

Developing Reflection in Writing for Pre-service Teachers: A Participatory Action Research Approach to Syllabus Design

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Abstract

This paper reports on a quasi-experimental study meant to develop pre-service teachers' reflective abilities in writing using a participatory action research (PAR) based syllabus. It aims at testing a directional hypothesis supporting the efficiency of the PAR writing syllabus based on Macrorie's (1988) I-Search Paper philosophy in developing the participants' reflection. The study was conducted with 3rd year pre-service teachers at the Teacher Training School of Constantine (ENSC), Algeria during the academic year 2017-2018. Data was collected using reflective journals in a form of extended essays; and participants' reflection was measured using Kember's (2008) coding scheme. The conducted t-tests yielded to statistically significant results validating the set hypothesis.

Keywords:

Participatory Action Research, Reflection in writing, Assessing reflection, Kember's coding scheme, I-Search Paper,

1. INTRODUCTION

This study reports on an investigation of the teaching of writing at the university level that has been conducted within the scope of a three-phase PAR program meant to develop pre-service teachers' reflective abilities. The investigation being reported is the second phase of an implemented program that targeted (1) the reading, (2) writing, and (3) research methodology skills of the pre-service teachers, and represents an important

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section of the overall program. The study was conducted with 3rd year pre-service teachers at the teacher training school of Constantine, Algeria during the academic year 2017-2018. In more explicit terms, the objective of the investigation is to test the directional hypothesis in favour of the efficiency of the PAR based syllabus for writing in developing pre-service teachers' reflective abilities.

2. Review of Literature

2.1. What is Reflection?

Dewey defined reflection as '...active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends' (Dewey, 1933). His definition raised many questions and opened debates about the processes and the components of reflection (Iser, 1999). This has led to a sharp divergence in conceiving the concept and a difficulty of agreeing on a conceptual definition of reflection as highlighted by (Kember, McKay, Sinclair, & Wong, 2008). Dewey asserted that "there is an element of confusion within the literature because the concept has become so widely and diversely used that it is now found within quite disparate contexts and based on divergent frames of reference" (1933, p. 369).

As to further expose Dewey's (1933) perspective, Lyons (2010) underlined the motives behind reflection in a sense that reflective inquiry is driven by an inherently doubtful situation. "Unless there is something doubtful, the situation is read off at a glance; it is taken in on sight... but if it suggests, however vaguely, different meanings, rival possible interpretations, there is some point at issue, some matter at stake," (Dewey, 1993, p. 121, as cited in Lyons, 2010).

Anyone, however, would consider thinking about a case which is not doubtful as an act of reflection. How can the distinction between Dewey's reflection and a simple act of thinking be made? A question that led Rodgers (2002), Gurol (2010) among others, to point to the distinction between reflective thinking and other modes of thinking like metacognition, critical thinking, analytical thinking, and creative thinking. In this

perspective, Gurol (2010) argued that reflective thinking differs from these types of thinking in that it presents as a solution interpreting, deferring, translating, arrogating to the individual, comprehending the issues thought in the school and making predictions for the future. This confusion has made the concept very delicate to deal with: how can reflection be assessed if it is vaguely defined? what value reflection has? and how can its effects on other research variables be measured?

Schön's work (1983) is considered as highly influential in the field. What distinguished Schön's work is its relatedness to professional practitioners. He determined experience as a key component of the concept and distinguished between experts and novice practitioners in achieving the expected improvement.

In parallel, among other scholars, Mezirow (1981, 1991, 1992) interpreted Dewey's definition as implying that reflection means validity testing (Mezirow, 1991, p.101, as cited in Kember, 1999, p. 22). He derived categorical descriptions of reflection from critical theory.

Schön and Mezirow's conceptualization made a clear reference to the effect of experience on the development of reflection. High levels of reflection are more likely attained by people who experienced certain amounts of professional problems (experts) in terms of properly 'posing' rather than 'solving' the problems.

Scholars such as Boud and collaborators (1985, 1991) and Jarvis (1987, 1992, 1995), have taken a more experiential approach to propose models of reflective thinking processes (Kember, McKay, Sinclair, & Wong, 2008). According to Taggart and Wilson (2005), reflective thinking is the process of making informed and logical decisions on educational matters and then assessing the consequences of these decisions. Moallem (1997) explained that according to Dewey's perception, reflective teachers continuously engage in questioning their objectives, observing their practices and results and thinking about every student in the short and long terms.

Although the meaning of reflection has developed discretely “depending on the context in which the work is situated and the tradition and discipline on which the writer draws” (Kember, McKay, Sinclair, & Wong, 2008, p. 370), what has been agreed on as a general consensus is Dewey’s attribute that reflection is a thought process that education should strive to cultivate.

According to Kember (1999), it has become widely accepted that successful professionals need to reflect upon their actions as most tasks they perform involve novel elements to which there are no defined solutions. Likewise, the field of education is constantly loaded with novel problematic situations where reflection is highly required to cope with each. The daily changing teaching environments and conditions made it extremely necessary for teachers to analyse, make decisions, implement and observe them in context and reflect on the effects they induce to improve their practices. The latter objective is the founding stone of action research philosophy over which AR and reflective thinking join to mutually shape their applications. Kember (1999) further developed that courses educating professionals should aim to develop students’ abilities to reflect upon their actions. The aim of encouraging student reflective thinking has been incorporated into many professional courses. Relating reflection to the learning process has been earlier conferred by Boyd and Fales (1983). They explained that reflective learning is the process of internally examining and exploring an issue of concern, triggered by an experience, which creates and clarifies meaning in terms of self, and which results in a changed conceptual perspective (Boyd & Fales, 1983, p. 100). Kember (1999) underlined the affinity of Boyds and Fales’s perception with Schon’s framework. He argued that Boyds and Fales’s definition is of particular relevance to professional practice in that it views experience as the touchstone for reflection (Kember, 1999, p. 22).

Similarly, reflection in the context of learning has been regarded by Boud and Walker (1985) as a generic term for those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to new understandings and appreciations. A definition that

is consistent with Dewey's. Danielson (1996) noted that reflection refers to an activity or a process in which an experience is recalled, considered, and evaluated, usually in relation to a broader purpose. With an implicit reference to experience, Husu, Toom, and Patrikainen (2006) synthesized that reflection is usually referred to as a process of self-examination and self-evaluation that teachers should regularly engage in to interpret and improve their professional practices. Mirzaei, Phang and Kashefi (2014) further developed that reflection can be seen as a response to past experience which involves conscious recall and examination of the experience as a basis for evaluation and decision-making and as a source for planning and action. They argued that with experience, teachers become more discerning and can evaluate their successes as well as their errors.

2.2. Developing Reflection in Writing

Within the academic context, many techniques and tools exist to develop reflection in writing. Because of the importance and the difficulty of the writing task, those techniques and tools have received careful attention from scholars and were investigated by many researchers. Journal writing, among other ways, is considered as an important technique to develop reflection in higher education context. According to (Dyment & O'Connell, 2011) Dyment and O'Connell (2011), journal writing can vary both in terms of form and content. Journals can take the form of highly structured classic leather bound book or a dispatched on-line blog; and they can contain a "listing of evidence with very little analysis/reflection [or] highly personal and reflective account of events." (Moon, 2006, as cited in Dyment & O'Connell, 2011)

Using journals to develop reflection was not always considered effective. Many researchers (as illustrated below) highlighted its pitfalls as related to the lack of provided training in writing journals. Most educators in higher education consider the task as implicitly acquired by learners throughout their conventional training which is not always true reference. Learners are in most cases expected to write journals with no specific training on how to do it. Mills (2008) stated that too often students are

simply handed a journal and asked to write about their practical experiences with little or no structure provided.

At the ENSC, journal writing is one of the techniques that teachers use to incite pre-service teachers reflect on the different tasks they have to accomplish during their training. Mostly, pre-service teachers use journal writing in the reading classes as response journals to their reading assignments or after attending their practical training sessions as reflective reports on their daily practices.

In this study, we opted for the I-Search Paper in a form of extended essay to collect the students' reflection because of its benefits mentioned earlier. Learners were required to produce pieces of writing through a participatory oriented guided process. The process is meant to encourage learners to reflect on the assigned topics by being "open-minded, friendly, and have the responsibility of learning." (Ross, Bondy, & Kyle, 1993).

Even though the treatment of this study has implicitly covered the process of writing journals in a learning by doing oriented instruction based on peers' feedback, it ought to be mentioned that the use of reflective journals in this study was not meant to develop the participants' reflection, but rather to display the latter in a piece of writing. Focus was rather set on the development generated by the consecutiveness of the instruction delivered within the PAR program. The latter has been designed as to involve participants in a participatory search/research oriented learning process; whereby they are constantly exposed to problematic situations they are required to think about and search for a potential solution.

2.3. Assessing Reflection

Many models have been developed to measure human reflection; yet, the application of these models to real contexts is in most cases complex because of the subjective interpretation of the output to be analysed, the complexity of the construct itself and the diversity of fields within which the models have been thought. The present work focuses on developing pre-service teachers' reflective ability which is expected to appear in their writings throughout the implemented program. In this sense, Kember,

McKay, Sinclair, and Wong (2008) attested that “assignments that call for reflection normally seek written responses. Examples would be reflective journals, judgements on case studies and contributions to online discussion forums.” (p. 371). Nevertheless, determining the level of reflection does not aim to provide precise measurements; rather, it seeks to provide guidance in making judgements and decreasing the level of subjectivity. For the purpose of this study, we found it appropriate to adopt Kember’s (2008) scheme for determining the level of reflection. The scheme consists of four categories: habitual action / non-reflection; understanding; reflection; and critical reflection. The scheme has been based on Mezirow’s (1977, 1985, 1991, 1992) writings and has evolved through a refining process taking into consideration its easiness of application by practitioners who are not deeply informed about the literature on which the categories were based on. The categories were extracted from a questionnaire developed by Kember, et al. (2000). The questionnaire has been tested with confirmatory factor analysis which has indicated a very good fit to a four-factor mode and provided empirical evidence that the most viable scheme for assessing the level of reflection in writing is likely to have four categories. The latter have been tested successfully for reliability and validity (Kember, McKay, Sinclair, & Wong, 2008, p. 372)

2.4. Participatory Action Research

Implicitly, the ‘participatory’ component of PAR has always existed within the philosophy of action research since, in its gist; action research turns around doing research by and within the scope of action of the practitioners of the field and not an outsider researcher reference. Practitioners are not necessarily researchers but people who are involved in the field who may not be satisfied with what is going on and start looking for change. Through the literature, those people are commonly qualified as ‘stigmatized’ ‘disempowered’ groups whose opinion is in most cases disregarded reference. Kidd and Kral (2005) reported that disempowered groups are seldom given the opportunity and, arguably, are discouraged from this type of action because of many factors, including a lack of respect for the knowledge of stigmatized people.

The best example can be taken from the field of education where teachers were not necessarily trained to do research, since they rely most of the time on university professors to do that; while they are the ones who express dissatisfaction with the daily practices applied in the field of education and they are the ones whose participation in research really mean. Participation, from this perspective, is omnipresent in action research as it reflects each practitioner's personal addition to their own field.

Kemmis and McTaggart (2007) reported that “although the process of participatory action research is only poorly described in terms of a mechanical sequence of steps, it is generally thought to involve a spiral of self-reflective cycles of the following:

1. Planning a change;
2. Acting and observing the process and consequences of the change;
3. Reflecting on these processes and consequences;
4. Replanning;
5. Acting and observing again;
6. Reflecting again, and so on . . .” (p, 276)

In their vision of action research, Kemmis and McTaggart (2007) made a strong connection to research methods claiming that “research methods are what make action research ‘research’” (p. 284). The point, however, was not made to underestimate the power of action research in conducting sound research; rather, it was to add PAR features to the requirements of conducting research: “sound research must respect much more than the canons of methods” (p. 284).

This vision highlights a critical perspective of doing research in terms of ‘who’ is to do the research and the roles that might be assigned or taken by other stakeholders in the social framework. The example of the education field given by Kemmis and McTaggart (2007) is of high significance to our study and to the Algerian context in general as the lack of collaboration between the socially involved stakeholders have important negative effects on the application of PAR features. Although the practice of education involves curriculum practices, policy and administration

practices, research and evaluation practices, a variety of student learning practices and community and parent participation practices, the active role of action research is in most cases played by university professors. The later are often teacher educators as well as researchers who engage in action research processes neglecting the ‘Participatory’ features.

Although it would be far too pretentious to claim that the present study succeeded in implementing the ‘Participatory’ component in the design and conduct of the treatment; we could, however, involve the participants in getting in touch with the on-campus available stakeholders through the process of collecting information for the writing of their essays. This unusual social practice was meant to prepare the participants to accept the others’ perspective in their problem solving process and to enable the promotion of their reflective abilities as the main concern of the study

2.5. The I-Search Paper

The I-Search Paper emerged out of Macrorie’s dissatisfaction with how research was dealt with. The way in which students were instructed to complete research papers pushed him to rethink the whole process. He designed the I-Search Paper to “encourage student reflection and autonomy” (Johns, 2006, p. 163). Macrorie’s approach becomes popular in the US as many secondary schools and universities adopted it. The approach provides students with opportunities to reflect on their research and writing processes (Johns, 2006).

The I-Search paper was developed based on Dewey’s philosophy consisting of encouraging “teachers and students to participate in authentic inquiry by exploring genuine questions and searching for answers to those questions.” (Assaf, Ash, & Saunders, 2011, p. 32). This common concern makes the I-Search Paper philosophy strongly related to action research and more specifically to PAR. Even though Macrorie (1988) had not explicitly linked his work to PAR, yet all the features he set are strongly related to the principles of PAR. According to Macrorie (1987), writing an I-Search paper involves the three contributors: the student searcher, the authorities to be consulted, and the persons likely to read the paper. The needs of the

searcher to solve a given problem or answer a question are what determine the validity of the paper and its results. Combining the student researchers' prior knowledge to answers they get from the authorities to be consulted yields the appropriateness of the material discovered. A distinguishing feature of the I-Search Paper is that it contains no pretentious claims for generalization, which is one of founding principles of action research. Once the reasons for searching, the requirements and the degree of knowledge of the searcher are set, no readers would think that the findings are meant to create a general theory. "Properly directed, the I-Search is an exercise in intellectual modesty, a characteristic of most of the great inquirers." (p, 128).

Many scholars such as Taylor (1981); Silva (1990); and Johns (2009) advocated the benefits of I-Search papers to research assignments because they: (1) encourage deep reflection; (2) involve students in a recursive process of their revising their strategies of intervention while conducting research; and (3) increase their meta-awareness and autonomy by providing self-evaluative opportunities.

3. The Investigation

The investigation of the reported study has been designed and administered by the first author of the present paper as part of the overall program.

3.1. Population of the Study

As a quasi-experimental design was adopted, two intact classrooms from 3rd year at the ENSC were selected on administrative assignment basis to serve as an experimental and a control group. Each group contains 26 participants which represents 20,47% of the overall population of 3rd year students. Participants from both groups consented to participate voluntarily in the study and were informed about all ethical concerns related to the research and the right to withdraw at any time of the research. Participants from the experimental group were coded PEX and participants from the control group PCT with a number (1 to 26) for each participant in order to

insure anonymity. The data gathered was analysed using Statistical Package for the Social Sciences (SPSS).

3.2. Traditional Situation and New Objectives

Traditionally, the basics of Writing are taught in the first and second year starting from sentence construction, types, and mechanics, to reach paragraph writing by the end of the second year. Introducing essay writing using one type of patterns is usually partly dealt with during the second semester of the second year. Yet, the focus is mainly put on sentence structure and paragraph unity. In the third year, writing and grammar are joined in one subject to help learners put into practice the grammar they have been taught previously in writing their own essays focusing on language accuracy as a main objective. Assessment is mostly centred on language form: composition form, grammar accuracy, sentence structure, punctuation and spelling. Little attention is given to generating ideas and reflection. The subject is taught on two sessions per week: a first session (1h30min) where students are assigned a grammar lesson to be presented by two students. Assignments are distributed at the beginning of the academic year and presented according to the order of the lessons in the syllabus; a second session (3h) where students practice writing essays. Four types of essays are generally covered during the academic year: exemplification, comparison and contrast, cause-and-effect, and argumentation. Given the load of the syllabus, the number of students per group, and the structure of the subject, it has always been problematic to provide effective feedback and/or to properly discuss students' writings or to provide space for collaborative work.

The traditional instruction used in the department does not involve students enough in the writing process and if we are to make them think about what they write and not do it to get rid of their assignments; we need to involve them in every single detail of the writing process. One of the shackles we first fought to break was that of the form-oriented instruction; a practice that we believe kills the learners' involvement. The first thing we did was to explain to the participants that there will be no specific pattern to follow and no limited number of paragraphs. They were free to write

following the pattern(s) that their ideas require. We have clarified from the first session that the most important point is the generation of ideas. The focus of the program is to free the participants' minds from the explicit restrictions that may limit their thinking activity and limit their ability to generate ideas. Lindemann (1982) argued that during the first phases of the writing process, free writing "postpone the students' inhibiting fears about spelling and grammar and enable them to concentrate on writing honest ideas in natural language" (p. 363).

The main objective we set for the study was to develop the participants' reflective abilities rather than developing their writing skill. Designing a treatment that would fit this objective proved to be a hard task. We struggled to find an appropriate formula not to deviate far from the objectives determined by the institution and incorporate new objectives that would serve the research. The new objectives were set as: (1) developing participants' reflection; (2) involving participants in data collection; (3) involving participants in data analysis and interpretation; and (4) providing more opportunities for criticizing and exchanging analytical feedback.

3.3. Syllabus Design and Assumptions

The syllabus we designed for the treatment has no pre-determined elements as any traditional syllabus. It was an on the run construction that builds onto the participants' interests and choices, reactions and interactions with the choices, progress and desired changes and experiences. The participants were closely and consciously involved in the construction of lessons and the syllabus as well. What were agreed upon, however, from the beginning were the new assumptions:

1. writing is the reflection of what you think put on a piece of paper, not a fill in gaps exercise in which you collect, arrange, and assign different existing elements into the required form (pattern);

2. assessment is exclusively formative; official exams will be taken into consideration only if they will increase the participants' general score.

3.4. Administering the Treatment

The first session of the treatment was devoted to the explanation of the I-Search Paper and its objectives. The lessons were, then, administered in a form of topics (3 to 4 topics) that were, most of the time, selected out of the participants' suggestions, then, negotiated and discussed in class to reach an assignment that turns around related topics in order to enhance the quality of the discussion after reading the participants' productions. Participants were asked to decide which topic they will develop and start thinking about it. A ten-minute silence phase was provided; participants were asked to close their eyes and think deeply about the topic they have selected for five minutes without writing anything on their brainstorming sheet. We believe that rushing to write the first word (idea) that comes to their minds would direct and/or limit their vision to that specific idea, which is in most cases a stereotype or a surface idea that most participants would think of. Consequently, they would automatically and unconsciously exclude other ideas, which might be deeper, more elaborated and authentic.

After this phase, participants could start writing their ideas on their brainstorming sheets. This strategy helped the students generate more ideas. Some of them reported that they found it relaxing, and helped them 'travel to other worlds'. Another objective of this strategy is change. Such a break in a class where the learners usually feel the teacher's control and the pressure of finishing the assignment in time, has allowed the participants to feel free of the classroom limits. Some of them reported that 'it was such a comfort that I felt asleep.

Then, five brainstorming sheets are randomly selected to be analysed in class. During the first session, three of the five sheets were well organized. They looked more like a final outline of the essay the participants intend to write. It was clear that some participants are still unconsciously bound to the time limits and work according to rule of submitting a final product by the end of each session. We found it necessary to re-explain to the participants that a brainstorming sheet is a rough paper meant to collect all the participants' thoughts. They are not required to produce a paper directed to the teacher in which they are supposed to take care of tidiness, correctness, or clearness. We have displayed the five

papers on projector screen and commented on them; highlighting that the more the brainstorming sheet is messy and contains more elements, ideas, words, drawings, diagrams, etc, the more it helps generating natural authentic ideas.

The next step was exchanging the papers and discussing them in groups of four during 20 min. Participants were encouraged to externalize their ideas by trying to explain them to the group and to ask questions to each others to try to understand their classmates' works. Discussing their ideas in group helped the participants narrow down their topics and decide what perspective to develop in their writing.

A fifteen-minute individual work phase followed the group discussion. In this phase, the participants were instructed to work on their thesis statement and a potential draft of the outline. Then, another collaborative work phase followed, where participants exchange their papers again to get feedback.

During the first sessions most of the feedback was positive in a form of expressing feelings about the thesis statement and the outline. Many participants replied to the question "how did you find your classmate's paper?" by saying: "I liked it", "it is good". When asked to explain their answers, most of them felt unable to provide any logical or reasonable explanation for their feelings. Participants were, then, prompted to talk about what they expect the essay to be about. At this level they started predicting from their classmates' thesis statements elaborating on what has been explicitly announced in the thesis. Some papers were selected to be discussed in class. Authors were required to listen and react to their classmates' predictions. In most cases peers' predictions did not fit to the authors' visions and they had to explain their position and justify what they have written. A striking comment that was repeated continuously was "this is what you mean, but not what you have written". For most cases the discussion sounded more like an argument where (a) the authors try to convince the class that they could not understand the thesis, or (b) the class tries to convince the authors that what they got from their thesis is different

from what they try to explain. It was clear that there is gap between what the participants think and what they write.

The same process was adopted along the academic year. The administered lessons followed the same principles and steps, yet, were not always similar in terms of order because of the different interactions of the participants within the social environment created by treatment and the development of their reflective abilities accordingly. A quicker and smoother transitional pace between the phases of the lesson has been observed along with the lessons progress.

3.5. Data Collection

Data collection was conducted as a pre-post-test design form. Both the pre and post-tests were administered in a form of an essay writing instruction that were administered before and after the treatment for both groups. Dependent and independent t-tests were run to assess individual progress (or otherwise) in each of the experimental and control group (a within-subject effect); and to compare the variation of the reflection levels of the experimental group to those of the control group (a between-subjects effect).

3.6. Procedure

Due to the essay form of the tests and to avoid subjectivity, the tests were scored by three examiners: A 'Maitre de Conférence classe B' MCB equivalent of a lecturer in applied linguistics at the department of English from the Teacher Training School ENS Constantine, Algeria; a PhD holder from the department of Language and Linguistics at the University of Essex, UK; and the researcher.

In order to preserve the reliability of the scores, the two scorers were trained by the researcher on Macrorie's approach (1988) adopted in the treatment following Syed and Nelson (2015) training coders' procedure. They were also provided with Kember's (2008) coding scheme with a detailed explanation and discussion of the scoring scheme, relevant questions were addressed. A sample of the data was selected and scored by the three assessors together as a practice to ensure mutual understanding of

the application of the scoring scheme. At the end, the scoring of the tests was done by scorers independently and inter-rater reliability was calculated. Reconciliation of differences was done via consensus.

3.7. Kember's Coding Scheme Adaptation

Kember's (2008) coding scheme was used to assess the participants' level of reflection. The scheme was built on four main levels: A, B, C, and D, each level represents a category of reflection as described by Kember et al. (2008). According to Kember et al. (2008), pluses and minuses can be used to cater for intermediate [or transitional] cases. In order to enable a proper computation of the values within the statistical models we have built, Kember's coding scheme was adapted as to fit the conventional scoring scheme used by the ENSC administration. The main and transitional categories have been translated to the mean scores of equal intervals of the conventional scoring scheme (0 to 20). Table 1 below provides a detailed description of the coding procedure.

Table 1. *Kember's Coding Scheme Adaptation*

Levels of Reflection	Description	Conventional Interval	Grades and intermediate	Approximate values
A	Critical Reflection	16 to 20	A+	19.5
			A	18
			A-	16.5
B	Reflection	11 to 15	B+	14.5
			B	13
			B-	11.5
C	Understanding	6 to 10	C+	9.5
			C	8
			C-	6.5
D	Non Reflection	1 to 5	D+	4.5
			D	3
			D-	1.5

3.8. Results

This section reports on the results obtained from the pre-post tests administered to the experimental (PAR) and control (TI) group. The results revealed the superiority of the PAR program over the TI program in developing the participants' reflective abilities through the use of reflective journals in form of extended essays. The results were obtained using a

statistical model by processing the collected data using SPSS. Nevertheless, before displaying the results of the study, participants' scores have been statistically explored to ensure that the assumptions of parametric data have not been violated. The exploration revealed that the participants' scores have met the assumptions of parametric data:

K-S test indicated $D(24) = .11, p > .05$ and $D(24) = .13, p > .05$ for the pre and post-test of the PAR group, and $D(24) = .14, p > .05$ for the post-test of the TI group. However, the test indicated $D(24) = .27, p < .05$, which reports a deviation from normality. This deviation appeared only in the scores of pre-test of the TI group which represents 25% of the overall data, and hence, does not have a significant effect on the conducted tests (see appendix A for details).

Levene's test of Homogeneity of Variance indicated $F(46) = .43, p > .05$ for the pre-test and $F(46) = 2.77, p > .05$ for the post-test which means that the assumption of homogeneity of variance has not been violated (see appendix B for details).

Assumptions of interval data and independence have not been broken as the distances between points of the adopted scale are equal at all parts along the scale (from 0 to 20), and the tests are paper-based and have been administered individually, which means that no influence between the participants' answers could have been possible.

Since a level of judgement was involved in scoring the tests due to their essay form, inter-rater reliability was calculated using Intra-class Correlation Coefficient ICC on SPSS Statistics 22 (*based on a mean-rating $k=3$, absolute agreement, 2-way mixed-effects model*) (see appendix C for details). The data used in the calculation process involved the pre-post-test and the participants' essays collected periodically through the experiment. The result of ICC indicated a good agreement between three the raters ($r = .854$ ranging between .744 and .921). According to Han (2020), the threshold of ICC good agreement ranges from 0.75 to <0.9

3.8.1. Descriptive Statistics

As displayed in Table 2, the mean scores of the two groups indicate a higher entrance level of reflection of PAR group participants ($M = 12.06$) as compared to TI group participants ($M = 8.60$). This difference might be due to the familiarity with the experimental situation; what is known as the practice effect (Field, 2005), since the PAR group has already received the 1st phase of the program related to the reading skill which is not reported in this paper.

Table 2. *Descriptive Statistics*

Group	Tests	N	M	SD	Min	Max
PAR group	Pre-test	24	12.06	1.63	9	14.5
	Post-test	24	14.25	1.82	10	17
TI group	Pre-test	24	8.60	1.56	7	13
	Post-test	24	9.68	2.24	6	14

Moreover, the comparison of the mean scores reveals a significant improvement of the PAR group participants. The recorded improvement increased from 12.06 to 14.25 as compared to a lower improvement recorded by the TI group participants from 8.60 to 9.68.

3.8.2. Inferential Statistics

An independent t-test and a dependent t-test have been conducted on the data to dig deeper through the results of the descriptive statistics and provide a better understanding of the effect of the PAR treatment on promoting the participants' reflection.

As indicated by the results of the independent t-test, there appear to be a significant difference in terms of reflective abilities between the two groups. Contrastively, the level of reflection of the experimental group participants is considerably higher than that of their counterparts from the control group. Both at the level of the pre-test and the post-test, ($p = .000$) lesser than .05, which denotes a significant statistical difference between the tested conditions. ($t(46) = 7.73$, $p < .05$) between the PAR group participants' reflective abilities ($M = 14.25$, $SE = .37$) and the TI group participants' reflective abilities ($M = 9.68$, $SE = .45$) with a very large effect size ($r = .75$). Table 3 below displays the independent t-tests results.

Table 3. Independent t-test Results

		t-test for Equality of Means						
		t	df	Sig. (1-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Pretest	Equal variances assumed	7.475	46	.000	3.45833	.46264	2.52709	4.38957
	Equal variances not assumed	7.475	45.912	.000	3.45833	.46264	2.52705	4.38962
Posttest	Equal	7.730	46	.000	4.56250	.59020	3.37449	5.75051

variances assumed							
Equal variances not assumed	7.730	44.135	.000	4.56250	.59020	3.37313	5.75187

Additionally, the dependent t-test results demonstrated that the reflexive abilities of the experimental group participants improved significantly after receiving the PAR treatment from ($M = 12.06$, $SE = .33$) recorded in the pre-test to ($M = 14.25$, $SE = .37$, $t(23) = -4.95$, $p < .05$) in the post-test. The effect size of the experimental condition (PAR) indicated a very high value ($r = 0.71$) which is above .5 the threshold for a large effect.

In parallel, participants' reflection in the control group as well displayed a significant statistical improvement after receiving the TI treatment; even though the improvement was not as important as in the PAR group. The results of the dependent t-test indicate a lower variation from ($M = 8.60$, $SE = .31$) in the pre-test to ($M = 9.68$, $SE = .45$, $t(23) = -4.95$, $p < .05$). The effect size of the TI treatment indicated a high value ($r = 0.65$) which is also above .5 the threshold for a large effect. These results support again the superiority of the PAR treatment in promoting the participants' reflective abilities over the TI treatment. Nevertheless, the TI treatment displayed efficiency in promoting reflection at a lower level. The results of the dependent t-test are displayed in Table 4 below.

Table 4. *Dependent t-test Results*

Group			Paired Differences					t	d f	Sig. (1-tailed)
			Mean	Std. Deviat ion	Std. Error Mean	95% Confidence Interval of the Difference				
						Lower	Upper			
PAR	Pair 1	Pre -	- 2.285 71	1.9996 6	.534 43	- 3.440 28	- 1.131 15	- 4.2 77	1 3	.000 5

TI group	Pair 1	Pre -	- .4107 1	2.6139 6	.698 61	- 1.919 97	1.098 54	- .58 8	1 3	.283
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4. Conclusion

The investigation confirmed the stated hypothesis suggesting that participatory action research promotes significantly pre-service teachers' reflective abilities. These results agree with many researches such as Connelly & Clandinin (1990); Heron (1992); Froggatt et al. (2014) among others, and bring about more evidence to support the efficiency of action research in general in developing reflection regardless of the field it has been applied to. Nonetheless, the paralleled improvement recorded by the traditional instruction group leaves many questions opened to reflection and highlights the limitations of the study especially in terms of factors influencing the human reflection that haven't yet been covered either by traditional instruction in the field of teacher training or by action research programs. The field is still virgin and needs to be dig into to reveal new uncovered aspects that can be exploited to motivate, externalize and enhance the human reflection in such important fields such as education and teacher training. We, hereby, suggest that further research should explore the use of artificial intelligence in the development of PAR programs in the field of education, focusing on psychological attributes in Action Research programs, and developing measurement scales for reflection through behaviour.

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6. Appendices

Appendix A: Tests of Normality

Gr Exp/Contr		Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Experimental group	Pre	.137	24	.200*	.956	24	.362
	Post	.148	24	.189	.938	24	.150
Control group	Pre	.275	24	.000	.821	24	.001
	Post	.121	24	.200*	.962	24	.477

Appendix B: Levene's Test for Equality of Variances

		F	Sig.
Pre	Equal variances assumed	2.762	.103
	Equal variances not assumed		
Post	Equal variances assumed	3.611	.064
	Equal variances not assumed		

Appendix C : Intraclass Correlation Coefficient

	Intraclass Correlation ^b	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.660 ^a	.492	.795	7.135	34	68	.000
Average Measures	.854 ^c	.744	.921	7.135	34	68	.000