

THE IMPACT OF INTENDED USE AND PERCEPTIONS OF MICRO-CREDENTIALS ON PROFESSIONAL DEVELOPMENT OF TEACHERS IN ACADEMIA: AN EMPIRICAL EVIDENCE FROM AN EMERGING ECONOMY

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ABSTRACT

Purpose: The purpose of this research paper is to analyze the impact of perceptions and intended use of micro-credentials on professional development of teachers. Alternatively, this study focuses on how micro-credentials can play a role in enhancement of teachers' content knowledge, collaboration, employability, and competence.

Design Methodology Approach: This research paper followed the positivist approach to analyze data and therefore quantitative analysis was undertaken to examine the problem by circulating a questionnaire among 256 people who were selected by using purposive sampling technique as the target audience was teachers working in higher education institutes in Pakistan who have prior experience with micro-credentials.

Findings: The findings of this study support that the perceptions and intended use of micro-credentials have a positive effect on collaboration and employability enhancement of teachers. However, the hypotheses that perceptions and intended use of micro-credentials have an impact on teachers' content knowledge were rejected. Research also suggested that positive perceptions of micro-credentials have a high effect on perceived competence.

Originality value: This paper provides evidence to conclude that micro-credentials play a vital role in the professional development of teachers. Educators perceive micro-degrees as an important element in their career growth as it provides them an opportunity to learn new skills, discuss their ideas, and increase their employability and competence. Thus, policymakers should take the necessary steps to promote micro-learning prospects for teachers.

Keywords: Micro-credentials, Perceptions of Micro-credentials, Use of Micro-credentials, Teachers' professional development.

INTRODUCTION

"Microcredentials", "badges" or "micro certificates" have become a very important aspect of personalized professional development in recent years and one of the most prominent topics in skills policy literature (OECD, 2020; European Commission, 2020; Cedefop, 2021). The Fourth Industrial Revolution (4IR) is characterized as an era of innovation, digitalization, and emerging technologies (Schwab, 2016). Micro-learning is also assumed to be an informal approach to professional learning as the environment, structure, and application are based upon the discretion of the trainer (Glatthorn, Boschee, Whitehead, & Boschee, 2019). As Tucker (2019) suggested, Leaders who

want to create a learning environment and encourage innovation have to invest resources, time, and energy to build sustainable infrastructure fostering professional learning to facilitate the anticipated change.

There are two main sections of this study. The first one provides details about the origin, emergence, and usefulness of micro-credentials for the personalized professional development of employees. And how Human capital theory forms the basis of micro-credentials and how it forms a tertiary education system for the skills development of the workforce (Brown et al., 2020). In the second part, the link between micro-credentials, professional

development, and employment opportunities in the gig economy will be illustrated.

Problem Statement

With an emerging consensus among researchers, Micro-credentials are described as short courses substantive and aligned with industrial insights enough to be considered as professional qualifications (Kato et al., 2020). The structure and focus of micro-credentials have a significant potential to support a gig economy. Pakistan was ranked 4th in the global digital gig market in 2017 according to a report by the Oxford Internet Institute (OII). Cirlan and Loukkola (2020) claimed that micro-credentials will revolutionize higher education.

Many employed persons working full time and lack behind because of social, and financial issues, can enhance their skills with the help of a Massive Online Education System. It has increased opportunities for potential professional students of Pakistan and can be beneficial for employees who like to develop themselves and excel in their professions (Urooj, Ali, Bano, & Mukarram, 2022).

Not only for the professional development of teachers, but micro-credentials also serve employers' interests by promoting personalized student-centered learning (Wills & Xie, 2016). Arguably they are considered to be a low-cost alternative to higher education. Micro-credentials can be offered in hybrid or blended form i.e., online, group, and face-to-face. However, they are mostly linked with online learning and self-paced (Kato et al., 2020). It prepares graduates for the upcoming challenges of the professional world, equips them with the necessary skill sets, and encourages them to further education (Moodie et al., 2019; Wheelahan & Moodie, 2017). According to Klaus Schwab (2016), there is a need for specialized, highly skilled, and knowledge workers in the market.

So, this research is aimed to study the potential role of micro-credentials to equip an employee with specialized skill sets; the altering process of conventional ways of learning, and its benefits for professional development to analyze the progress at the beginning of the fourth industrial revolution.

Research Objectives

The objective of this quantitative research is to study the impact of the Intended Use and Perception of Micro-credentials on Teacher's content knowledge,

Collaboration, Employability, and Perceived competence of teachers working in higher education institutions.

Scope

Micro-credentials work as an instrument to shape the higher education system in a way that provides a student not just with education but with the necessary skills to get employed after completing higher education. The reorientation of education from knowledge development to producing skilled workers has been greatly amplified by micro-credentials. Micro-credentials can accomplish three goals at the same time: first, they help to design a curriculum more focused on work (Muller & Young, 2014); second, they make the education system more market-oriented and responsive towards technology (Marginson, 2006); and third, it may embed as a key component of higher education, drive additional income for institutions offering it and create skilled workforce relevant to the industry (Tehan, 2020).

Theoretical Background

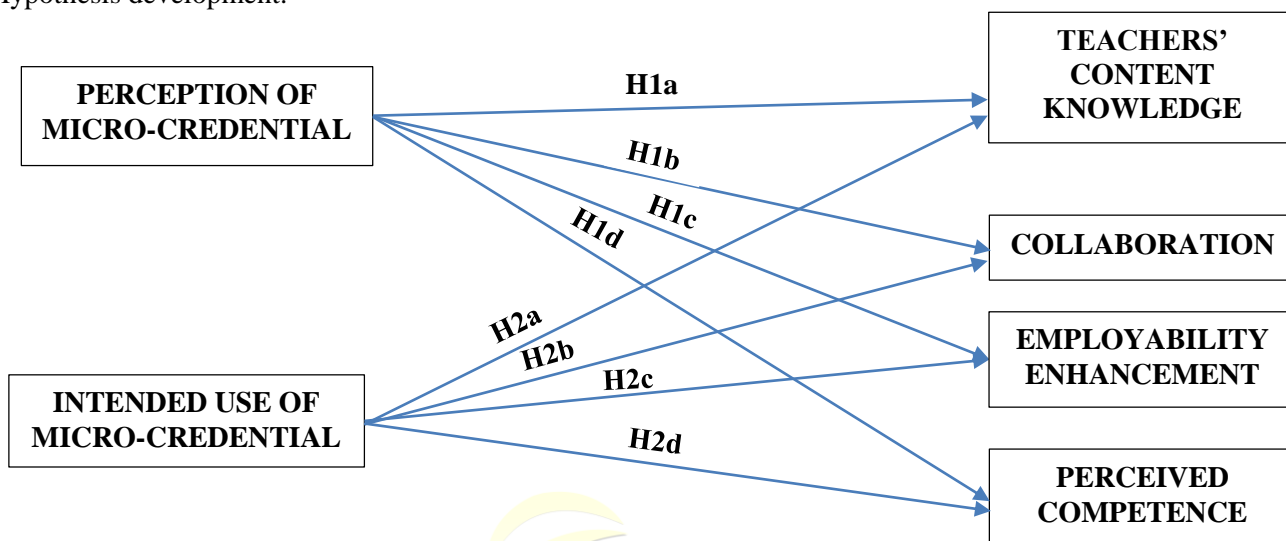
The human capital theory forms the baseline proposition of micro-credentials which believes the right credentials or qualification at the right time is essential for a professionally equipped individual order to enter the socially congested labor market (Brown et al., 2020; Livingstone, 2019). For the development of micro-credentials programs, digital platforms need to be developed as a micro-unit of learning within the institutions and record transmissions between its affiliate institutions is an important aspect as well (Keavy & Chakroun, 2019). Griliches (1969) and Welch (1970) developed the Skill-Based Technological Change theory which suggests with the advent of technology, the relative demand for skilled labor has increased. This theory has advocated the importance of skilled labor in the technological era for many years. The link between necessary skillsets and the labor market can be legitimized with the use of personalized micro-credentials. SBTC theory is aiding to determine the link between micro-credentials and higher technical skills to bridge the gap between academic programs and the skills required for sustaining in the labor market (Cirlan & Loukkola, 2020). With the emergence of new databases, the SBTC theorists have operationalized those elements of unobserved skills which they have been looking for (Lauder et al., 2018).

Micro-credentials can elevate a few difficulties: It requires data sharing across the institutions and also seeks to discipline educational institutions; it advocates tertiary flexible education system which reorients the objective of higher education from knowledge purposes to employment purposes; it

might end up in a market of privatized higher education institutions; it seeks to divert students from traditional to the contemporary education system; the main focus is to develop a skilled workforce to fulfill the demand of labor not to produce knowledge workers.

Conceptual Framework

Hypothesis development:



Perception of Micro-credentials

- H1a: Perception of micro-credentials has a positive effect on teachers’ content knowledge.
- H1b: Perception of micro-credentials has a positive effect on collaboration.
- H1c: Perception of micro-credentials has a positive effect on employability enhancement.
- H1d: Perception of micro-credentials has a positive effect on perceived competence

Intended use of Micro-credentials

- H2a: Intended use of micro-credentials have a positive effect on teachers’ content knowledge.
- H2b: Intended use of micro-credentials have a positive effect on collaboration.
- H2c: Intended use of micro-credentials have a positive effect on employability enhancement.
- H2d: Intended use of micro-credentials have a positive effect on perceived competence

Methodology

Procedure

This research paper followed the positivist approach to analyze data and therefore quantitative analysis was undertaken (Crossan, 2003). Since we don’t have a sample frame of all teachers working in higher education institutions in Pakistan, therefore, we have

utilized purposive sampling, a type of non-probabilistic sampling, to collect data from relevant respondents (Etikan, Musa, & Alkassim, 2016). The sampling unit for our research is teachers working in higher education institutes in Pakistan who have prior experience with micro-credentials. The sample size for our study has been calculated as 220 considering a 5:1 ratio of responses to construct items (Hair et al., 2018).

Scale and Measure

The measurement of constructs is dependent upon scales. This research tests the relationships of 6 constructs with the help of scales that were adopted from past research papers. The constructs we used include Perceptions of micro-credentials, intended use of micro-credentials, teachers’ content knowledge, collaboration, employability enhancement, and perceived competence.

We have adopted a total of 16 Perception of micro-credentials (PCP) scales from (Dyjur & Lindstrom, 2017; Watson et al., 2020). Scales on Intended use of micro-credential (USE) were adapted from Dyjur & Lindstrom, 2017 whereas for Teachers’ content knowledge (TCK) items have been chosen from Vermunt et al., (2019) and Soine & Lumpe, (2014). Collaboration (CLB) scales are taken from (Vermunt

et al., 2019, Watson et al., 2020, Garett et al., 2001) and scales on Employability enhancement (EPE) are adapted from Ritzhaupt et al., (2010). Items for the perceived competence (PC) were adapted from

(Mogere, 2017). Our all responses were collected on a 5-points Likert scale where “1” indicated “Strongly Disagree” and “5” indicated “Strongly Agree”.

Table 1
Measures

S. No.	Variable	Reference	Items
1.	Perceptions of micro-credential (PCP)	Dyjur & Lindstrom, 2017 Watson et al., 2020	16
2.	Intended use of micro-credential (USE)	Dyjur & Lindstrom, 2017	4
3.	Teachers’ Content Knowledge (TCK)	Vermunt <i>et al.</i> , 2019 Soine & Lumpe, 2014 Vermunt <i>et al.</i> , 2019	8
4.	Collaboration (CLB)	Watson <i>et al.</i> , 2020 Garett et al., 2001	8
5.	Employability enhancement	Ritzhaupt et al., 2012	5
6.	Perceived Competence	Mogere, 2017	3

Results

Sample Characteristics

There were 382 respondents to our questionnaire out of which 126 respondents failed to qualify as a target

sample; these respondents did not have a micro-credential. Out of 256 remaining responses 9 were discarded as they were outliers. The demographics of the remaining 247 respondents are shown in Table 2.

Table 2
Sample characteristics (n=247)

Variables	Category	Frequency	Percent
Gender	Male	138	55.87%
	Female	106	42.91%
	Prefer not to say	3	1.21%
Age	20-29 years	66	26.72%
	30-39 years	151	61.13%
	40-49 years	26	10.53%
	Older than 60 years	4	1.62%
Education	Bachelors Degree	37	14.98%
	Masters Degree	62	25.10%
	MPhil Degree	101	40.89%
	PhD	39	15.79%
	Postdoc	8	3.24%
Teaching experience	Less than a year	19	7.69%
	1-3 years	60	24.29%
	4-6 years	89	36.03%
	7-10 years	36	14.57%
	More than 10 years	43	17.41%

Descriptive Analysis

To check the univariate normality of the adopted constructs, Skewness and Kurtosis analyses are used.

The results of the descriptive analysis are summarized in Table 3.

Table 3
Descriptive Analysis

Construct	Mean	Std. Dev.	Skewness	Kurtosis
Perception of Micro-credentials (PCP)	3.795	0.429	-0.595	0.975
Intended use of Micro-credential (USE)	3.874	0.743	-0.913	0.449
Teacher’s Content Knowledge (TCK)	3.825	0.572	-0.908	0.657
Collaboration (CLB)	3.802	0.594	-0.931	0.855
Employability enhancement (EPE)	3.774	0.661	-0.966	0.715
Perceived Competence (PC)	3.801	0.503	-0.683	0.788

It is evident from Table 1 that the Skewness and Kurtosis levels of adopted constructs are within the acceptable range of ± 2.5 (Park, 2015). Thus, the data is normally distributed.

Reliability Analysis

To measure the internal consistency of the adopted constructs, Cronbach’s Alpha and Composite reliability have been used. Table 4 shows the results of the reliability analysis.

Table 4
Reliability Analysis

Construct	Cronbach’s Alpha (Std)	Composite Reliability	No. of items	Mean	SD
Perception of Micro-credentials (PCP)	0.773	0.896	16	3.795	0.182
Intended use of Micro-credential (USE)	0.694	0.850	4	3.873	0.100
Teacher's Content Knowledge (TCK)	0.738	0.874	8	3.825	0.118
Collaboration (CLB)	0.747	0.896	8	3.802	0.118
Employability enhancement (EPE)	0.724	0.860	5	3.774	0.071
Perceived Competence (PC)	0.681	0.810	3	3.812	0.045
Overall (OV)	0.943	-	44	3.808	0.134

As depicted in Table 2, Cronbach’s Alpha values of all the constructs are greater than the cutoff value of 0.60. Thus, it indicates acceptable internal consistency (Hair, 2015). Similarly, the composite reliability of variables is meeting the minimum

criteria value of 0.7 (Chin, Marcolin, & Newsted, 2003).

Exploratory Factor Analysis (EFA)

To understand the relationships between the constructs and indicator variables, EFA was conducted. Table 5 shows the results.

Table 5
 Exploratory Factor Analysis (EFA)

Constructs	Items	KMO	BToS	CFL
Perception of Micro-credentials (PCP)	16	0.750	2831.335	0.751
Intended use of Micro-credential (USE)	4	0.726	322.081	0.581
Teacher's Content Knowledge (TCK)	8	0.715	1094.768	0.842
Collaboration (CLB)	8	0.743	1113.326	0.788
Employability enhancement (EPE)	5	0.746	479.194	0.737
Perceived Competence (PC)	3	0.524	319.108	0.644

Note: Kaiser Meyer Olkin, Bartlett Test of Sphericity, Cumulative Factor Loading

Kaiser-Meyer-Olkin (KMO) for all the constructs is at least 0.524, which is greater than the minimum value of 0.50 (Field, 2000; Kaiser, 1974). It shows that the sample used in this research is adequate.

Bartlett's Test of Sphericity for all the constructs was significant at a 95% confidence level. Also, the Cumulative Factor Loading (CFL) for all the

constructs is greater than 0.50. Thus, this confirms the strength of the relationship between constructs.

Correlation Analysis

To check whether the items in the research are unique and distinct, Correlation analysis was used. The results of the analysis are shown in Table 6.

Table 6
 Correlation Analysis

Construct	PCP	USE	TCK	CLB	EPE	PC
Perception of Micro-credentials (PCP)	1					
Intended use of Micro-credential (USE)	0.674	1				
Teacher's Content Knowledge (TCK)	0.839	0.788	1			
Collaboration (CLB)	0.845	0.835	0.925	1		
Employability enhancement (EPE)	0.801	0.834	0.881	0.907	1	
Perceived Competence (PC)	0.842	0.678	0.813	0.796	0.727	1

Construct Validity

Convergent and discriminant validity have been used to ascertain construct validity.

Convergent Validity

Table 7 shows that the variance explained for the constructs ranges from 0.581 to 0.842 which is

greater than or approximately equal to 0.60. Furthermore, Cronbach's Alpha values were around 0.70 thus the data meets the requirement of convergent validity (Hair, 2015).

Table 7
 Reliability of the constructs and Variance Explained

Constructs	Cronbach's Alpha (Standardized)	Variance Explained	Mean	Std. Dev.
Perception of Micro-credentials (PCP)	0.773	0.751	3.795	0.429
Intended use of Micro-credential (USE)	0.694	0.581	3.874	0.743
Teacher's Content Knowledge (TCK)	0.738	0.842	3.825	0.572
Collaboration (CLB)	0.747	0.788	3.802	0.594
Employability enhancement (EPE)	0.724	0.737	3.774	0.661
Perceived Competence (PC)	0.681	0.644	3.801	0.503

Discriminant Validity

The constructs used in this research are unique and distinct since the square root of variance i.e. average variance extracted is greater than the square of each

pair of correlations (Fornell & Larcker, 1981; Hair Jr et al., 2016). Table 8 demonstrates the summarized results.

Table 8
Discriminant Validity

Construct	PCP	USE	TCK	CLB	EPE	PC
Perception of Micro-credentials (PCP)	0.867					
Intended use of Micro-credential (USE)	0.454	0.762				
Teacher's Content Knowledge (TCK)	0.704	0.621	0.918			
Collaboration (CLB)	0.714	0.697	0.856	0.888		
Employability enhancement (EPE)	0.642	0.696	0.776	0.823	0.858	
Perceived Competence (PC)	0.709	0.460	0.661	0.634	0.529	0.802

Regression Analysis

Multivariate regression analysis was conducted to test the model hypotheses. Table 9 shows the results of the regression analysis.

Table 9
Multivariate Regression Analysis

Relations	Beta coefficient	Standard error	T Statistics	P Values	Decision
PCP -> TCK	0.088	0.063	1.400	0.163	Not Supported
PCP -> CLB	0.178	0.065	2.739	0.007	Supported
PCP -> EPE	0.103	0.046	2.241	0.026	Supported
PCP -> PC	0.372	0.043	8.625	0.000	Supported
USE -> TCK	-0.065	0.126	-0.519	0.604	Not Supported
USE -> CLB	0.560	0.130	4.294	0.000	Supported
USE -> EPE	0.497	0.092	5.387	0.000	Supported
USE -> PC	0.062	0.086	0.713	0.477	Not Supported

Note: Thresholds for the above table are: P-value < 0.05, T-statistics > 1.645

Hypothesis 1a postulated that the perception of micro-credential (PCP) has a positive impact on teachers' content knowledge (TCK). The findings in Table 9 do not support hypothesis 1a ($\beta = 0.088$, $t = 1.400$, $p = 0.163$). As revealed in Table 9, a significant positive impact of perception of micro-credential (PCP) on collaboration (CLB) was found ($\beta = 0.178$, $t = 2.739$, $p = 0.007$). Thus, hypothesis 1b was supported. Likewise, a positive effect of perception of micro-credential (PCP) on employability enhancement (EPE) was found ($\beta = 0.103$, $t = 2.241$, $p = 0.026$). Thus, hypothesis 1c was supported. Hypothesis 1d also received empirical support. The results showed a significant positive impact of perception of micro-credential (PCP) on perceived competence (PC) ($\beta = 0.372$, $t = 8.625$, $p = 0.000$).

For hypotheses 2a and 2d, the results did not support that use of micro-credentials (USE) can influence

teachers' content knowledge (TCK) and perceived competence (PC). ($\beta = -0.065$, $t = -0.519$, $p = 0.604$; $\beta = 0.062$, $t = 0.713$, $p = 0.477$). Finally, the findings of Table 9 indicate that the use of micro-credentials (USE) plays a positive role in collaboration (CLB) and employability enhancement (EPE). Thus, hypothesis 2b and 2c were supported ($\beta = 0.560$, $t = 4.294$, $p = 0.000$; $\beta = 0.497$, $t = 5.387$, $p = 0.000$).

Discussion and Conclusion

Discussion

Teachers' professional development comprises their increase in knowledge about their subject of expertise, collaboration among fellow professors to discuss and share each other's experience, and enhancement in teachers' employability and perceived competence (Sancar et al, 2021). This research paper measured how perception and intended use of micro-credential can impact these

factors and ultimately lead to the professional growth of educators.

The hypothesis that “perception of micro-credential has a positive effect on the teachers’ content knowledge” was rejected (Refer to Table 9). This shows that even though teachers’ might recognize micro-credential as important and feel positive about earning a micro-credential, this does not affect teachers’ knowledge about their field of expertise. Abramovich et al. (2013) found that micro-credential has a similar motivational effect on the learner but it also depended upon the candidates’ prior knowledge. The hypothesis on the effect of “perception of micro-credential on collaboration” failed to be rejected (Refer to Table 9). This shows that teachers who perceive micro-credential as authentic and credible tend to discuss it more with their cohorts. Garet et al. (2001) also suggested that professional development activities give teacher’s an opportunity for increased professional communication.

The hypothesis on the effect of “perception of micro-credential on employability enhancement” failed to be rejected (Refer to Table 9). Previous studies have shown that earning an additional degree or skill increases the employability of teachers (Ritzhaupt et al., 2012). Our research results show that teachers consider micro-credential as beneficial in getting a job. Also, educators are confident in presenting their micro-credential on their résumé to aid in the hiring process.

The hypothesis “perception of micro-credential has a positive effect on perceived competence” failed to be rejected (Refer to Table 9). This means that a good perception of a micro-credential increases teachers’ perceived competence. Thus, teachers who felt satisfied with their micro-credential also thought that they were highly skilled at their job. This finding is consistent with previous studies (Mogere, 2017).

The hypothesis that the “intended use of micro-credential will positively affect teachers’ content knowledge” was rejected (Refer to Table 9). The research findings show that although teachers intend to display their micro-credential in their portfolio they feel that skills they learned in micro-credential didn’t have a major impact on improving their understanding of the subject. The authors found little evidence in past literature to substantiate or challenge this result. However, past research has shown that professional development programs tend to enhance teachers’ knowledge and skill (Garet et al., 2001). The contrasting result in our research might be

because of the lack of interest shown by teachers during micro-credential programs or the lack of focused content in micro-degrees. Future research is needed to substantiate these speculations.

The hypothesis that the “intended use of micro-credential is linked to collaboration” was substantiated (Refer to Table 9). Thus, teachers with positive intentions to add micro-credentials to their resumes had more inclinations towards collaborating with their fellows. The increased discussion of the micro-credential topic with others reflects the confidence that teachers felt after completing the micro-credential program. Dyjur & Lindstrom (2017) suggested that participants who earned digital badges tend to use them in various ways like adding to their portfolio, sharing on social media platforms, showing accomplishments to their peers, and enhancing existing networking opportunities.

The hypothesis that “intended use of micro-credential and employability enhancement are positively related” was supported. This shows that teachers believe that they can display micro-credential on their profile and that potential employers will see it as a snapshot of their knowledge and skills. Previous research papers validate this result (Ritzhaupt et al., 2012)

Finally, the hypothesis on the effect of the “intended use of micro-credential on perceived competence” was rejected. Teachers who believed that micro-credential contributed positively towards the enhancement of their credentials, didn’t feel confident about their competence to perform well at their job. These findings are contrary to past research papers (Mogere, 2017). These differing results might be because of the presence of external factors that affect this relationship. For instance, the organization's culture, leadership, and motivation can affect employees' perceived competence. Further research is needed on this topic to understand these relationships.

Conclusion

Micro-credentials can contribute towards division and coherence of skills and knowledge required in the industry. The major point of discussion in this paper is that micro-credentials are needed to prepare a skillful workforce in the emerging economy of a developing country. Instead of making fixes for conventional education, micro-credentials are providing basic skills by blurring the line in higher education between the public and private sectors (Wheelahan, 2016). When universities become more

responsive to industrial and employer demands, micro-credentials can contribute by bridging the gap between work requirements and higher education curricula.

The broader perspective of education is to prepare individuals that have reason to value education and live lives to contribute to society (Nussbaum, 2000; Sen, 1999), rather than developing them for some specific jobs and providing them skills as quick fixes for the employer's needs. Education gives meaning to life and having a reason to value it is at its core, a skilled worker not only contributes to the growth of an organization but also becomes part of occupational evolution (Winch, 2014). The broader spectrum sees an employee as not only a part of the organization but also a person who has a stake in and who can contribute to society (Bernstein, 2000).

Implications for Policymakers

As discussed previously, this paper provides evidence to conclude that micro-credentials play a vital role in the professional development of teachers. Educators perceive micro-degrees as an important element in their career growth as it provides them an opportunity to learn new skills, discuss their ideas, and increase their employability and competence. Thus, policymakers should take the necessary steps to promote micro-learning prospects for teachers.

Limitations and future research

This study has some limitations. Firstly, this research paper utilized cross-sectional data which didn't provide an in-depth analysis of improvement in teachers' skills owing to micro-credential. Future research can carry out a longitudinal study to measure the professional development of teachers. Secondly, this research collected data from teachers working in higher education institutes in limited Pakistani universities. In future studies, it is suggested to conduct research in different countries and use multiple respondents from different educational institutions. Additional work should investigate factors that affect teachers' intention to obtain a micro-credential and look for reasons why teachers lack interest in these short courses.

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