gómez, G. (2018). Estudio conceptual de la socioformación en la formación docente mediante la cartografía conceptual. Revista Electrónica Desafíos Educativos, 2, 26-37.

Hamdan, N., McKnight, P., McKnight, K., & Arfstrom, K. (2013). white PAPer BAsed on the LiterAture review titLed A Review of flipped leARning. White paper flipped learning. https://shorturl.at/dfrB9

Henríquez-Aravena, A., Billi, M., Faúndez, V., Labraña, J., Neira, I., & Urquiza, A. (2021). Transdisciplinary University in the Framework of the Knowledge Society. Discursive Tensions Within Universidad de Chile. Pensamiento Educativo, 58, 1-19. https://shorturl.at/txyAE

Hernández-Mosqueda, J. S., Tobón-Tobón, S., & Guerrero-Rosas, G. (2016). Hacia una evaluación integral del desempeño: las rúbricas socioformativas. Ra Ximhai, 12, 359-376. https://shorturl.at/dnDOX

Holmner, M. A. (2008). A critical analysis of information and knowledge societies with specific reference to the interaction between local and global knowledge systems. Doctoral dissertation, University of Pretoria, Pretoria, Gauteng, Sudafrica.

Irigoyen, J. J., Jiménez, M. Y., & Acuña, K. F. (2011). Competencias y educación superior. Revista mexicana de investigación educativa, 16, 243-266. https://shorturl.at/fiTV3

Jiménez-Galán, Y. I., Hernández Jaime, J., & González, M. A. (2013). Competencias profesionales en la educación superior: justificación, evaluación y análisis. Innovación educativa, 13, 45-65. https://shorturl.at/hpqtT

John-Steiner, V., & Mahn, H. (1996). Sociocultural approaches to learning and development: A Vygotskian framework. Educational psychologist, 31(3-4), 191-206. https://doi.org/10.1080/00461520.1996.9653266

Kaiser, M. O. (1974). Kaiser-Meyer-Olkin measure for identity correlation matrix. Journal of the Royal Statistical Society, 52, 296-298.

Kilgour, P., Reynaud, D., Northcote, M., McLoughlin, C., & Gosselin, K. P. (2019). Threshold concepts about online pedagogy for novice online teachers in higher education. Higher Education Research & Development, 38, 1417-1431. https://doi.org/10.1080/07294360.2018.1450360

Kim, M. C., Hannafin, M. J., & Bryan, L. A. (2007). Technology-enhanced inquiry tools in science education: An emerging pedagogical framework for classroom practice. Science education, 91, 1010-1030. https://doi.org/10.1002/sce.20219

Kishun, R. (2007). The internationalisation of higher education in South Africa: Progress and challenges. Journal of Studies in International Education, 11, 455-469. https://doi.org/10.1177/1028315307304184

Krüger, K. (2006). El concepto de sociedad del conocimiento. Revista bibliográfica de geografía y ciencias sociales, 11(683), 1-14.

L. F. D. P., (2010). Datos. Ley Federal de Protección de Datos Personales en Posesión de los Particulares. Diario Oficial de la Federación. https://shorturl.at/fzMQ4

Lilles, A., & Rõigas, K. (2017). How higher education institutions contribute to the growth in regions of Europe?. Studies in Higher Education, 42, 65-78. https://doi.org/10.1080/03075079.2015.1034264

Lotz-Sisitka, H., Wals, A. E., Kronlid, D., & McGarry, D. (2015). Transformative, transgressive social learning: Rethinking higher education pedagogy in times of systemic global dysfunction. Current Opinion in Environmental Sustainability, 16, 73-80. https://doi.org/10.1016/j.cosust.2015.07.018

Luckmann, T. (2008). On social interaction and the communicative construction of personal identity, knowledge and reality. Organization Studies, 29, 277-290. https://doi.org/10.1177/017084060708726

Mancero, O., & Fabián, M. (2019). Estrategias metodológicas para fortalecer la inteligencia emocional en el rendimiento académico de los estudiantes de la carrera de la Pedagogía de las Artes en la Universidad Nacional de Chimborazo en el periodo académico 2019-2020 (Master's thesis, Ambato: Universidad Tecnológica Indoamérica). https://shorturl.at/erHYZ

Martin, B., & Etzkowitz, H. (2000). The origin and evolution of the university species. Organisation of mode, 2. 1-25. https://shorturl.at/qAIJT

McGourty, J., Sebastian, C., & Swart, W. (1998). Developing a comprehensive assessment program for engineering education. Journal of Engineering Education, 87, 355-361. https://doi.org/10.1002/j.2168-9830.1998.tb00365.x

McGregor, S. L. (2017). Transdisciplinary pedagogy in higher education: Transdisciplinary learning, learning cycles and habits of minds. Transdisciplinary higher education: A theoretical basis revealed in practice, 3-16. https://doi.org/10.1007/978-3-319-56185-1_1

Morawska-Jancelewicz, J. (2022). The role of universities in social innovation within quadruple/quintuple helix model: Practical implications from polish experience. Journal of the Knowledge Economy, 13, 2230-2271. https://doi.org/10.1007/s13132-021-00804-y

Morin, E., & Pakman, M. (1994). Introducción al pensamiento complejo (p. 167). Barcelona: gedisa. https://shorturl.at/ahvD3

Morze, N. V., & Strutynska, O. V. (2020). Model of the competences in educational robotics. In Proceedings of the symposium on advances in educational technology, aet. https://shorturl.at/MNOV5

Morzinski, J. A., Diehr, S., Bower, D. J., & Simpson, D. E. A. (1996). descriptive, cross-sectional study of formal mentoring for faculty. Family medicine, 28, 434-438. https://shorturl.at/nxABK

Mtawa, N. N., Fongwa, S. N., & Wangenge-Ouma, G. (2016). The scholarship of university-community engagement: Interrogating Boyer's model. International Journal of Educational Development, 49, 126-133. https://doi.org/10.1016/j.ijedudev.2016.01.007

Ndibuuza, F., Langa, P. V., & Bisaso, R. (2021). Higher Education and the Knowledge Society Agenda in Uganda. Universities in the Knowledge Society: The Nexus of National Systems of Innovation and Higher Education, 22, 67-82. https://doi.org/10.1007/978-3-030-76579-8_5

Nieto, Y., Gacía-Díaz, V., Montenegro, C., González, C. C., & Crespo, R. G. (2019). Usage of machine learning for strategic decision making at higher educational institutions. IEEE Access, 7, 75007-75017. 10.1109/ACCESS.2019.2919343

Nikolou-Walker, E., & Garnett, J. (2004). Work-based learning. A new imperative: developing reflective practice in professional life. Reflective Practice, 5, 297-312. https://doi.org/10.1080/1462394042000270637

Noreña, A. L., Alcaraz-Moreno, N., Rojas, J. G., & Rebolledo-Malpica, D. (2012). Aplicabilidad de dos criterios de rigor éticos en pesquisa cualitativa. Aquichan, 12, 263-274.

Olivos, T. M., Meneses, M. E., Meneses, E. E. S., & Orozco, M. M. F. (2016). Evaluación de un modelo educativo universitario: una perspectiva desde los actores. Revista iberoamericana de evaluación educativa, 9, 29-48. https://dialnet.unirioja.es/servlet/articulo?codigo=5825914

Oude-Vrielink, R. A., Jansen, E. A., Hans, E. W., & van Hillegersberg, J. (2019). Practices in timetabling in higher education institutions: a systematic review. Annals of operations research, 275(1), 145-160. https://doi.org/10.1007/s10479-017-2688-8

Pace, M. (2023). Language Teachers' Training Courses. The Need for Practical Strategies and Resources in the Light of Today's Evolving Educational Landscape. In Conference Proceedings. Florence, Italy Innovation in Language Learning 16th Edition.

Parra, H. A., Cordero Lerma, P. B., & López, J. L. (2022). Socio-Formative Pedagogical Counseling: Professionalization and Improvement of Teaching Practice in Compulsory Education in Northern Mexico. International Journal of Educational Methodology, 8(1), 1-9. https://shorturl.at/enzP0

Prado, R. A. (2018). La socioformación: un enfoque de cambio educativo. Revista iberoamericana de educación, 76, 57-82. https://doi.org/10.35362/rie7612955

Prihadyanti, D., & Aziz, S. A. (2023). Indonesia toward sustainable agriculture–Do technology-based start-ups play a crucial role?. Business Strategy & Development, 6, 140-157. https://doi.org/10.1002/bsd2.229

Priyono, A., Moin, A., & Putri, V.N.A.O. (2020). Identifying Digital Transformation Paths in the Business Model of SMEs during the COVID-19 Pandemic. J. Open Innov. Technol. Mark. Complex, 6, 104. https://doi.org/10.3390/joitmc6040104

Quiroz-Niño, C., & Murga-Menoyo, M.Á. (2017). Social and Solidarity Economy, Sustainable Development Goals, and Community Development: The Mission of Adult Education & Training. Sustainability, 9, 2164. https://doi.org/10.3390/su9122164

Ramírez-Montoya, M.S., Castillo-Martínez, I.M., Sanabria-Z, J., & Miranda, J. (2022). Complex Thinking in the Framework of Education 4.0 and Open Innovation—A Systematic Literature Review. J. Open Innov. Technol. Mark. Complex, 8, 4. https://doi.org/10.3390/joitmc8010004

Rodríguez, E. (2016). El liderazgo directivo en la hermenéutica micropolítica de la escuela. Alteridad, 11(1), 231-239. https://www.learntechlib.org/p/195385/

Rodríguez, V. (2019). Análisis de caso sobre las prácticas pedagógicas desde la socioformación en el Instituto de Educación Superior Pedagógico Público "José Jiménez Borja". En J. M. Vazquez-Antonio (Ed.), Reflexiones sobre las prácticas pedagógicas desde la socioformación. Lima: Centro Universitario CIFE. (www.cife.edu.mx).

Rosenfeld, K.N. (2015). Virtualization and Neoliberal Restructuring of Education. In: Digital Online Culture, Identity, and Schooling in the Twenty-First Century. New Frontiers in Education, Culture, and Politics. Palgrave Macmillan, New York. https://doi.org/10.1057/9781137442604_5

Sabol, F. R. (2013). Seismic shifts in the education landscape: What do they mean for arts education and arts education policy?. Arts Education Policy Review, 114, 33-45. https://doi.org/10.1080/10632913.2013.744250

Salas-Velasco, M. (2014). Do higher education institutions make a difference in competence development? A model of competence production at university. Higher Education, 68, 503-523. https://doi.org/10.1007/s10734-014-9725-1

Sánchez, V.; Esteban, G. Las Urgencias Pedagógicas en la sociedad del aprendizaje y el conocimiento. Un estudio para la reflexión sobre la calidad en el nuevo modelo educativo. Multidisciplinary Journal of Educational Research, 8, 1-28. https://doi.org/10.17583/remie.2018.3199

Savickas, M. L., Nota, L., Rossier, J., Dauwalder, J. P., Duarte, M. E., Guichard, J., & Van Vianen, A. E. (2009). Life designing: A paradigm for career construction in the 21st century. Journal of vocational behavior, 75, 239-250. https://doi.org/10.1016/j.jvb.2009.04.004

Secretaría de Educación Pública, G. de M. (2016). El Modelo Educativo en México: el planteamiento pedagógico de la Reforma Educativa. Perfiles Educativos, 38(154), 216–225. https://doi.org/10.22201/iisue.24486167e.2016.154.57670

Shyshkina, M. (2013). Emerging technologies for training of ICT-skilled educational personnel. In Information and Communication Technologies in Education, Research, and Industrial Applications: 9th International Conference, ICTERI, Kherson, Ukraine, Revised Selected Papers 9 (pp. 274-284). Springer International Publishing. June 19-22, 2013. https://doi.org/10.1007/978-3-319-03998-5_14

Simões, P.C., Moreira, A.C., & Mendes Dias, C. (2020). Portugal's Changing Defense Industry: Is the Triple Helix Model of Knowledge Society Replacing State Leadership Model? J. Open Innov. Technol. Mark. Complex, 6, 183. https://doi.org/10.3390/joitmc6040183

Solano, J. J. B., Nemecio, J. L., Esteban, A. M., & Solano, R. B. (2023). Automated model for the sustainability of the educational physical infrastructure in Smart Cities. Journal of Positive Psychology and Wellbeing, 664-688. https://shorturl.at/bemMZ

Teixeira, A.F., Gonçalves, M.J.A., & Taylor, M. (2021). How Higher Education Institutions Are Driving to Digital Transformation: A Case Study. Educ. Sci, 11, 636. https://doi.org/10.3390/educsci11100636

Tobias, S., & Carlson, J. E. (1969). Brief report: Bartlett's test of sphericity and chance findings in factor analysis. Multivariate behavioral research, 4, 375-377. https://doi.org/10.1207/s15327906mbr0403_8

Tobón, S. (2017). Essential axes of knowledge society and socioformation. Mount Dora: Kresearch. DOI: dx. doi. org/10.24944/isbn

Tobón, S., & Luna-Nemecio, J. (2021a). Complex Thinking and Sustainable Social Development: Validity and Reliability of the COMPLEX-21 Scale. Sustainability, 13, 6591. https://doi.org/10.3390/su13126591

Tobón, S., & Luna-Nemecio, J. (2021b). Proposal for a new talent concept based on socioformation. Educational Philosophy and Theory, 53, 21-33. https://doi.org/10.1080/00131857.2020.1725885

Tobón, S., Gonzalez, L., Salvador Nambo, J., & Vazquez Antonio, J. M. (2015). The Socioformation: a Conceptual Research. Paradígma, 36, 7-29. https://shorturl.at/lLRU9

Tobón, S., Guzmán, C. E., Silvano Hernández, J., & Cardona, S. (2015). Sociedad del Conocimiento: Estudio documental desde una perspectiva humanista y compleja. Paradigma, 36, 7-36.

Tovkanets, A. (2020). University and Lifelong Education in the European Educational Space: the Interdependence of Goals and Strategies. UNESCO Chair Journal Lifelong Professional Education in the XXI CENTURY, 2, 24-29. https://doi.org/10.35387/ucj.2(2).2020.24-29

Valdés, K.N., Alpera, S.Q., & Cerdá Suárez, L.M. (2021). An Institutional Perspective for Evaluating Digital Transformation in Higher Education: Insights from the Chilean Case. Sustainability, 13, 9850. https://doi.org/10.3390/su13179850

Valenzuela, L. I. (2016). Sociedad del conocimiento, aprendizaje y capacidades humanas: aportes al desarrollo teórico. Revista de Ciencias Sociales (Cl), 37, 8-26. https://shorturl.at/cprHT

Van der Wende, M., & Beerkens, E. (1999). An international orientation on institutional strategies and governmental policies for the use of ICT in higher education. Interactive learning environments, 7(2-3), 283-321. https://doi.org/10.1076/ilee.7.2.283.7429

Walker-Gleaves, C. (2019). Is caring pedagogy really so progressive? Exploring the conceptual and practical impediments to operationalizing care in higher education. Higher education and hope: Institutional, pedagogical and personal possibilities, 93-112. https://doi.org/10.1007/978-3-030-13566-9_5

Wang, S. K., Hsu, H. Y., Reeves, T. C., & Coster, D. C. (2014). Professional development to enhance teachers' practices in using information and communication technologies (ICTs) as cognitive tools: Lessons learned from a design-based research study. Computers & Education, 79, 101-115. https://doi.org/10.1016/j.compedu.2014.07.006

Wang, X., & Cheng, Z. (2020). Cross-sectional studies: strengths, weaknesses, and recommendations. Chest, 158(1), S65-S71. https://doi.org/10.1016/j.chest.2020.03.012