Development of an Observation Grid to Evaluate Pre-service Teachers' Competences during the Practice Teaching Sessions at the Lebanese University, Faculty of Education

Hanadi Chatila[1], Iman Abou Ali[2], Hiba Naccache[3], Mariam Raad[4]

[1, 2, 3, 4]Lebanese University, Faculty of Education, Beirut, Lebanon

Abstract: *Research in teaching education programs has focused on competence development and evaluation. This study aims to develop and validate an observation grid to measure pre-service teachers' acquisition and practice of competences during the training sessions. A grid consisting of a demographic introduction and a three-scale questionnaire, along with a comment and feedback section, was constructed on the basis of an adapted Perennoud (2001) competences framework and following Chatila and Abou Ali's (2016) reflective practice model. A cross-sectional study was conducted in order to validate the three-scale questionnaire. Content validity was assessed by means of Lawshe's method; factor analysis was used to assess construct validity; and Cronbach's α was employed to test internal consistency. In addition, a bivariate study and a comparison of means were also conducted in order to ensure the validity of the factors extracted. A sample of 133 pre-service teachers at the faculty participated in the validation study. The findings show the development of a psychometrically reliable tool with high construct, content, internal and external validity to measure the pre-service teachers' competency development and practice over the practice courses. The grid can also be used to evaluate the teacher education program and monitor the progress of practice teaching.*

Keywords: Observation grid, competences, pre-service teachers, evaluation, practicum course

1. Introduction

Teacher preparation programs have witnessed a huge reform, shifting from a theory-based approach to a constructivist theory-practice blended approach that ensures a better preparation of teachers (Chatila & Abou Ali, 2016). This approach has been mainly illustrated by the model of classroom-based practice and research, namely action research, and the use of professional portfolios as a means of self-assessment and regulation in order to induce a habitual way of thinking, practice, action and reflection (Altrichter, 2005; Ryan, 2006). This model defines the teacher as a reflective practitioner who critically mobilizes his/her scientific knowledge to inform practice. From this perspective, researchers such as Perrenoud (2001) and Koster et al. (2005) added that, by nature, teaching is a complex job which involves, in addition to pedagogical knowledge and practice, a combination of various personal and professional aspects (Briccia, 2016). So, they developed professional competences that pre-service teachers should develop and demonstrate a good acquisition and use of (Morisin, 2011) and considered training of competent, professional teachers as the main goal of any initial teacher preparation program (Tardif, 2001).

2. Theoretical Framework and Literature Review

2.1 Competences

In general, competences refer to the knowledge, skills and attitudes that pre-service teachers should learn and practice. To be more specific, according to Perrenoud (2001), competences refer to the ability of trainees to mobilize their knowledge, skills and attitudes in diverse situations within their professional status. In this sense, competences go beyond knowledge to reach the level of action.

Hodson and Hodson (1999) and Perrenoud (2001) perceive teaching as a complex system in which teachers are faced with many factors or variables that may affect their teaching performance. Therefore, despite its importance, knowledge is not the only key factor to successful professional teaching; the ability to know how to act is also essential and depends on how teachers inter-relate different areas of knowledge and mobilize competences. In addition, mobilization of teachers' resources is only relevant in certain situations related to a certain context in a unique way even though one's way of dealing with a given situation may be similar to others previously encountered (Briccia, 2016). So, it is assumed that the competency approach is a genuine model to adopt in order to improve the educational quality of teacher education programs (Al Sharif, 2010). In addition, training allows preservice teachers to develop and demonstrate their competences through the mobilization of resources in various situations.)

2.2 Teacher preparation program competences framework

A review of the literature shows that most educators have developed models that include both "teaching competences" and "teacher competences" which are overlapping and complementary.

Teaching competences refer to role of the teacher in action in the classroom setting and are linked to the act of teaching, whereas teacher competences highlight teacher professionalism, representing the multi-faceted roles of the

teacher on the individual, school, and community levels (Hagger & McIntyre, 2006).

A broad understanding of teacher competence is inclusive of knowledge and understanding, skills and abilities, as well as teachers' beliefs and moral values (Pantić & Wubbels, 2010). A framework developed by many researchers perceived the concept of competence as "an integrated set of personal characteristics, knowledge, skills and attitudes that are needed for effective performance in various teaching contexts (Stoof, Martens & Van Merrienboer, 2002; Tigelaar et al., 2005)" (Pantić, & Wubbels, 2010, p 7).

Accordingly, a professional competence preparation program model was designed to provide learning with "significance and functionality" (Moreno-Murcia, Torregrosa, & Pedreo, 2015) by putting into action knowledge, attitudes, skills, and values and encouraging pre-service teachers' reflection and critical thinking in order to spark greater interest, increase commitment to the professional development program and enhance performance (Leary, Walker, Shelton, & Harrison, 2013; Vansteenkiste, Soenens, Sierens, Luyckx, & Lens, 2009).

In this context, Perrenoud (2001) developed ten core competences for professional teaching, including the two faceted-competences. According to him, the pre-service trainee teacher should (1) organize and facilitate learning situations, (2) manage the progress of learning, (3) design and develop differentiating features, (4) involve students in their learning and their work, (5) work in teams, (6) participate in the school management, (7) inform and involve parents, (8) use new technologies, (9) face the duties and ethical dilemmas of the profession, and (10) manage his/her own training.

In their turn, Koster et al. (2005) divided teacher competences into five categories: domain-specific knowledge, communication, organization, pedagogy, and attitude. Each competence can have several behavioural indicators. They are manifested through teachers' teaching activities and behaviours.

Similarly, Danielson (1996; 2007; 2001; 2013) developed a framework for teaching evaluation that identifies four domains: planning and preparation; classroom environment; instruction; and professional responsibilities.

Likewise, Blomeke (2017) proposed a framework presenting "professional knowledge" that includes content knowledge, pedagogical knowledge and "affective motivational characteristics," including beliefs and attitudes as well as job motivation.

In conclusion, all proposed models share the same perception of mutli-dimensional teacher competences by being inclusive of knowledge, skills, beliefs and moral values. And each competence framework includes a set of components with related indicators that may vary according to school level that teachers are required to teach at and to the curriculum.

2.3 Pre-service teaching preparation programs at the Lebanese University, Faculty of Education

The pre-service primary teacher's initial preparation program at the Lebanese University, Faculty of Education follows the LMD program that has been implemented since 2009-2010. The faculty includes different departments, with the courses offered in Arabic and two foreign languages, English and French, taking into consideration that the native language is Arabic.

The table below shows the different departments with majors and the language(s) of instruction.

Table 1: Departments and majors at the Lebanese University, Faculty of Education

Department	Specialisation	Language
Psychology Education	Early Childhood Education	Arabic English French
Science Education	Primary Science Teaching	English French
	Primary Math Teaching	English French
Languages Education	Primary Arabic Teaching	Arabic
	Primary English Teaching	English
	Primary French Teaching	French
Social Studies Education	Primary social studies Teaching	Arabic
Physical and Sports Education	Physical Education Art Education Music Education	Arabic English French

The graduates hold a Licentiate degree in their field of study with a minor from variously offered programs.

Each program offers both theoretical and practical courses distributed over three years and covering 180 credits. The theoretical courses cover pedagogical knowledge such as Curriculum Studies, Child Psychology, Classroom Management, Evaluation and Assessment and Teaching Methodology, as well as other specific subject area courses depending on the pre-service teacher subject area specialization over the three years of the program. The practicum courses represent 11 % of the program (20 credits out of 180 credits). Starting the second year of preparation program, four practicum courses are offered: School Observation (2 credits), Practicum I (6 credits); Practicum II (6 credits) and Practicum III (6 credits) for pre-service minor subject area teachers. Practicum courses take place at the faculty and in participating cooperative schools.

The staff members at the faculty vary between theoretical and practicum courses. All theoretical courses and the first practicum course, School Observation, are taught by PhD holders in the required fields, whereas students in the other three practicum courses are mentored by trainers, usually Master's degree holders in the field who have at least five years of experience in teaching and who, in turn, are mentored by practicum coordinators, one in each department program mentioned above. The practicum coordinator is

usually the same faculty member who follows the same general framework model.

3. Problem

Being practice coordinators from various departments at the faculty, the researchers have noticed that although the same model is followed by the different departments, there is apparently a great deal of diversity in terms of assessment and evaluation of the development of trainee competences.

In fact, pre-service teachers are required to undergo an indefinite amount of micro teaching at the university in the presence of the trainer and their colleagues in addition to three macro teaching sessions in participating schools in the presence of the trainers.

Trainers are currently using observation grid as assessment and evaluation tools for both micro and macro teaching. The observation grid is common for all trainers, but it lacks reliability, as two trainers may assess the same pre-service teacher differently.

Therefore, the main aim of this research is to develop an assessment grid based on an adapted Perrenoud (2001) competence framework and to determine its validity and reliability. The findings of this study may serve as reference for pre-service teachers' competence development and assessment.

4. Methodology

A sample of 133 pre-service teachers completed the grid. These teachers were attending the practicum courses for one academic year and were distributed according to their major of study: Math education, Science Education, Languages (Arabic, English, French), early childhood education and social sciences. The language of instruction is Arabic, English and French.

4.1 Framework

The researchers have adapted the Perrenoud (2001) framework to suit both the Lebanese University Faculty of Education and the Lebanese curriculum contexts.

As shown above, the different majors are offered in both the native language (Arabic) and a foreign language (English and French) since the language of instruction in schools varies according to the area of study. For example, Sciences and Maths are delivered in English and French, while Social studies are instructed in Arabic.

In addition to the fact that mastering the native language and a foreign language is one of the main goals of the curriculum, the development of language as a mean of communication for pre-service teachers is considered as a major requirement of the teacher education program and was added to the framework.

Other minor modifications were made to Perrenoud's (2001) original framework to reach an adapted framework that includes ten competences as shown in table 2.

Table 2: Pre-service teachers' competences with their sub-competences

Competence	Sub-competence
1. Organize and facilitate learning situations	• Master, for a given discipline, the contents to be taught and their translation into learning objectives • Take into consideration student representations • take into consideration student's errors and barriers to learning • Construct and plan teaching sequences • Engage students in research activities and projects • Design and manage problem situations adjusted to student levels and opportunities • Acquire a longitudinal vision of the objectives of primary education • Establish links to the theories underlying learning activities
1. Evaluate students' learning and manage their progress	• Observe and evaluate students in learning situations, using a formative approach • Establish periodic skills assessments and make progress decisions • Design assessments at different times of learning (diagnosis, formative, summative) • Consider the results of evaluations in the construction of a pedagogical progression.
2. Design and develop differentiating features	• Manage heterogeneity within a class-group • Practice integrated support • Consider different learning styles • Work with students with special needs • Develop cooperation between students and some simple forms of mutual education
3. Involve students in their learning and their work	• Stimulate the desire to learn • Organize student council (class or school council) and negotiate with students various types of rules and contracts • Encourage student's personal projects
4. Work in teams	• Develop and organize team

	projects • Manage group work • Train educational teams • Engage in projects at school level • Manage crises or conflicts among people
5. Participate in the school management	• Develop, negotiate a settlement project • Organize and develop student participation within the school • Facilitate information meetings • Conduct interviews • Involve parents in the construction of knowledge
6. Use new technologies	• Exploit the didactic potentialities of software in relation to the objectives of the teaching fields • Use multimedia tools in teaching • Communicate remotely via digital means
7. Perform the duties and face ethical dilemmas of the profession	• Respect the rules of conduct related to the exercise of the profession • Act positively with students and encourage them to act positively with each other • Respect students and parents at all times
8. Manage their own training and be innovative	• Be able to explain their practices • Establish their own skills assessment and personal training program • Participate in collaborative action research • Participate in in-services programs
9. Master the language of instruction	• Efficiently use the language of instruction in both oral and written forms • Integrate the objective of mastering the oral and written language in the different learning situations

4.2 Construction of the grid

The grid is designed to measure the pre-service teachers' competence development and practice over the practicum courses and aims to monitor the progress of the practice. Due to the significance of the development of reflective practice in the teacher education program, which is embedded in the framework of the study, the researchers designed the grid following the reflective practice model used by Chatila and Abou Ali (2016). The latter model was adapted from Schon's (1983, 1987) conceptual framework which suggests

three stages of practice, starting from planning the lesson as a "for-action" phase, moving to the implementation of the lesson in class as an "in-action phase" to the final phase after the class where the pre-service teachers discuss their performance with the trainers and get their feedback, as "on-action" stage. The model is presented in the table below.

Table 3: Reflective practice model by Chatila & Abou Ali (2016)

Phase	Description
For- action	the planning of the lesson
In -action	during the teaching of the lesson
On- action	after the teaching of the lesson

A literature review of existing grids was conducted to guide the development of items. The grid includes 57 items distributed over three scales matching the three phases of the model represented above and covering the ten competences of the framework of the study. The scales, sub-scales and number of items are presented in the table below:

Table 4: Scales, sub-scales and number of items

Scales	Number of items
Planification of the lesson	17
Implementation of the lesson Subscales:	32
- introduction	3
- development	9
- closure	1
- language	4
-classroom management	7
- ethics and professionalism	8
Evaluation and feedback	8

The ten competences are covered and measured by the 57 items of the grids as follows:

Table 5: Distribution of competences across the items

	Items		
Competence	Scale 1 Planification of the lesson	Scale 2 Implementation of the lesson	Scale 3 Evaluation and feedback
1. Organize and facilitate learning situations	1; 3; 4; 5; 6; 7; 10;16	6;8;10;11	
2. Evaluate students' learning and manage their progress	14;15;17	9;12;13; 18; 21;22;23;24	4
3. Design and develop differentiating features	12	5;19	
4. Involve students in their learning and their work	8;9	1;2;3;20	
5. Work in teams	13	4	
6. Participate in the school management		25;26;27	
7. Use new	11	7	

technologies			
8. Perform the duties and face ethical dilemmas of the profession		28;29;30;31;32	8
9. Manage their own training and be innovative			1;5;6;7
10. Master the language of instruction	2	14; 15; 16; 17	2;3

The grid consists of three main parts:

The first part: The cover page that includes information about the pre-service teacher trainee: Name, department and year, in addition to the name of the trainer and three spots for the scores of the three macro-teaching practices carried out by the trainee throughout the course.

The second part: A questionnaire that includes 57 items consisting of three-point rating scales. Each scale contains three position statements: "A" for achieved outcome, "B" for needs improvement and "C" for not achieved.

All the items were scored 1 for "A", 0.5 for "B" and 0 for "C", noting that the three items 4, 6 and 7 from the third scale were assigned a double weight, so the total score of the instrument was 60.

The grid was designed to show the scales of macro-teaching practices required by the course in three adjacent columns.

The third part: The trainer's evaluation and feedback

Under each scale of the questionnaire, there is a space for the trainer's feedback corresponding to the macro-teaching practices presented for the corresponding scale along with the score, so the trainer and the trainee may monitor the improvement over the three practices.

In addition, the last page includes three sections for general feedback and comparison of the improvement between the three macro-teaching practices and the total score.

The grid was constructed by group of educators, staff members at the Faculty of Education, who are involved in the practicum programs, mainly the practicum coordinators representing all the departments. It was initially constructed in Arabic and then translated to English and French. To confirm accurate translation, the English and French versions were back translated to Arabic by a translator and the versions were compared for equivalence. The grid was piloted and tested by ten trainees at the faculty and modifications were made accordingly.

The researchers used SPSS software version 25 to investigate the reliability and the validity of the constructed questionnaire. Cronbach's alpha was used to measure internal consistency and reliability, a factor analysis was conducted to check the construct validity, and Lawshe's

method (1975) was used for the content validity. In addition to these steps, a bivariate study and comparison of means were also conducted to ensure the validity of the factors extracted.

Regarding the qualitative part of the study, mainly the second part of the grid described above, a panel of experts worked on the external validity to ensure the overall validity of this part.

5. Findings

5.1 Construct validity

After conducting Kaiser-Meyer-Olkin (KMO) test and the test of sphericity X2 Bartlett test as preconditions for factor analysis, the KMO was close to 1 which insure a sampling adequacy (table 6), and scree plot (figure 1), the values of KMO and the scree plot insured that a factor analysis may be useful for the data . then, factor analysis with Varimax rotation was carried out in order to investigate the construct validity of the grid. In the first scale in the questionnaire (planning the lesson), out of 17 items, 14 were extracted; in the second scale out of 32 items, 23 factors were extracted; and in the third scale out of 8 items, 8 factors were extracted.
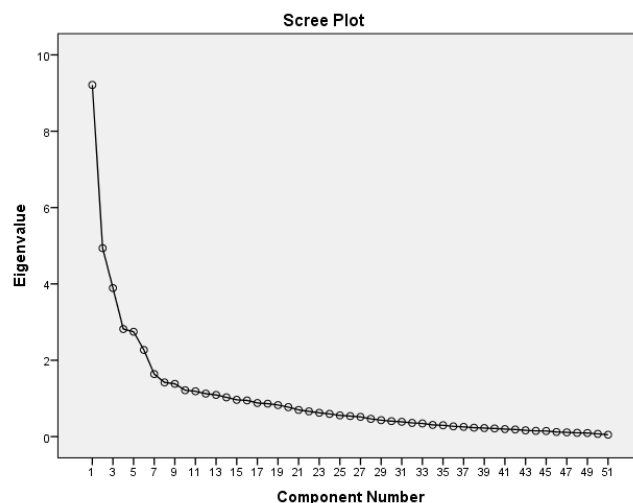

Figure1: Scree plot

The KMO of the scales indicated a high significance, and the extraction of the factors was based on the inflection point of the scree plot. The values of each scale are represented in table 6.

Table 6: KMO test of sphericity

	Scales		
	Planification of the lesson	Implementation of the lesson	Evaluation and feedback
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.886	.739	.842
Bartlett's Test of Sphericity	3.081	10.550	1.191
Significance	.253	.523	.256
Extraction of factors	15	23	8

This result indicates that the data is adequate for factor analysis, then the researchers ran the factor analysis and insured from the factor loading and the scree plot (fig1) that we had high construct validity for the questionnaire, and the factors extracted revealed a high correlation between items.

5.2 Content validity

In the process of developing the questionnaire, a content panel of experts was formed. Four experts in the domain were involved at various professional levels, involving, math education, science education and general education, with each item being rated as "essential", "useful", or "not necessary" (Polit, 2006). Responses from the experts in the panel were pooled, the items were rated, and the number indicating ''essential'' for each item was determined. When more than half of the panellists agreed on an item as "essential", the degree of content validity was considered to be greater.

The more panellists (beyond 50%), perceived an item as ''essential'', the greater the extent or degree of its content validity was considered to be. The content validity ratio (CVR) was calculated using the formula in figure 1 (Devon, 2007).

$$CVR = \frac{n_c - \frac{N}{2}}{\frac{N}{2}} \; ; \; ; \; n_c = \text{number of panellists}$$

identifying an item as essential; N= total number of panellists.

This equation was set by Lawshe (Lawshe, 1975) to calculate the content validity. CVR was calculated for each item, if the value was above 0.78, the items were kept; otherwise they were removed.

CVR indicates the validity of each item. In order to check the validity of the whole instrument, the researchers calculated the mean of CVR defined as content validity index, CVI, and a value of above 0.7 was considered preferable. The questionnaire set in this study indicated a CVI value of 0.81; thus, the content of the instrument used was considered valid.

Moreover, another method was used to test content validity using SPSS by checking the Pearson correlations of the items with their sum. The results appear in table 7 below.

Table 7: Pearson validity of the scales

Scale	Min	Max	Significance
Planning the lesson	.212	.639	0.000
Implementation of the lesson	.174	.664	0.000
Evaluation and feedback	.230	.604	0.000

A high significance and strong correlation appeared between items, thus ensuring the content validity of each scale.

5.3 Descriptive analysis and bivariate correlation

A descriptive analysis and Pearson correlations test also employed in the analysis revealed a high correlation between the three scales after factor analysis. The results appear in the Table 8 below.

Table 8: Descriptive analysis and bivariate correlation

	M	SD	Factors in scale 1	Factors in scale 2	Factors in scale 3
Planning the lesson	.7493	.12506		.623**	.753**
Implementing the lesson	.7941	.09708			.725**
Evaluation and Feedback	1.0674	.29968			

Note: ** p < .001; M = Mean; SD = Standard deviation

The bivariate correlation indicated a strong correlation between the factor scale and a high significance at 0.0.

5.4 External validity

In addition to the above validity tests, one more issue to consider in the instrument is the external validity. The qualitative part of the grid that deals with the open-ended questions where the pre-service teachers evaluate their own experience in the three sections of the grid was validated using a comparison with their answers in the questionnaire. External validity deals with the applicability of the findings in other settings (Burns, 1999). The randomisation in the selection of the subjects confirmed the external validity of the whole grid, including the qualitative part.

5.5 Internal consistency and reliability

A random sample of 133 pre-service teachers from different majors at the Lebanese University, Faculty of Education was selected to complete the three-scale questionnaire concerning their competencies and development over the practicum courses. Internal consistency was measured using Cronbach's alpha, with a value set above 0.6 for high internal consistency. (Lawshe, 1975). The values are presented in table 9 below.

Table 9: Internal consistency measured using Cronbach's alpha

Scales				
	Planification of the lesson	Implementation of the lesson	Evaluation and feedback	The whole questionnaire
Cronbach's alpha	.852	.787	.773	.879
Number of items	51	94	24	169

As shown in the table above, the values of Cronbach's alpha for the three scales "planification of the lesson", "implementation of the lesson" and "evaluation and feedback" were respectively .852, .787 and .773, and the value for the whole questionnaire was .879. All the values

represented were above .6, which indicates high internal validity. Therefore, no items were removed in order to improve Cronbach's alpha since it indicates high values for each scale and for the whole questionnaire.

6. Discussion

To ensure quality higher education, universities are required to operate under criteria of efficacy, efficiency and excellency (Serdyukov, 2017). The purpose of this study was to construct and validate a tool to address the need for a reliable and valid instrument to measure items about competences of pre-service teachers while completing their practicum courses at the Lebanese university, Faculty of Education. The design and validation of such measurement tools may contribute to a better teaching performance and to an objective assessment.

A panellist of experts followed Perrenoud's (2001) adapted framework when constructing the tool, comprising 10 competences addressing the Lebanese University Teacher Education Program context. The instrument tool consisted of a grid that included a three-scale questionnaire (planning, implementing the lesson and reflection), along with a section for comments and feedback.

6.1 Validity

Scale validity is the extent to which the tool measures the desired latent dimension or constructs it was designed to assess (Raykov & Marcoulides, 2011). The validity of the instrument in this study was examined by testing content and constructs validity, in addition to external validity. Knowing that content validity refers to the adequacy of the assessment of the domain of interest (Hinkin, 1995), it is considered as a vital and basic requirement the items of the tool are to measure what they are meant to do. Moreover, content validity specifies the relevance and representation of the content, which means that the items seizure the relevant experience of the target population (Church & Waclawski, 2007). The results of the study show that the three constructed scales measured in the grid met the standards of an excellent content validity (Lawshe, 1975).

Construct validity refers to the extent to which the measurement tool evaluates a specific construct, is supported by evidence that measures other related constructs, and measures specific real-world criteria (Raykov & Marcoulides, 2011). The factor analysis used to assess the construct validity in the study revealed a significant correlation between items which suggests the use of this questionnaire for assessing pre-service teachers at universities.

Each item in the scale or subscale appeared to measure what the scale is supposed to measure; the planning of the lesson scale measured the organization competence and to what extent pre-service teachers can facilitate the learning situations. Moreover, the content validity of the scale implementing the lesson ensured the validity of the item design, and development of differentiating features, and the involvement of the pre-service teacher students in their learning and work. In addition, the assessment scale measured how pre-service teachers face the duties and the ethical dilemmas of the profession and presents a high validation in this scale.

Overall, all the items in the grid scales, individually and all together, met the constructed and content measurable validity, and the comparison of each item to the total correlation proved that each item was related with its corresponding subscale.

Since the grid includes a questionnaire along with open - ended questions for comments and feedback, it was crucial to be tested by a panel of experts who ensured its external validity.

6.2 Reliability

Reliability refers to the degree of consistency exhibited when a measurement is repeated under identical conditions (Porta, 2014). In this study, Cronbach's alpha was used to assess the internal consistency of the scale items, or the extent to which the set of items in the scale co-vary, relative to their sum score (Cronbach, 1951).

The value of Cronbach's alpha for the three scales "planification of the lesson", "implementation of the lesson" and "evaluation and feedback" ranged between 0.773 and 0.852, with a value of 0.879 for the whole questionnaire. Usually an alpha coefficient of 0.70 is considered as an acceptable threshold for reliability; however, coefficients of 0.80 and 0.95 are preferred for the psychometric quality of scales (Cortina, 1993; Cronbach, 1951). This implies that the reliability of the grid confirmed a high internal consistency for each scale and for the grid.

7. Conclusion

Following the different analyses conducted in this study, it is estimated that the grid developed represents a measuring instrument with adequate psychometric properties, rendering it valid for the assessment of pre-service teacher development of competences in the practicum courses. The results of this research indicate that the scales developed were valid and reliable to measure the addressed need. The tool provides significant external and internal validity, and, therefore, it offers a quality academic measure for the teacher education program based on the competency approach.

However, focusing only on students' assessment may pose a certain limitation to the study, knowing that students' assessment is a goal, but it is not enough (Berk, 2013). Other studies are required to verify the instrument's factor structure, including all-encompassing evaluation such as faculty self-evaluations and reports from mentors in cooperated schools so that the overall character of the evaluation process would be covered (Moreno-Murcia, Torregrosa, & Pedreo, 2015). In addition, further studies, such as longitudinal studies may be considered to determine

the validity of the grid's content and construct, in addition to expanding the sample of pre-service participants and estimating structural regression models in order to corroborate the results obtained.

References

[1] Al-Sharif, E. M. (2010). Evaluation of student/teacher teaching competencies in the curricula and teaching methods of motor expression in the light of quality academic standards. *World Journal of Sport Science, 3*, 331-358.

[2] Altrichter, H. (2005). The role of the 'professional community in action research. Educational Action Research, 13 (1), 11-25.

[3] Berk, R. A. (2013). Top five flashpoints in the assessment of teaching effective- ness. *Medical Teacher, 35*, 15-26. doi: 10.3109/0142159X.2012.732247

[4] Blömeke, S. (2017). Modelling teachers' professional competence as a multi-dimensional construct. *Pedagogical knowledge and the changing nature of the teaching profession,* 119-135.

[5] Briccia, V., & Carvalho, A. M. P. D. (2016). Teacher competencies and training for science education in early years of elementary school. *Ensaio Pesquisa em Educação em Ciências (Belo Horizonte), 18*(1), 1-22.

[6] Burns, A. (1999). *Collaborative action research for English language teachers*. Cambridge: CUP

[7] Chatila, H., & Abou Ali, I (2016). The development of pre-service science teachers' reflective practice at the Lebanese University Faculty of Education. *The Eurasia Proceedings of Educational & Social Sciences, 4*, 33-45.

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

[9] Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of applied psychology, 78*(1), 98.

[10] cronbach, L. J.; Meehl, P.E. (1955). HYPERLINK "http://psychclassics.yorku.ca/Cronbach/construct.htm" "Construct Validity in Psychological Tests" . *Psychological Bulletin. 52* (4): 281–302. HYPERLINK "https://en.wikipedia.org/wiki/Digital_object_identifier" \o "Digital object identifier" doi : HYPERLINK "https://doi.org/10.1037%2Fh0040957" 10.1037/h0040957 . HYPERLINK "https://en.wikipedia.org/wiki/PubMed_Identifier" \o "PubMed Identifier" PMID HYPERLINK "https://www.ncbi.nlm.nih.gov/pubmed/13245896" 13245896 .

[11] Church, A. H., & Waclawski, J. (2007). *Alternative validation strategies: Developing new and leveraging existing validity evidence (Vol. 19)*. John Wiley & Sons.

[12] Danielson (2013). *The framework for teaching.* HYPERLINK "https://www.danielsongroup.org/framework" https://www.danielsongroup.org/framework

[13] Hagger, H. & McIntyre, D. (2006). *Learning teaching from teachers. Realizing the potential of schoolbased teacher education.* Maidenhead: Open University Press.

[14] Hinkin, T. R. (1995). A review of scale development practices in the study of organizations. *Journal of management*, *21*(5), 967-988.

[15] Hodson, D., & Hodson, J. (1998). Science Education as Enculturation: Some Implications for Practice. *School Science Review, 80*(290), 17-24.

[16] Koster, B., Brekelmans, M., Korthagen, F. A. J., & Wubbels, T. (2005). Quality Requirements for Teacher Educators. *Teaching and Teacher Education, 21*(2), 157-176.

[17] Lawshe, C.H. (1975). A quantitative approach to content validity. *Personnel Psychology, 28,* 563–575. doi:10.1111/j.1744-6570.1975.tb01393.x

[18] Leary, H., Walker, A., Shelton, B. E., & Fitt, M. H. (2013). Exploring the relationships between tutor background, tutor training, and student learning: A problem-based learning meta-analysis. Interdisciplinary Journal of Problem-based Learning, 7(1), 6.

[19] Moreno-Murcia, J., Torregrosa, Y. S., & Pedreo, N. B. (2015). Questionnaire evaluating teaching competencies in the university environment. Evaluation of teaching competencies in the university. Journal of New Approaches in Educational Research (NAER Journal), 4(1), 54-61.

[20] Morissini, M. C., Cabrera, A, F., & Felicetti, V. L., (2011). Professional development of pedagogues: Competencies and quality indicators. JISTE 15 (1), 42-49.

[21] Pantić, N., & Wubbels, T. (2010). Teacher competencies as a basis for teacher education - Views of Serbian teachers and teacher educators. Teaching and Teacher Education, 26(3), 694-703.

[22] Perrenoud, Ph (2012). Développer la pratique réflexive dans le metier d'enseignement. Paris : esf editeur.

[23] Porta, M. (Ed.). (2014). A dictionary of epidemiology. Oxford university press.

[24] Ryan, T. G. (2006). The reflexive classroom manager: a required pre-service mode. Networks: An Online Journal for Teacher Research, 9(1), 10-10.

[25] Raykov, T., & Marcoulides, G. A. (2011). Introduction to psychometric theory. Routledge.

[26] Serdyukov, P. (2017). Innovation in education: what works, what doesn't, and what to do about it?. Journal of Research in Innovative Teaching & Learning, 10(1), 4-33.

[27] Tardif, M (2001). Pre-service Teacher Training Programs: Outcomes of recent reforms and new trends towards effective professional training. Pan-Canadian Education Research Program Symposium

[28] Vansteenkiste, M., Sierens, E., Soenens, B., Luyckx, K., & Lens, W. (2009). Motivational profiles from a self-determination perspective: The quality of motivation matters. Journal of educational psychology, 101(3), 671.

Author Profile

Hanadi Chatila is a professor and researcher at the Lebanese University, Faculty of Education. Chatila earned her PhD in Science Education, in 2005 from Macquarie University Australia.

She joined the Faculty of Education at the Lebanese University in 2005 and became professor in 2018. In addition to teaching under and postgraduates' courses, Chatila has been the coordinator of Biology Teaching since 2014, and the head of the practicum office for pre-service teachers since 2017. Moreover, she participated and contributed in various local and international educational conferences. Her main area of interest: teacher education program, teaching strategies and epistemology of science.

Iman Abou Ali is an assistant professor and researcher at the Lebanese University, Faculty of Education. She achieved her PhD in science education at the ENS Cachans in Paris , joined the Faculty of education at Lebanese university in 1999. In addition to teaching under and post graduates courses, she has been the supervisor of science practicum for pre-service teachers since 2012, and supervisor of primary pre-servive teacher practicum since 2018. She contributed in various local and international conferences. She developed various research topics in epistemology of science, in environmental education and sustainable development, in teaching strategies and teacher education program.

Hiba Naccache is an assistant professor in Mathematics education at the Faculty of Education, Lebanese university. She joined the Lebanese University in 2008. İn addition to her teaching duties, she supervises graduates and posgraduat reserach peojects. Her primary research interests are in the field of Statistics and Mathematics Education, bringing together topics from statistics, math, probability theory and expectancy value theory. The rich experience as statistics consultant gave her the opportunity to work on exploring the possibility of building a research direction in education.

Mariam Raad is an assistant professor in Early Chıldhood Education education at the Faculty of Education, Lebanese university. She joined the Lebanese University in 2010 and has been the supervisor of ECE practicum for pre-service teachers since 2014. Her main interest is Children Literature, and wrote many Children books. Currently she is working on ECE teacher preparation program in Lebanon.