

FUTURE AND DIGITAL LITERACIES: TRANSFORMATIVE LEARNING EXPERIENCES IN NORTHEAST MEXICO

LETRAMENTOS FUTUROS E DIGITAIS: EXPERIÊNCIAS DE APRENDIZAGEM TRANSFORMADORAS NO NORDESTE DO MÉXICO

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ABSTRACT: This paper builds toward the convergence of future and digital literacies as catalysts for transformative learning experiences. Based on a systematic analysis of qualitative data obtained from an entrepreneurship digital program with women from marginalized communities in Northeast Mexico (Monterrey), we examine the transformative potential of education. This is done with the use of a participatory action research paradigm and a decolonial perspective with the use of participant observation, semi-structured interviews and ethnographic tools. This study systematizes the experiences of a group of women who transformed their living conditions with the technological intervention and meaningful learning experiences, highlighting their life stories and success cases. This research evidences that future and digital literacies are key components to developing transformative learning experiences that have an impact on a community's social and economic improvement to think about different and possible lifestyles. Results also show the personal and learning profile of each participant and its relationship with the development of a specific scenario on the intersection of the skills in the areas of future and digital literacies. Discussions are built toward the possibilities of improving people's present conditions when enhancing their future and digital skills. Thus, a component of social transformation and educational innovation and technology is present throughout the text.

KEYWORDS: Future literacies. Digital literacies. Transformative learning. Educational technology. Educational innovation.

RESUMO: Este artigo se baseia na convergência dos letramentos futuros e digitais como catalisadores para experiências de aprendizagem transformadoras. Com base em uma análise sistemática de dados qualitativos obtidos de um programa digital de empreendedorismo com mulheres de comunidades marginalizadas no Nordeste do México (Monterrey), examinamos o potencial transformador da educação. Isso foi feito com a utilização de um paradigma de pesquisa-ação participativa e uma perspectiva descolonial com o uso de observação participante, entrevistas semiestruturadas e ferramentas etnográficas. Este estudo sistematiza as experiências de um grupo de mulheres que transformaram suas condições de vida com a intervenção tecnológica e experiências de aprendizagem significativas, destacando suas histórias de vida e casos

de sucesso. Esta pesquisa evidencia que os letramentos futuros e digitais são componentes-chave para o desenvolvimento de experiências de aprendizagem transformadoras que têm impacto na melhoria social e econômica de uma comunidade para pensar sobre estilos de vida diferentes e possíveis. Os resultados também mostram o perfil pessoal e de aprendizagem de cada participante e sua relação com o desenvolvimento de um cenário específico de intersecção de competências nas áreas de futuro e letramento digital. As discussões são feitas sobre as possibilidades de melhorar as condições presentes das pessoas ao aprimorar seu futuro e suas habilidades digitais. Assim, um componente de transformação social, inovação e tecnologia educacional está presente ao longo do texto.

PALAVRAS-CHAVE: Letramentos futuros. Letramentos digitais. Aprendizagem transformadora. Tecnologia educacional. Inovação educacional.

1 Introduction

Digital technologies have pointed out challenges to develop competencies that are needed to be a successful person in the context of the information and knowledge society. Additionally, the digital divide and digital inequalities represent today an obstacle to achieve equitable and fair learning opportunities for everyone (RAGNEDDA, 2017). The relevance of digital literacy and its relationship with the future is evidenced by the regional and national efforts that have been executed in the last decade to implement digital literacy frameworks and strategic plans and workshops to strengthen people's life competencies (UNESCO, 2018). This article is a proposal on how to bring transformative learning experiences in Latin American contexts to aid in the process of enabling people to develop skills for the 21st century. Drawing from these theoretical and pragmatic commitments, an analysis was conducted in order to understand how future and digital literacies develop transformative learning experiences within a group of women in Northeast Mexico, who were part of an educational project that promoted social transformation for marginalized communities in this region.

1.1 Context of the project

The 'Women in Action' project took place from the years 2016 to 2019 in two of the most important cities in Mexico: Escobedo and Tijuana. The project was born from the intention of fortifying the future and digital literacies of women in situations of educational and economic vulnerability who could benefit from workshops designed with the intention of providing them tools for the management and use of Web 2.0 applications, along with the basic framework behind entrepreneurship with the hopes of motivating these women to the formalization or creation of small businesses to support themselves and their families. The project became a reality thanks to the Inmujeres-Conacyt Sectorial Fund, and through the joint work between educational institutions, municipal organizations, and social support projects. In sum, 89 women were able to develop and strengthen the digital and entrepreneurial skills.

The 'Women in Action' program was conceived as a dynamic workshop that would teach the enrolled participants the basic and appropriate use of a computer system. Also,

the objective of the program was to facilitate participants the use of the digital tools to partake in collaborative work that would enrich their lives and the plans for their own small businesses. In order to accomplish this, the workshop consisted of two large modules that focused on knowledge and application through practical exercises: the use of Information and Communications Technology (ICT) with focus on contemporary open resources being introduced in Module 1, and the basic aspects of entrepreneurship being taught in Module 2.

The main objective of the workshop was to help the women enrolled develop a series of abilities and knowledge about the basic aspects of entrepreneurship that would be supported and put into action by the realization of a business plan that would be created with the programs they would be taught to use. The workshop was designed to run for 12 weeks, with three main objectives outlined for the participants:

- a) First, they would learn to use the tools provided by the Google Drive Suite, which include: Gmail, Google Docs, Google Sheets, and Google Slides.
- b) Then, they would learn about the most popular social networks, such as Facebook and Instagram, exploring the potential for advertising and marketing to their target market. They would also explore the platform of YouTube, where they can look up tutorials and videos that could help them learn more about the type of business they wished to start.
- c) Finally, they would partake in the final challenge of the workshop: writing a business plan with the minimum essential elements to be submitted for evaluation by microfinance or social interest institutions that support micro-businesses with seed capital.

Something important to highlight is the fact that the workshop, being focused on using free online tools from the Google Suite, can be applicable in either MacOS or Windows computers, and all the content from the workshop was made available to the community so that it can be replicated in different contexts. The purpose of the project was to promote technological literacy and entrepreneurship as two of the pillars of the knowledge and skills that the 21st century citizen must have.

1.2 Geographical regions of the project

This workshop took place in Escobedo and Tijuana, Mexico. Escobedo is a municipality in Monterrey, Mexico (Northeast region of the country) that currently has a population of approximately 425 thousand inhabitants (INEGI, 2016). According to estimates from the National Council for the Evaluation of Social Development Policy (CONEVAL, 2015), around 85 thousand people from Escobedo are living in poverty, that is, 24 percent of the population. Of these households, 13,000 are headed by women. The president from the National System for the Integral Development of Families in Escobedo was interested and committed to support the workshop the moment the project was pitched to her.

They guided the research group by pointing out the lack of social projects and support for women in Escobedo. Thus, a first database was obtained to contact more than 200 women living in conditions of economic and educational vulnerability in this municipality. In addition, from the aforementioned alliance, there was access to the Santa Martha community center, which is located in the neighborhood of the same name. This

center has eight computers connected to the Internet, a printer, a projector and a space for class sessions. It was there that the sessions of the workshop would take place.

As mentioned before, this project was also worked on in the city of Tijuana, Baja California. In this city there are five oratories and the 'Padre Chava' Breakfast Room, which are located in the most unprotected areas of the city. The oratories, as a whole, offer services to their community, such as educational, recreational, sports, artistic and care for the migrant population. More than 8,000 people are served there each year and the breakfast room serves 800 to 1,200 meals a day. Each Oratory has classrooms, a patio, and a vast community of volunteers and people who, with their donations, support this work.

In the Oratory associated with the Parish of María Auxiliadora, under the direction of Dr. P., the Women in Action workshop was held. To achieve this, this Oratory was equipped with laptops for its execution. The instructors who gave the sessions in this city were trained with the materials created. The dissemination of the course was made through direct invitation in the various activities that take place in the Oratory every week. Almost all of them were neighbors of the Parish and some others were individuals who were invited by a friend or an acquaintance.

Thus, the Women in Action project was run in these two locations at the same time during the years 2016 to 2019.

2 Theoretical and conceptual framework

In the traditional literature, future and digital literacies have been discussed in isolation. While there is an anthropological and sociological view on future and future literacy (MILLER, 2018, 2019; MISCHÉ, 2009; UNESCO, 2020), digital literacies have been discussed as the set of skills needed to develop efficiently in the information and communication society (HINRICHSEN; COOMBS, 2013; SILAMUT; PETSANGSRI, 2020). In this section, we present traditional theories on both concepts, and a theoretical model that integrates them. Finally, the concept of 'transformative learning' (MEZIRROW, 2000) is discussed as a means to assess the extent to which the development of future and digital literacies in the educational scenario is linked to a transformative learning process.

2.1 Future and digital literacies

2.1.1 Future literacies

When individuals use prospective tools to foresee and predict the different scenarios of their futures, they build an 'anticipatory capability profile' (MILLER, 2018). One of the objectives of the Women in Action project was to assist participants in the development of the competencies to think in terms of 'future' (future literacy). The benefits of developing this skill are related to a better comprehension of the world around us and its complexity, in order to respond in creative ways to the transformations of the environment (MILLER, 2019). Also, people are prepared to solve situations that are unpredictable and, sometimes, difficult to understand.

According to Miller (2018), the skill to anticipate living conditions and think in terms

of future is theoretically described by the Futures Literacy Framework (FLF) that is “an analytical tool for describing the different attributes of FL (Futures Literacy) as a capability” (p. 23). Figure 1 outlines the components of the Futures Literacy Framework, which is constituted by two interconnected areas: (a) The ontological side, and (b) the epistemological side. The first one refers to the different kinds of futures people can imagine, while the epistemological side explains the knowledge creation processes that are behind every type of future.

The first component – ontological side – may consider a conscious-closed, semi-closed or open system, which refers to which extent people think that the future presents a more open (flexible or unexpected) or closed (it is something that can be predicted) structure. Also, it draws upon the level of purpose or *teleology* that is the degree in which the “imaginary futures are constrained or unconstrained by the imperatives of probability and desirability” (MILLER, 2018, p. 26). When considering the ‘purpose of the future’, people may think they have more power to modify their futures (anticipation for the future) or they can only react to what life brings to them (anticipation for the emergence). The ontological side also considers the type of future people constructs in three different degrees: (a) Type 1: Preparation (people build the tools to face future situations and problems), (b) Type 2: Planning (people build the tools and change their present conditions to live desired futures), or (c) Type 3: Novelty (people do not prepare their desired futures nor the tools to face future situations and problems).

The second component – epistemological side – refers to the knowledge creation processes that are related to the different types of futures. There are two types of epistemological categories: (a) General-scalable (people who prefer general models such as statistics or proved situations to plan their futures), and (b) Specific-unique (individuals who build their futures based on improvisation and difference, considering each case is unique and cannot be replicated).

Figure 1: Futures Literacy Framework (MILLER, 2018, p. 24).

Discipline of Anticipation (DoA) (Anticipatory Systems (AS))			Epistemological (Knowledge Creation Processes (KCP))	
			General-Scalable (GS) (statistics, common denominators, universals, repetition)	Specific – Unique (SU) (novelty, ephemerality, spontaneity, improvisation, difference)
System	Purpose	Type		
O n t o l o g i c a l	Conscious Closed	AS 1 Preparation & AS 2 Planning ↑ Anticipation for-the-Future (AIF)	AA1	AA2
	Conscious Semi-closed/open	↓ Anticipation for-the-Future (AIF)	AA3	AA4
		Anticipation for-emergence (AIE) AS 3 Novelty (Not-doing)	AA5	AA6
Non-Conscious Anticipation			Anticipatory Assumptions in biology, physics, mathematics, sociology, etc.	

Source: from the authors.

As a result of the intersection between the ontological (system, purpose, and type) and epistemological sides (knowledge creation processes), the Futures Literacy Framework generates six clusters (scenarios) of anticipatory assumptions (AA) that describe how individuals 'use the future':

AA1 Closed/Anticipation-for-the-Future and General-Scalable: 'forecasting': Imaginary futures are based on closed systems such as forecasting, trends and statistics. This scenario tries to predict future possibilities on statistics and information that has been previously proved. People who lay in this cluster are based on previous cases of success that are general-scalable and that are relevant for them to predict their own futures.

AA2 Closed/Anticipation-for-the-Future and Specific-Unique: 'destiny': Imaginary futures are seen as predetermined futures, based on myths or preordained outcomes. As in the example of AA1 futures, in this scenario people base their futures on a preordained outcome that is specific-unique and that helps them to understand the possible cluster for them.

AA3 Semi-open/Anticipation-for-the-Future and General-Scalable: 'creative reform': Imaginary futures are seen as the creative and innovative solutions to achieve a desired project. When thinking of this scenario, people prefer to see the future as something they can adapt and have an influence on.

AA4 Semi-open/Anticipation-for-the-Future and Specific-Unique: 'self-improvement': Imaginary futures are consciousness-oriented and promote adaptation of the present conditions. In AA4 case, people act toward a consciousness of their own lives and projects. Even though they can see difficult conditions in the present stage, they have the openness to adapt their living conditions to face the challenges to have the future they hope for.

AA5 Semi-open/Anticipation-for-Emergence and General-Scalable: 'strategic thinking': Imaginary futures use patterns of repetition to see and give sense to emergence in the present to general-scalable repetition. In this scenario, people react to the emergencies they live in and use their personal tools' repertoire to adapt to challenging situations in a general-scalable knowledge process.

AA6 Semi-open/Anticipation-for-Emergence and Specific-Unique: 'wisdom-Tao-being': Imaginary futures use patterns of repetition to see and give sense to emergence in the present to specific-unique difference as a being. When people think according to this scenario, they react to emergencies according to a specific-unique perspective on life, most times related to their personal beliefs.

2.1.2 Digital literacies

Latin America has experienced an accelerated increase in digital literacy rates in the last decade (UNESCO, 2020). Education policy in most Latin American countries has been fundamental for the integration of Information and Communication Technologies in education, mainly through programs and projects. As of late, there has been an increasing number of resources for use in the classrooms to promote and teach about ICT, although there is still room for improvement (SENA RIVAS; HERRERO GUTIÉRREZ; CASILLAS MARTÍN, 2018). Programs have been implemented to promote the development of digital skills, aimed at integrating ICTs into their educational projects as a way to guarantee justice and social inclusion (BORCHARDT; ROGGI, 2017). In recent years, 31 of the 38 of

these countries have implemented the use of ICT at all educational levels of their respective systems (UNESCO, 2013; 2014).

There has also been an effort to promote learning from the comfort of your phone through mobile learning. Research has shown that the use of mobile learning has been well received by the students, who claim they get a better learning experience thanks to the support that mobile learning provides (HINOJO LUCENA; AZNAR DÍAZ; ROMERO RODRÍGUEZ, 2018). But it is not only the knowledge of digital technologies nor the evidence of its need in the improvement of people's lives that is important to take in consideration when evaluating digital literacy. It is also related to the domain of digital technology to the extent that people know how to use information and communication technologies to solve problems in their daily lives and their professional goals. Even e-Learning tutors have to know how to use digital tools successfully to make their students feel satisfied, since students who perceive that their teachers are not well versed in the use of digital tools when taking an online teaching lesson, they believe that the person providing the learning experience lacks the criteria to transfer the knowledge successfully (AZNAR DÍAZ; CÁCERES RECHE; ROMERO RODRÍGUEZ, 2019).

In this matter, Silamut and Petsangsri (2020) have developed a literature review on the proposals of multiple authors related to the topic of digital literacy. As a result, they defined the digital literacy ability as "knowing how to use techniques and [a competency that] relates to basic knowledge and skills for operating with information technology and networks, including abilities in retrieving, managing, sharing, creating information and knowledge" (SILAMUT; PETSANGSRI, 2020, p. 4). Thus, the components that evidence the mastery of this competency are:

Operational literacy: People are able to study, follow and use computer instructions or manuals, solving problems that require digital technologies.

Analysis and evaluation literacy: People are able to use the Internet and search engines, while they criticize and evaluate information.

Value and creation literacy: People are able to value the creation process in digital environments, using the copyright laws and the permission formats.

Social-culture-organization literacy and cooperation: People are able to interact with people in social media and respect the organizational culture.

2.1.3 Future and Digital Literacies: A conceptual model

The nexus between the future and digital literacies represents an opportunity to close the life skills gap in the 21st century. In this article we propose a model in which the studied cases will be assessed in relationship to the following intersections: (a) Future literacies: Anticipatory Assumptions clusters or scenarios (1 to 6) (MILLER, 2018; 2019), and (b) Digital literacies: Operational literacy, analysis and evaluation literacy, value and creation literacy, social-culture-organization literacy and cooperation (SILAMUT; PETSANGSRI, 2020).

2.2 Transformative learning experiences

In 1991, Jack Mezirow developed a theory of transformative learning experiences.

Since then, his proposals have been used to describe how educational experiences can create meaningful experiences to students and teachers. Drawing on Mezirow's perspective on the matter, Cranton (2016) defines transformative learning as "a process by which previously uncritically assimilated assumptions, beliefs, values, and perspectives are questioned and thereby become more open, permeable, and better validated" (p. 2). In this task, the inner transformation of the adult learner is essential, due to the fact that attitudes and beliefs towards his/her own existence will allow more transformative learning processes to improve the comprehension of the world.

Mezirow (1991) drew on other researcher's work on types of knowledge to characterize the types of knowledge that are related to a transformative dimension of adult learning, which are:

Technical or communicative knowledge: The type of knowledge that refers to the manipulation and control of the environment. Mezirow (1991) defined *instrumental learning* as the process of acquisition of this type of content.

Practical knowledge: The type of knowledge that helps people connect and understand each other through language. It strengthens the bonds among societies and drives toward better social practices and diversity.

Emancipatory knowledge: This type of knowledge comes when questioning the current beliefs and knowledge that were built in the previous two dimensions. Self-determination and self-awareness allow people to be more reflective and critical toward the world that surrounds them. As a result, people will be capable to create new knowledge and be involved in critical learning processes.

When considering transformative learning experiences, adult learners need to analyze their own perspectives about the world, to question their prior knowledge and create more open and flexible learning environments. Thus, the goal of adult education, according to Mezirow, is summarized in the following quote: "help adult learners become more critically reflective, participate more fully and freely in rational discourse and action, and advance developmentally by moving toward meaning perspectives that are more inclusive, discriminating, permeable, and integrative of experience" (MEZIRROW, 1991, p. 224-225).

3 Method

This study analyzed how future and digital literacies developed transformative learning experiences in participants of the 'Women in Action' program. To achieve this objective, a qualitative approach was applied for this research (CRESWELL; POTH, 2018). This was done with a process of systematization (JARA, 2018), that consists in an interpretive and theoretical exercise of giving meaning to the lived experiences. As of late, we used the following research instruments with an ethnographically informed viewpoint and the next research instruments:

Participant observation (Field notes): Researchers participated as instructors of the sessions of the 'Women in Action' project. Classes were held in two regions of Mexico: Monterrey (Escobedo) and Tijuana (Baja California state). Participants from both contexts had continuous communication procedures to give feedback on the activities that were planned. Also, field notes were written during the information gathering. During the project,

researchers participated in a collaborative process of discussing the main findings and observations, to compare and contrast what was identified in this task.

Semi-structured interviews: Eight semi-structured interviews were planned and held during the development of the project. Women were selected by a convenience sample method (CRESWELL; POTH, 2018). The requirement was to be an active participant of the 'Women in Action' project and to show commitment with the learning process.

Furthermore, this study considered a participatory action research paradigm (KEMMIS; MCTAGGART, 2007) in which researchers participated both as scientists and teachers of the 'Women in Action' project, sharing their perspectives, observations and interpretations during the entire process. Additionally, the investigation was built toward a decolonial perspective (SANTOS, 2010; WALSH, 2014) that honored the Latin American perspective and research procedures.

The organization, analysis and interpretation of the data was done with the proposals of Jara (2018), in the context of the theory of systematization of experiences. This is a conceptual approach that appeared in the context of "[...] Latin America as a product of the effort to build our own frameworks of theoretical interpretation from the particular conditions of our reality (JARA, 2018, p. 27). Thus, the origin of this method is deeply connected with the aim of the project of building theory from the situated regions of Latin America and within the knowledge of applied environments in the everyday educational experiences. The process of systematization of the information retrieved the the 'five moments' of Jara's (2018) model:

(a) The experience (records of the information of each experience): Information retrieved from every learning session of the 'Women in Action' project.

(b) Systematization plan (establishment of the objectives and procedures): The objective of the systematization process was to assess the potential of future and digital literacies as key components to developing transformative learning experiences that have an impact on a community's social and economic improvement to think about different and possible lifestyles. This was done within a qualitative perspective with the use of field notes and semi-structured interviews.

(c) Reconstruction of the lived process: With the use of qualitative instruments, we ordered and classified the information according to the research objectives.

(d) Reflection (identification of relationships and interpretation of data): The collaborative dialogue and interpretation, categories of analysis were developed.

(e) Arrival points (conclusions and discussion): A systematic analysis of data (field notes and semi-structured interviews) was relevant to connect the future and digital literacies in the context of transformative learning processes.

4 Results

4.1 General results: Participants – their personal and learning profiles

After conducting the interviews, two types of codification of the interviews took place. The first one was a free coding and analysis approach, allowing one of the researchers to approach the interviews without any set categories in mind and creating the

different codes based solely on the content of the interviews (AUERBACH; SILVERSTEIN, 2003). In order to conduct this coding process, the program MAXQDA Pro was used, taking advantage of the tools provided for the qualitative data analysis in the software (BASIT, 2003). Because the interviews were semi structured, the analytical categories were designed and developed in response to the demands of the material that was collected (SCHMIDT, 2004), which in this case were eight interviews conducted to eight participants who enrolled and completed the workshop successfully.

Out of the categories that were generated through this analysis, three main topics arose. The main findings are listed as follows:

4.1.1 Category 1: Participant's family vocation

Participants were requested to elaborate on their living situation, including the way their families were distributed. Out of the eight participants, four of them shared that they had three children they needed to provide for, while two of them had two children they needed to care for. Thus, out of the eight participants that were interviewed, six of them were mothers. During the interview, these participants constantly referred to their children, voicing how they hoped to have a better economic situation at home to provide for them. Thus, we can observe that there was a strong family vocation amongst the interviewed participants.

The participants who did not have children also expressed concern for loved ones in their family, especially when it came to providing economically to those in need. One of the participants said she had no children, but that she economically supported her parents, who were old and could not work and provide for themselves. The last participant said that she was married, but that they did not have any children yet. However, she pointed out that she was economically supported by her husband, since she had been unable to find a job.

4.1.2 Category 2: Participant's education level

When questioned about their maximum level of students, two of the participants explained they were only able to complete their elementary studies due to economic circumstances in their families. Three of them completed middle school and did not pursue further studies because they were told that they better stay at home, look for a husband or even start working to help their families economically. Two of the participant's finished high school successfully, and only one of the women interviewed said she attended college, specifically for a technical career.

4.1.3 Category 3: Participant's main motivations and plans for the future

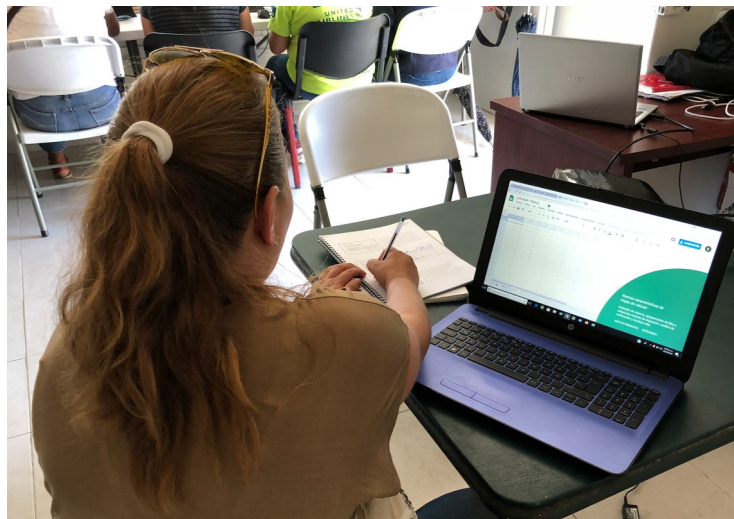
After they had completed the workshop, the women interviewed were requested to share what had been their main motivation to keep participating in the workshop week after week, as well as what plans they had for the future ahead. Four of the participants expressed that their motivation for enrolling and completing the workshop was the desire to learn more about using computers, since they considered their skills lacked the use of

digital tools and they consider this topic to be relevant and important when seeking future professional opportunities.

Four participants expressed that their main motivation was related to their children. One of them claimed she wanted to reconnect with her daughter through social media, and thus she needed to have an email address and the knowledge on how to access her account from a computer. Two of the women said they wanted to learn how to use a computer to seek better jobs that would pay them enough to provide enough food, shelter, and education for their children. One last one said that, because her daughter is still young, she wants her child to see that if you set your mind to it, you can learn whatever you want. To be an inspiring example for her child, she decided to tackle this challenge and was happy to have persevered to the end of the workshop.

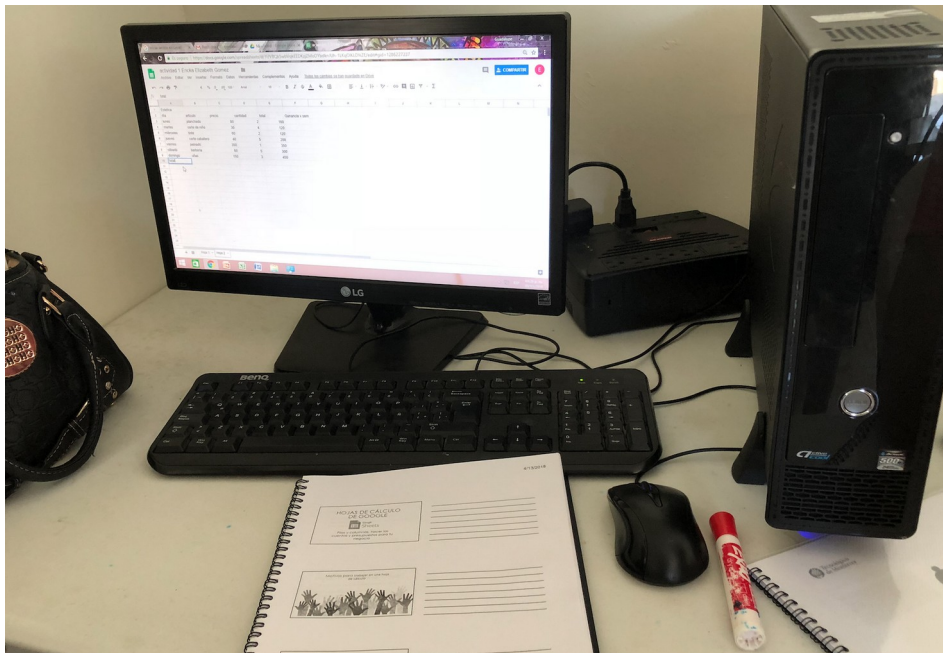
Regarding their future, six participants said that they planned on keeping attending lessons or seeking new ways to keep learning about computers, while two of them said they were going to focus on their future businesses, trying to use what they had learned to start setting things in motion for their business administration.

Figure 2: All participants were given instructions on how to run the Google Suite programs. Many of them took notes to replicate these exercises back home.



Source: from the authors.

Figure 3: All participants were provided a manual with the Powerpoint slides there were used by the facilitators from the sessions that took place so that they could take notes and write down comments in their manuals.



Source: from the authors.

4.2 Results on future literacy

The 'Futures Literacy Framework' was used as a conceptual reference to create codes that would allow the interviews to be analyzed and interpreted through a theoretical coding process. Thus, the results presented in the following tables were calculated by the frequency of appearance of the codes in the interviews. The tables show the percentages of appearance of each type of future and outline a cross-sectional analysis that integrates the theoretical components explained in section 2.

Participants of the 'Women in Action' program evidenced the improvement of their ontological side of futures literacy in the topic of 'types of future'. Table 1 outlines the code presence of the different types of futures according to each interview. Only in one case (Interview 8) the type of future that was planned was in the first level (Be prepared for the future). This observation means that the woman was aware of the possible futures but was not using her tools to modify the possibilities of creating a desired future. Only in one case (Interview 8) the type of future that was planned was in the first level (Be prepared for the future). This last case means that this woman was aware of the possible futures but was not using her tools to modify the possibilities of creating a desired future. She only developed the characteristics to deal with future situations, but not creating a desired future.

Table 1: Futures Literacy (Ontological side – Type of future).

Future Literacy: Ontological Side (type of future)	A: OS – AS 1 (Be prepared for the future)	B: OS – AS 2 (Plan the future)	C: OS – AS 3 (Novelty - Not doing)
1: Interview 1	12.31%	61.92%	25.77%
2: Interview 2	21%	79%	0%
3: Interview 3	27.54%	72.46%	0%
4: Interview 4	17.12%	77.98%	4.9%
5: Interview 5	12.84%	76.15%	11.01%
6: Interview 6	46.54%	53.46%	0%
7: Interview 7	0%	80.75%	19.25%
8: Interview 8	71.19%	28.81%	0%

Source: from the authors.

When talking about the dimension of 'Purpose in future' (ontological side), results evidenced that seven cases (out of eight) were prepared to apply an anticipation for the future and only one case (Interview 6) showed an anticipation for the emergence. This result points out that the 'Women in Action' program seems to have helped participants to have a sense of future that was relevant for them as it assisted them in the process of anticipating their future possibilities and scenarios. In the case of Interview 6, the woman is still in the level of reacting to the situations that occur to her.

Table 2: Futures Literacy (Ontological side – Purpose in future).

Future Literacy: Ontological Side (purpose in future)	A: OS – Purpose - Anticipation-for-the-emergence	B: OS – Purpose - Anticipation-for-the-future
1: Interview 1	0%	100%
2: Interview 2	0%	100%
3: Interview 3	8.7%	91.3%
4: Interview 4	7.61%	92.39%
5: Interview 5	30.6%	69.4%
6: Interview 6	65.88%	34.12%
7: Interview 7	26.09%	73.91%
8: Interview 8	23.81%	76.19%

Source: from the authors.

Finally, when referring to the epistemological side of the future, results show that the behavior of data is heterogeneous. While cases 1, 2, 6, 7 and 8 react to the future as something that is specific-unique (spontaneous, different and novel), cases 3, 4 and 5 are on the side of recovering general-scalable information to predict their futures, as they consider that the future is something that can be replicated from other situations or statistics.

Table 3: Futures Literacy (Epistemological side).

Future Epistemological Side	Literacy: A: ES - GS (General-Scalable)	B: ES - SU (Specific-Unique)
1: Interview 1	47.52%	52.48%
2: Interview 2	0%	100%
3: Interview 3	79.58%	20.42%
4: Interview 4	74.48%	25.52%
5: Interview 5	52.52%	47.48%
6: Interview 6	0%	100%
7: Interview 7	33.91%	66.09%
8: Interview 8	0%	100%

Source: from the authors.

4.3 Results on digital literacy

The Silamut and Petsangsri (2020) model on digital literacy was used as a conceptual reference to create codes that would allow the interviews to be analyzed and interpreted through a theoretical coding process. Thus, the results presented in the following tables were calculated by the frequency of appearance of the codes in the interviews. The tables show the percentages of appearance of each component of the digital literacy and outline a cross-sectional analysis that integrates the theoretical components explained in section 2.

As presented in Table 4, participants were requested to elaborate about their new digital literacy skills, along with the main lessons or knowledge they had obtained as a result of participating in the workshop. Based on the results, we can observe that the main skill that was developed by the participants was of operational nature, meaning that they were able to study, follow and use computer instructions or manuals, being capable of solving problems that require digital technologies. One of the participants (Interview 7) also showed a very high level of value and creation literacy, which means that she values the creation process in the digital environment, respecting the permission formats that are applicable for this kind of endeavor.

Through the analysis of the results, it was determined that the area in which the

participants did not show any development or growth was that of Analysis and Evaluation. This finding will be valuable for future implementations in the workshop, because now part of the learning process might be modified to teach participants how to access and use search engines to gather information that might be valuable for their personal lives or business goals.

Table 4: Digital literacy.

Digital literacy	A: DL-Operational literacy	B: DL-Analysis and evaluation literacy	C: DL-Value and creation literacy	D: DL-Social-culture-organization literacy and cooperation
1: Interview 1	39.24%	0%	39.24%	21.52%
2: Interview 2	100%	0%	0%	0%
3: Interview 3	100%	0%	0%	0%
4: Interview 4	44.83%	0%	17.9%	37.27%
5: Interview 5	50.77%	0%	34.02%	15.21%
6: Interview 6	51.58%	0%	20.75%	27.67%
7: Interview 7	0%	0%	100%	0%
8: Interview 8	61.48%	0%	38.52%	0%

Source: from the authors.

5 Discussion

This paper discusses the possibility of connecting future literacy and digital literacy to create meaningful and transformative learning opportunities for women in marginalized communities in northeast Mexico. In this section, we characterize each studied case (eight) within their intersections between these literacies. This process was applied to promote transformative learning paradigms from the Latin American pedagogical and social scenarios.

5.1 Case 1: Future Literacy (AA2) + Digital Literacy (Operation + Value & Creation)

Considering the future literacy skills, this participant developed an Anticipatory Assumption 2 (Destiny), which is characterized by the development of predetermined futures, based on myths or preordained outcomes. When this woman was interviewed, she declared that her plan was to “keep my little business growing, and with the knowledge they have shared with me” (Interview 1). She declared that she was going to use the

example of other successful cases and women to improve her own case. Because of this reason, she will improve her business according to her own needs and characteristics.

When the participant was requested to talk more about the knowledge they had acquired from the workshop, she stated she had learned how to operate the Google Suite tools and she proudly stated that she now had her own email address. Something interesting to note is that, even though we can see reflected here that the digital literacy in this specific case developed the operational factor, there was also a thirst to create new networks and to start creating value in the future for her business model. She elaborated on this in her interview, stating:

“This workshop has helped me a lot, because in the business part of the workshop, they taught me how to manage my resources better, how to organize my information better and how to channel the data that I gather. My plan is to keep my little business growing, and with the knowledge they have shared with me, organize myself better. I was even thinking about getting in touch with a supplier that might be interested in selling my products in the future” (Interview 1).

The intersection between future literacy and digital literacy in this case shows that the participant learned to use and to value the creation of documents with the use of the computer, something she hopes to use in the future for the sake of her business. She felt empowered with this new knowledge and hopes to apply it in a practical way. Thus, she developed a transformative learning process that was helpful to understand the multiple ways in which she could use knowledge to transform her present and future living conditions.

5.2 Case 2: Future Literacy (AA2) + Digital Literacy (Operation)

As the previous case, this woman evidenced a development of an Anticipatory Assumption 2 (Destiny), which means she prefers a specific-unique future, according to what she needs for her own characteristics (not retrieving other cases to inform her life). Even though she considered her own limitations as a means to develop new knowledge, she also took her personal reference as a motivation to improve her living conditions. Also, after analyzing the participant's replies regarding her future and digital abilities before and after the workshop, the participant confessed that before the workshop, she had never worked with a computer up close. In her interview, she stated:

“Well... to be honest, this has been the first time I have seen a computer up close. I don't have one at home, I don't have the means to get a computer so... that really made me feel excited. I can't say I am a pro at it now, but I definitely learned some basic tools and I can understand now how these tools work” (Interview 2).

Evaluating from her response, we can state that she developed her digital literacy to the operational level, meaning that at least on the basic level of running and understanding the programs, she felt comfortable enough with this newfound knowledge. From not having used a computer ever before, to feeling comfortable sending out an email or even writing a word document, she felt like she had learned a lot in a small period.

The intersection between future and digital literacies in this case demonstrates that, applying the new knowledge on how to operate the basic tools that were part of the curricular plan for the workshop, the participant was able to surpass her previous limitations of not having access to computer equipment and in the process she began to

feel hopeful that, in the future, she might be able to get her own computer and continue fortifying her new learned skills. She strongly believes that this newfound knowledge she acquired will be useful for her future. Thus, her transformative process focuses more on new technical knowledge, thanks to the instrumental learning she obtained as a result from participating in the workshop.

5.3 Case 3: Future Literacy (AA1) + Digital Literacy (Operation)

For this participant, characteristics pertaining to the Anticipatory Assumption 1 (forecasting) profile were identified when analyzing her interview. The participant was aware that there could be future scenarios that could present themselves, and she was interested in developing knowledge and tools that could help her deal with said scenarios. However, her anticipation for these scenarios was limited to previous experiences or forecasts she has witnessed in her environment and context.

When questioned about their digital abilities and level of comfortableness when using the computer equipment, she showed a level of digital literacy pertaining to the operational level. This means that she feels comfortable running and using specific tools, even if it might be at a basic level. In her own words:

“When using computers, well... I only knew the very basic stuff. I had no idea on how to do calculations, or how to use drive. Sure, it is very simple, but back when we began, I had no idea how to do it. They taught me how to use other tools, such as Excel and Word” (Interview 3).

The intersection between future literacy and digital literacy in this case showcases a type of learning process that allowed the participant to discover new tools that can help her better her life. This helped her develop skills and knowledge in how to operate programs that let her to communicate her plans and thoughts with others, as well as making calculations that were done before with an external calculator with an Excel sheet. The development of more practical knowledge permitted her to develop new insights to plan out her personal future, connecting with others and fortifying her digital skills in the process.

5.4 Case 4: Future Literacy (AA1) + Digital Literacy (Operation + Social & Cooperation)

This participant is an example of Anticipatory Assumption 1 (Forecasting). As in the previous case, this woman preferred to consider examples and successful cases to guide her own business and living experience. As an example of this perspective of the future, during the interview, this person retrieved previous educational experiences to explain her motivations for coming to this workshop and how these previous events have helped her in the process of believing she was able to do it: “When I saw new topics in high school or junior high, I thought it was an advanced and difficult knowledge. However, this workshop has taught me to say ‘Yes, you can do it... If you want it, it is possible for you’” (Interview 4). When requested to elaborate on the newfound knowledge that the workshop had provided, she stated:

“I learned about new webpages I had no idea existed. I learned to make my own email. I used to have an old email, but I had no idea how they made it or how to access it,

it was my daughter who set it up for me. But this time, it was different, because I was the one who made my own account. I also learned about what a Powerpoint is, I had never understood what it was. Even when my daughter told me she had a Powerpoint due for her homework, I couldn't understand what she was referring to. But that has changed now" (Interview 4).

Thus, we can observe that she developed operational skills regarding the use of the computer and tools such as email and Powerpoint. However, this participant also delved upon brand-new social skills and opportunities that arose as a result of the workshop:

"What I liked most of the workshop is that now I have more ways to communicate with my loved ones. I can feel closer to my daughter, because I have an email and that means I can have social media now, too. Not only that, but I feel like I can help my daughter with her homework better now. Before, I used to isolate myself whenever her homework had something to do with a computer. But now it will be different" (Interview 4).

Based on that statement, we can observe that she also developed social and cooperation skills in the digital literacy field, meaning that she is ready and willing to use her computer to cooperate and keep in touch with friends and loved ones.

5.5 Case 5: Future Literacy (AA1+AA2) + Digital Literacy (Operation + Value & Creation)

This participant is an example of a balanced perspective on the future, considering both specific-unique and general-scalable epistemological sides. While this woman considered the statistics and models to plan her future actions, she was also committed to her own background and its local needs. This future perspective also helped her to develop a digital literacy on the levels of 'Operation' and 'Value & Creation', because she was flexible to learn how to improve her digital skills, but also to connect with other members to launch business ideas according to the opportunities of the market. This is evidenced with the following quote:

"Well, I have learned to make a business program, for when you start a business... With these learning I am going to establish a hardware store or a beauty salon. These things are important because you learn about business expenses" (Interview 5).

She also declared that "[...] sometimes we have to update, because right now there is a lot that you have to use the computer for, that you have to use the internet" (Interview 5) to be an example for her children. Drawing from this idea, this participant was committed to her specific-unique needs to build a future in which her children will have a reference of commitment and perseverance. Thus, self-determination and self-awareness were developed as a means to generate a transformative learning process (MEZIROW, 1991). Moreover, this woman explored the possibilities of digital technologies to improve her role as a mother, to plan a better future for herself and her children.

5.6 Case 6: Future Literacy (AA2) + Digital Literacy (Operation + Social & Cooperation)

This participant is an example of an Anticipatory Assumption 2 (Destiny) with a combination of the levels of 'Operation' and 'Social & Cooperation' in the case of the digital

literacy dimension. She evidenced an orientation toward a closed system in which she did not have enough possibilities to plan her future. For example, she declared that she did not have a successful experience when trying to establish her own business (selling chicken in her community). Also, this participant mentioned that she wants “to start a business, so that we [she and her husband] can have a better living and economic condition” (Interview 6). When doing more questions about her plans towards a new project, she did not have clarity, as she was waiting for the local conditions to be suitable to start this project.

Even though she has limitations when talking about future literacy, she learned how to use and connect to other people while using digital media, applying practical knowledge (MEZIROW, 1991) to strengthen her bonds with other members of the group. In this context, she declared that instructors “taught her to open Google, and to create an email, which I already had... They taught me how to open and use these tools” (Interview 6). Finally, she declared that this project was also an opportunity to improve her connections to “make her business grow” (Interview 6), as she will have the opportunity to learn from other people and their experiences.

5.7 Case 7: Future Literacy (AA1) + Digital Literacy (Value & Creation)

Case 7 is an example on how to link the Anticipatory Assumption 1 (Forecasting) with the level of ‘Value & Creation’ in the digital literacy dimension. This woman summarized her learning process with the following words: “Well, in these classes, what they have taught us is how to run a business [...] These contents are relevant, because they are teaching us how to run our own businesses” (Interview 7). She considered her future was flexible and open to see possibilities to create a new organization, according to her personal characteristics and the chances of her environment. Also, she found the opportunity to change her present living conditions to connect to other members of the group to look for new ideas of entrepreneurship and economic improvement. Finally, as she presented an AA1, she retrieved examples of her classmates and other cases to inform herself and avoid mistakes in the future processes.

When talking about the creation of a transformative learning process, this woman declared that during this project, she became part of a group of entrepreneurs who developed a business of creating ribbons. While they were still in the first stages of the enterprise, they developed practical knowledge (MEZIROW, 1991) to use what they learned in their courses in the development of a new activity. These new concepts helped them to emancipate their marginalized positions to promote new possibilities and lifestyles with a vision of improvement and social justice.

5.8 Case 8: Future Literacy (AA2) + Digital Literacy (Operation + Value & Creation)

Finally, this woman evidenced a future background on Anticipatory Assumption 2 (Destiny) with a combination of the levels of ‘Operation’ and ‘Value & Creation’ in the dimension of digital literacy. When talking to this participant, she declared that her motivation to enter this program was to learn new things and improve her own resources: “I have always liked to learn. I have already taken about four courses with this one. I think I need to learn how to use the computer to be able to manage my business a little bit more”

(Interview 8). She also talked about her learnings related to what she has studied from other cases and that she will strengthen her point of view with the analysis of these previous situations. Her motivation to accomplish this was also related to the bond with her beloved ones and the possibilities of developing her lifestyle. Because of this, she developed a consistent digital literacy on the operation and value-creation levels, which represented her commitment to know how to use digital technologies and to connect to people who have similar interests: "My idea is to continue studying in this course... Or maybe I can study the undergraduate degree of Agricultural Engineer" (Interview 8).

Finally, she declared that the digital technologies helped her in the process of creating new possibilities for her business, and for connecting to other people who are interested in similar topics. These relationships showed how a transformative learning process that is connected to other people, to future possibilities and digital technologies open new opportunities to improve lifestyles, to control or manipulate the environment and to change the way human beings assess the contexts in which they live. With this evidence, it can be argued that transformative learning does not change the way people understand new knowledge, but also transform the present conditions when considering new future aspirations.

6 Conclusions

This study discussed the transformative potential of education, with the analysis of an entrepreneurial program in Mexico whose main goal was to promote future and digital literacies in women who found themselves in vulnerable positions, be it by social or economic factors, and in some cases even both. Women were provided classes and manuals to familiarize themselves with Google Suite. They also participated in an intensive program to understand the basic terms of entrepreneurship. The objective behind this workshop was to provide the women with tools that would help them run their own micro businesses, with the hope that the new skills and tools they learned about would make a positive impact in their professional and personal lives.

Results evidence that future and digital literacies are key components of transformative learning experiences. The participants felt empowered and more hopeful about the future once they obtained at least an operational understanding of the Google Suite tools, especially after they discovered that these could be accessed for free in an online platform. Many women expressed interest to continue their learning process on their own, since they still considered there was much to learn. Others, motivated by their newfound skills, were excited to start putting their new knowledge into motion by focusing their efforts to their micro businesses immediately. All interviewed participants reflected and demonstrated characteristics of having undergone through a transformative learning experience at the end of the workshop, many of them expressing that using computers is something they had always wanted to learn, since they consider it is an important skills that open up doors to seek better job opportunities for them.

Future topics to be researched include the following: (a) The development of advanced digital literacies related to the evaluation and analysis skills, in order for people to know how to discriminate information and use it to accomplish multiple goals, (b) The inclusion of these topics in formal educational settings, such as elementary and middle education with children and youth, to analyze the impact of these topics when considering

future competencies, and (c) A longitudinal analysis on how participants develop future and digital competencies; this will help to analyze if their plans were developed in an applied context or not. Doing this project was a transformative process not only for participants, but for teachers and researchers, who changed their perspectives towards the transformations that teaching and learning processes can promote in people from vulnerable communities. There are multiple topics to be discussed, to enhance people's lives and educational pathways, and to foster a general wellbeing through the development of future and digital literacies in educational scenarios.

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