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# Implication of Constructivism Philosophy on Teacher Professional Development: A Literature Review

**Lalu Hamdian Affandi[1,*], Dewa Komang Tantra[2]**

[1]Department of Primary School Teacher Education, University of Mataram, Indonesia

[2]Graduate School of Education Science, Ganesha University of Education, Indonesia

*Corresponding email: hamdian.fkip@unram.ac.id

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**Abstract: Implication of Constructivism Philosophy on Teacher Professional Development: A Literature Review. Objectives:** aim of the current study is exploring implication of constructivism on teacher professional development. **Methods:** This is a literature review conducted by selecting, evaluating, and synthesizing findings from previous research. Information found are analyzed by employing thematic approach. **Findings:** Constructivism views learning as active processes through which human grow by developing effective behavior in creating suitable adaptation to their environment. Implications of constructivism views on teacher professional development are growth is the ultimate purpose of teacher professional development, problem-based professional development, evaluation-integrated professional development, and ongoing professional development through learning by doing. **Conclusion:** Those implications can be seen as general principles in creating effective professional learning for teachers. The principles need to be investigated further in order to assess its efficacy against teachers working conditions.

**Keywords:** constructivism, teacher professional development, teacher professional learning.

***Abstrak: Dampak Filosofi Konstruktivisme pada Pengembangan Profesi Guru: Suatu Kajian Literatur.*** ***Tujuan:*** *Kajian ini bertujuan untuk mengeksplorasi implikasi filsafat konstruktifisme terhadap pengembangan profesional guru.* ***Metode:*** *Penelitian ini adalah penelitian kepustakaan yang dilakukan dengan menyeleksi, mengevaluasi, dan mensintesis temuan penelitian sebelumnya. Informasi yang terkumpul kemudian dianalisis dengan pendekatan tematik.* ***Temuan:*** *Konstruktifisme memandang belajar sebagai proses aktif yang melaluinya manusia tumbuh dengan mengembangkan perilaku yang efektif untuk menyesuaikan diri dengan lingkungannya. Implikasi pandangan konstruktifisme tersebut bagi pengembangan professional guru adalah pertumbuhan merupakan tujuan akhir dari pengembangan professional guru, pengembangan professional berbasis masalah, pengembangan professional terintegrasi dengan evaluasi, dan pengembangan professional berkelanjutan dengan belajar melalui tindakan.* ***Kesimpulan:*** *Implikasi-implikasi tersebut bisa dilihat sebagai prinsip umum dalam menciptakan lingkungan belajar yang efektif bagi guru. Prinsip-prinsip tersebut perlu dikaji lebih jauh untuk melihat kemanjurannya di dalam lingkungan kerja guru.*

***Kata kunci:*** *konstruktifisme, pengembangan professional guru, pembelajaran professional guru.*

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## INTRODUCTION

Constructivism is a school of thought which is recently famous among scholars. In education field, constructivism frequently treated as guidance for learning development. Despite its controversies, constructivism has gained much attention of a huge number of scholars in various field.

In educational fields, constructivism is deemed as philosophical basis of development of many learning models, such as cooperative learning, problem-based learning, inquiry learning, and other learning models. In Indonesian context, implementation of scientific approach as learning experiences frequently assumed to be based on constructivism thought (Noddings, 1998). In addition to scientific approach, constructivism also being claimed as having close relationship with student-centered learning because it places students as active constructor and meaning maker of knowledge and learning experiences.

Popularity of constructivism in student learning does not necessarily makes it popular in the context of teacher learning. In relation to the situation, principles of constructivism do not sufficiently understood by teachers (Gaitas & Alves Martins, 2017) and at the same time we rarely herd constructivism treated as a philosophical basis for teacher professional development.

Research on professional development shows that the trend is directed toward content to be learned by teachers, such as pedagogical knowledge, inquiry and problem-solving thinking skills (Aldahmash, Alshamrani, Alshaya, & Alsarrani, 2019). The trends can be conceived as a result of several challenges faced by professional development programs. Such challenges come from solitaire mentality of teachers as professional workers (Richardson, 2003A) and ineffective experiences of teachers during their involvement in professional development programs (Fekede, 2017). Based on those challenges, researcher suggested for professional development programmers to learn more about emerging frameworks, approach, model, and philosophy of effective professional development initiatives (Aldahmash, Alshamrani, Alshaya, & Alsarrani, 2019).

Of many philosophies recently studied extensively in the field of education is constructivism. Research on constructivism on teacher professional learning and development can be classified into constructivism as philosophical base and constructivism as the content to be learned by teacher. As content to be learned, researchers found that constructivism on professional development requires teachers' willingness to engage in with change and modify their professional practices (Peers, Diezmann, & Watters, 2003). As a result, constructivism provides a chance for teachers to make suitable adjustment of currently implemented curriculum with the society's basic philosophies (H±ng, Bulte, & Pilot, 2017). At the same time, researchers also found that teachers held positive perception about constructivism and the perception brought about changes in teachers' understanding about lesson plan (Colak, 2017). The positive perception of teachers expressed in their views that constructivism is a flexible and fluid framework for designing and implementing lesson plan based on classroom context (Kosnik, Menna, Dharamshi, & Beck, 2018).

Constructivism, besides of being treated as content to be learned by teachers, also treated as framework for designing and developing professional learning programs. Regarding professional learning program's framework, researchers found that constructivism can promote teacher's epistemological change (Howard, McGee, Schwartz, & Purcell, 2000) and develop confidence and engagement with content to be taught (Gealy, Tinney, Macdonald, & Waters, 2022). The changes emerge when teachers collaboratively examine and critically

analyze their current instructional practices (Brand & Moore, 2011; Edwards, 2007). The change as a result of constructivism-based professional learning takes place as transfer of learning occurred (McDonald, 2014).

Despite extensive research regarding constructivism on teacher professional development and learning, there is lack of consensus among researchers pertain to general principles on how constructivism-based professional learning should operate. The principles mainly need philosophical basis as it should be developed. The philosophical basis of principles can serve as a lens for critically clarifying conceptual differences about the term contained in professional learning and development (Oancea & Orchard, 2012). For teachers, a clear conception about principles underlie professional development can give ethical consideration during their engagement in professional learning programs. Ethical consideration is a process by which teachers articulate and re-articulate their practices in relations to teaching and learning, for them and for students (Schjetne, Afdal, Anker, Johannesen, & Afdal, 2016).

Problem of consensus scarcity on constructivism-based principles of professional development programs indicates the need to formulate and propose general assumption about the implication of constructivism on teacher professional development. By analyzing implication of constructivism ideas, at least, teacher professional development initiatives can attain 2 advantages. Firstly, we will have a description about why are so many teachers having difficulties in implementing constructivism ideas in their classroom. Second, we can elaborate in deeper the general principles of teacher professional development based on constructivism thought.

This paper is aimed at depicting implication of constructivism in the development of teacher professional learning, particularly in relation to how constructivism can be seen as basic assumption of the development of teacher learning. In order to achieve above goal, the paper is divided into 3 sections; critical analysis of constructivism tenets, analysis of teacher professional development, and the implication of constructivism on teacher professional development.

## METHODS

This This paper is based on literature study, which is aimed at describing implications of constructivism philosophy on teacher professional development. Literature study, or library research is conducted by collecting information in literature pertain to problem under investigation (Sari & Asmendri, 2020). Important benefit of literature study is that it builds description about potential research areas based on result or conclusion of from previous studies (Mertens, 2010; 92).

Current literature study was conducted through steps: finding, selecting, sense making, and synthesizing information from available source in the libraries (Bowen, 2009; 28). In this literature review, information was collected mainly from articles published online in google scholar database. Keywords used to find articles is "*constructivism*" and "*teacher professional development*". Inclusion criteria for articles selection is based on constructivism as philosophy, the credibility of publisher, and its relevancy to teacher professional development. Next step, researcher makes notes about relevant information such as author name(s), title, important finding, and methods being used. The final step is information analysis and conclusion drawing. Thematic approach was used to analyze information in order to sort and classify information based on research aim, that is to identify implications of constructivism views on teacher professional development.

## ■ RESULT AND DISCUSSIONS

### The emergence of constructivism philosophy

Constructivism is an epistemological school of thought studying the nature and origin of knowledge (Airasian & Walsh, 1997). Constructivism emerged when scholars' discussion about knowledge and truth in its peak. In the field of psychology, constructivism were responses to nativism and empiricism (Fedyk & Xu, 2017; Doolittle, 2014). Nativism, as epistemological and psychological school of thought, assumes that human knowledge determined by inheritance factors. Whereas empiricism insists that reality is an objective entity that is free from determination of human existence. Constructivism refuses both atomistic point of views because nativism and empiricism separate human from the environment in which they live.

In sociological field, constructivism is a redefinition and reformulation of Karl Marx and Max Scheler thinking (Berger & Luckmann, 1991). Constructivism brought change and shifts the focus of thought to a more concrete entity. In Marx's point of view, social reality is an outcome of human activities and the world produced by human action. Marx's perspective highlighted the ideation of reality that embodied in human consciousness. Due to ideation id the consciousness, realities have had distance from human daily life. These situations are the origin of false consciousness (Berger & Luckmann, 1991).

At the same time, Max Scheler thought about knowledge was seen as too fatalistic. For him, human knowledge is seen as given by society and as an apriorism towards human individual experiences (Berger & Luckmann, 1991; 20). The views place human in helpless position as an object of society. Thus, the view assumes that human is a creature totally conquered by the condition within which they live.

Responding to these thoughts, constructivism emerges and developed. In the field of psychology, constructivism brought balance by considering the wholeness of knowledge as products of transaction of individual internal aspects and environmental stimuli aspects. Constructivism refuses behaviorism views that placed human as passive organism which is merely shaped by environment. For constructivist, human does not passively wait for stimulus from environment. Instead, human is an active individual who selects, acts, and build dialectical interaction with environment. That is, stimulus is not the only things directed action. But, it only gives direction and determines the strength of action (Vanderstraeten, 2002).

In the field of sociology, constructivism shifted the focus of sociological knowledge investigation from merely theoretical thinking to a more earth-grounded reality of human live (Berger & Luckmann, 1991; 20). Ideation of reality takes place because sociology of knowledge tries to uncover the essence of knowledge as a product of social life determination, such social structure which is divide individual into social classes. The classification is a shape of ideations that makes reality of lives become obscure and ignored in sociological field. In this context, constructivism directs attention to individual daily live as something understood by people -common sense. As a common sense, daily live is the real reality for people. Nevertheless, the realities are understood differently by people because each individual has unique experiences.

Constructivism has many forms or variation, which in turn brings out different thinking. Nonetheless, the variation in constructivism can be classified into two general school of thought; social constructivism and psychological constructivism. Both constructivism school of thought met in the consensus that knowledge is actively constructed in human mind. The differences arise when both school of thought discuss about how knowledge is constructed.

Social constructivism argued that knowledge is socially constructed and affected by social, cultural, and political factors. Whereas psychological constructivism assumes that knowledge is individually constructed by human (Richardson, 2003B). Thus, psychological constructivism has a more idiosyncratic point of views.

Furthermore, scholars in educational field also argued about the status of constructivism. Many scholars contend that constructivism is a model knowing, instead of learning approach (Airasian & Walsh, 1997), and many others placed it as learning theories (Richardson, 2003B). Recently, constructivism is vewed as cognitive development theories (Xu, 2019). Nevertheless, diversification in the positioning of constructivism does not diminish constructivism implementation in educational settings, particularly in learning situation. This situation can be seen in the glow of scientific publication pertain to constructivism (Phillips, 1995). Huge and massive interest on constructivism ideas is more due to the need for reformation of learning and tempted rhetoric. The need for reformation of education and learning emerges due to school failure in meeting educational standards and job requirement. At the same time, rhetoric of constructivism as an alternative for increasing autonomy -as a contrary of obedience- and student's motivation hypnotizes educators and stakeholders. These situations direct educators to set aside lack of steady concept and strong evidences regarding constructivism efficacy (Airasian & Walsh, 1997).

**Basic tenets of constructivism**

Constructivism postulated that reality is a whole integrated which is built from interaction between human and the world (Vanderstraeten, 2002). Constructivism sees human as active organism that continuously active in finding and selecting stimulus from environment. As part of finding and selecting stimuli, human also choose a response from a set of alternatives available in their imagination. Response is selected based on previous experiences -response showed is a response deemed as best suited to environment.

Response selection, therefore, is a habituation process (Vanderstraeten, 2002), which is an adaptive reaction of human to their environment (Kivinen & Ristel, 2003). Adaptive reaction is directed by evolutive instinct, which is a set of internal changes in individual human that is reflected by human adaptive reaction to environmental stimulus. This proposition implies that habituation is a learning activity through selected action as human adaptive process in order to survive.

Learning activities through behavior habituation is conducted by converting trial action into intelligent action (Vanderstraeten, 2002). The converting process facilitated by experiences. By considering past experiences, human develops a picture of consequences of action. When the consequences result in harmony with environment, trial action become intelligent action. Adversely, when action did not meet harmony, then human would make action refinement, or even totally change their trial action.

By converting trial action into intelligent action, human develop a mechanism for knowledge construction. For constructivist, knowledge comes from the connection between action and its consequences. Therefore, knowledge is assumed as something constructed involved creation, choices, decision, and agency (Xyst, 2016). Process of creation and making choices gives human life experiences. Accumulated life experiences are constructed knowledge through meaning development resulted from the connection between action and its consequences.

In essence, constructivism assumes that realities are the whole integrated built from the interaction between human and environment. The

interaction stems from part of human adaptive reactions to the world through which they learn. As a result, learning is the process of habituation in which trial actions converted into intelligent action (Vanderstraeten, 2002). This conversion is a mechanism by which human construct knowledge. As a result of habituation process, knowledge comes as human find the correspondences of action and its consequences, between human action and its effect on and upon the world (Xyst, 2016). Therefore, knowledge is a product of meaning construction based on experiences (Kumar, 2006). Meaning construction indicates that human actively build the connection between action, consequences of action, and stimuli that provoke action. As a result, knowledge construction based on experiences is the way human employs to understand the world they live. The dialectical process of interaction between human and environment is labelled as transactional model (Kivinen & Ristel, 2003), or transactional constructivism, or dialectical constructivism (Berger & Luckmann, 1991).

**Critical analysis of constructivism basic tenets**

The main principles of constructivism can be classified into several propositions; realities are the concrete whole integrated of stimuli, action, and context, learning is an adaptive process through action habituation, and knowledge constructed from dialectics among action, stimuli, and the consequences in given context. Based on these propositions, we can identify several advantages and limitations of constructivism. Among many, the advantages of constructivism are the focus that human is subject and center of learning and its highlight on growth as general purpose of education. Whereas the limitation of constructivism is it generates knowledge relativism.

Constructivism places human an active agent of knowledge construction (Reich, 2007). The knowledge comes from experiences resulted in dialectical connection between action and stimuli. The central position of human is reflected in principle of human agency which is required human to create, select, and decide (Xyst, 2016). As an agent, human has a broad space for exploring environment by selecting stimuli they would response to. At the same time, the availability of alternatives for responding represents the chance for human to be creative by build the new pattern of behavior as effective ways to adapt to environment. The creation processes in which human selects and executes action is a representation of their position as learning agent.

The space of creation involving a set of action selection is needed for adaptation and problem solving. At this situation, stimuli can take shape as challenging situations or problems to be solved. Thus, the response is a solution generated from experiences. Process of solution selection and execution gives human opportunity for adaptation. Therefore, adaptation and problem solving is part of learning from experiences.

In addition to human agency in learning, constructivism also implies growth as important part of learning. Growth can be seen as positive change in human abilities. By reflecting on past action consequences, human dan develop a repertoire for avoiding failure in adaptation to environment. Avoiding past mistakes mean that human should develop a new type of behavior as part of their adjustment. When new type of behavior effectively yields harmony with environment, then human has had additional abilities to create a better world. The new and better world created as part of human adaptation represents growth in human and outcome of effective learning.

In addition to its advantage and strength, constructivism also embraces limitations. Of many of it, constructivism severely yields knowledge relativism. Knowledge relativism can be

conceived as knowledge that is subjectively deemed as truth by individual and lack of objective consensus. As we all see, for constructivist, knowledge is something constructed based on the meaning given by individual to reality. Therefore, we can not know "something in its being" -objective realities (Kivinen & Ristela, 2003; 366). In constructivist point of views, "something in its being" is never exist, because the only existing things are "something as individual interpretation" -subjective realities.

These subjective realities come from knowledge construction process and the quality of construction outcome -knowledge. Knowledge construction is highly affected by individual experiences and context in which individual live in. Diversification of experiences, in turn, affects how individual transform stimuli into knowledge. And then, affect the quality of knowledge as an outcome of construction process. At the same time, knowledge can be seen as representation of realities in human mind. As constructivism gives a broad space for individual judgement, it provides a wide range of reality interpretation (Phillips, 1995). And as knowledge is representation of subjective realities, then the quality of knowledge also and necessarily relative.

Relativism of knowledge as a result of constructivism point of view also comes from the context surrounded individual live. The condition in which knowledge constructed determines individual's interpretation and conclusion to stimuli (Airasian & Walsh, 1997). The differences of interpretation worsen the subjectivity of knowledge that has been relative in nature. The next implication of it is the difficulties of human to differentiates the truth from the false because there is no reliable and universal truth. And when the entire knowledge in true, then constructivism presented chaos and uncertainty that, in turn, can be seen as source of knowledge de-legitimation.

The next thing needed to explore is how constructivism ideas can be implemented in human live, particularly in educational settings. Above all of its controversies, constructivism provides some basic assumption can be implemented. Of many possibilities, constructivism provides a model for human adaptation, a model that is able to guide ways of thinking about how human can build effective adaptation to their environment.

Constructivism ideas are important ways of thinking for postmodern societies. Rapid change is the main feature of postmodern societies. As a consequence, postmodern people are always required to adapt. At this point, constructivism ideas meet the need of postmodern people. In a complex and uncertainty live, adaptability is core competency needed to survive. In relation to this condition, constructivism provides an alternative way of thinking -and way of life. For constructivist, learning is an active process through which people develops sense of crisis and necessities to change the way they interact with the world (Doolittle, 2014). Complexity and uncertainty bring about novelties. The novelties can be both, opportunities and threats for human. Novelty becomes opportunities when people see the possibilities to change and take advantage on it. At the same time, novelty can become a threat when people fail to adapt.

In order to convert novelties into opportunities, people should have learning abilities, the abilities to relearn the good habits and unlearn the bad one. Only by these abilities people can grow. And for constructivist, the primary purpose of learning is growth that only can be achieved by effective adaptation to the changing environment (Packer & Goicoechea, 2000). Through learning, people develop adaptation to changing environment that always presents novelties. Adaptation processes are representation of people positive change. Thus,

adaptation as learning produce growth that is the essence of learning for constructivist.

Implementation of constructivist ideas need some cautions, especially in relation to how knowledge relativity can be synchronized. As people being a member of many communities, they develop varieties of knowledge (Richardson, 2003B). Thus, they need to develop a sense that knowledge they absorb from different communities did not contradict one another.

People adaptation determined by knowledge they own. To be effective and fluent, people adaptation needs knowledge congruency. It means that new situation requires people to choose relevant information as a basis for action. When knowledge had by people are contradict one another, then people will find themselves overwhelmed or even anxious, and then fail to adapt. This challenging situation forces people to synchronize their knowledge. Thus, the specific skills needed to make effective adaptation to complexity and uncertainty is the ability to make sure that knowledge in our head is not contradict one another.

**The essence of teacher professional development**

Professional development is a process and activities designed to enhance the professional knowledge, skills, and attitudes of educators so that they might improve the learning of students (Guskey, 2000; 16). Implicitly, Guskey propose that professional development for teachers is part of continuous efforts to provide effective learning based on students' characteristics. The ultimate goal of professional development is improving student learning. In a similar vein, Diaz-Maggioli (2004; 5) pointed out that professional development is a career-long process in which educators fine-tune their teaching students need. In essence, it can be said that teacher professional development is ongoing efforts to improve the quality of teacher to increase the quality of student learning.

Professional development assumed as an effective and powerful ways of improving student outcomes (Goodall, Day, Lindsay, Muijs, & Harris, 2005; Burns, Naughton, Preast, Wang, Gordon, Robb, & Smith, 2018; Moulakdi & Bouchamma, 2020). The strategic position of professional development in education reformation endeavor is based on the assumption that teachers have great effect on students' achievement (Marzano, 2003; Hattie, 2012). That is, if we can improve teacher performance, then we can expect that students learning will be improved, and in turn students' outcome will be improved as well.

Furthermore, professional development also found to have effect on teacher's performance (Kraft & Papay, 2014) by increasing teachers' instructional skills (Affandi, Ermiana, Saputra, Witono, & Gunawan, 2020), teacher's collective efficacy (Voelkel & Chrispeels, 2017), and teachers' collectivity through the spread of assistances and good practices among teachers (Sun, Penuel, Frank, Gallagher, & Youngs, 2013). Teacher collective efficacy is a believe of a group of teachers in their abilities to collaboratively solve any problem arises in their daily activities as educator. As a community, teachers in individual school usually develop sense of collectiveness and common values and visions. These senses can be maintained and strengthened through collaborative work on professional development. When these senses translated into the action, teachers will work hand in hand with one another.

In addition to its effect on individual teacher, professional development also found to have positive effect on school change institutionally (Harris & Jones, 2010). As a member of school, teacher affects and is affected by how school managed. At this point, what teacher learned in professional development will eventually affected

school policies. At the same time, how teacher implements what learned in professional development needs support from school as an institution. Several important supports needed by teacher in implementing what learned in professional development are supporting leadership (Wells & Feun, 2013), coherent and flexible school culture and structure (Tam, 2014), and social capital in the form of rich and trusted relationship among teachers (Parlar, Polatcan, & Cansoy, 2020). Researcher also found several factors as sources of challenges in creating professional development for teachers. Those challenges include the difficulties in deprivation of school culture, reviewing student's achievement, discussing instructional methods, and in helping students to improve their learning outcomes (Wells & Feun, 2013). Essentially, those challenges come from school policy pertain to how teachers should work in school. Therefore, the need for strong and supportive leadership can be assumed as solution for the challenges.

There are some features characterizes effective professional development. Scholars have different emphasize on the feature of effective professional development for teachers. In general, effective professional development characterizes by several features; it is an intentional process, it is ongoing, and it is a systematic process (Guskey, 2000; 16). Diaz-Maggioli (2004; 5) added job-embedded commitment as a complement. Guskey's ideas about effective professional development slightly looked broad and general because it is based on how it should be arranged and evaluated. Nevertheless, the point of Guskey's effective professional development model is it should be grounded in specific and clear goal. This feature comes from the finding that professional development initiatives frequently lack of clear orientation towards the competencies should be mastered by teachers after their involvement in professional development programs (Guskey, 2017). In turn, professional development is deemed effective only when it is developed and arranged to achieve clear and relevant goals. Lack of clear goals to be pursued in professional development initiatives can be traced into the lack of careful planning and lack of evidence support for innovation to be implemented by teachers (Guskey, 2009). The main goal of professional development is collaboration for student learning improvement (Affandi, Ermiana, & Makki, 2019).

In order to make sure that professional development has a clear goal, Bernhardt (2015) proposed that professional development needs participation from teachers as it is planned, conducted, and evaluated. Teachers' participation is essential when professional development planned. By involving teachers in planning stage, designer of professional development can gain meaningful input about what teacher needs in most.

Another important general feature of professional development is ongoing, which can be defined as a continuous effort to sustain teacher's attention toward improving student learning. Ongoing processes imply that professional development should be arranged in line with school vision, content and pedagogical knowledge of teachers, and placed teacher as an active learner. Research on professional development initiatives in Australia and New Zealand found that teachers usually found difficulties in implementing what they learn in professional development when it is conducted by "one size fit all" approach (Petrie & McGee, 2012).

As an ongoing process, professional development should be arranged in continuous collaboration among teachers. This collaboration is focused on finding how to improve student learning. Therefore, professional development

should be focused on the mastery of subject matter and pedagogical skills (Desimone, 2011; Patton, Parker, & Tannehill, 2015; Merchie, Tuytens, Devos, & Vanderlinde, 2016).

The last feature of effective professional development according to Guskey (2000) is systematic, which mean that professional development should be designed and executed towards given goals involving relevant stakeholders. As a systematic endeavor, professional development not only needs goals as working orientation but also other key component such as resources, methods, and evaluation. Experiences from past professional development initiatives suggested for broader support and involvement of school principal and school supervisor (Bernhardt, 2015).

**Implications of constructivism philosophy on teacher professional learning and development**

There are several implications of constructivism philosophy on teacher professional learning, those are growth is ultimate purpose of teacher professional development initiatives, problem-based professional development, evaluation-integrated professional development, and ongoing professional development through learning by doing. These implications are in line with basic thought of constructivism, these are learning is human adaptive processes, learning occurs through effective behavior habituation, and growth is the primary purpose of education.

**Growth is ultimate purpose of teacher professional development initiatives**

Basically, learning is assumed as being occurred when learner has mastered or acquired new knowledge or skill. New knowledge or skill emerge from a set of interaction between learner and environment. Interaction between learner and environment emerges when environment presents stimulus to learner. The stimuli can take place as problems or challenging situation required learner to respond appropriately. New knowledge and skills acquired by learner when responses yield effective adaptation. Acquisition of new knowledge and skills is equivalent to growth.

Regarding professional development, teacher growth can be conceived as primary orientation and philosophy of teacher learning. As an orientation, teacher growth should always direct all teacher professionalization initiatives. As a philosophy, teacher growth should serve as a basis for design and development of teacher professional development programs. Bernhardt's work (2015) suggested philosophy of professional development as an important guiding foundation for teachers in relating what they do in professional development programs and the output expected.

Clear description of expected outcome serves as final destination of professional development journey. Specification of expected outcomes should answer questions such as "what we want to accomplish and how will we know if we had achieved it?" (Guskey, 2017). In his review of effective professional development evidences, Guskey (2009) concludes that many professional development programs did not begin with clear goal and purposes. As a result, evaluation of professional development programs rarely resulted in evidence-based conclusion about their effectiveness.

Overcoming the challenges previously mentioned, constructivism provides general guidance by emphasizing growth as ultimate purposes of every education endeavor. Growth is a result of adaptive behavior of human. In other words, every human behavior is directed as adaptation processes based on environmental stimulus. Eventually, effective adaptation will result in growth in human capacities for improving their live qualities. For teachers, growth can be

conceived as improvement of knowledge and skills as a result of their activities in solving instructional problems or overcoming challenging situations. Teachers can grow only if they are able to persist effective adaptive behavior. In essence, effective behavior habituation is a prerequisite for teacher's growth.

**Problem-based professional development**

Constructivism postulates that learning is part of human adaptive processes. To be adaptive, teachers should be faced with problems or challenging situations. Frequently challenging situations or problems faced by teachers, among others, are increasing variation in students' characteristics, rapid change of government policy, and increasing demand of parents and society. Problems and challenging situations require teachers to adapt and change how they conduct instructional activities.

Confronting to problems and challenging situations also reported to drive teachers asking their epistemological believe. When teachers are required to adapt, they will eventually doing epistemological reflection: a process of reassessing their assumptions about the nature knowledge; its certainty and constraint (Baxter Magolda, 2004). Epistemological reflection is a driving force for teacher to rethink about how they treat knowledge and knower, how they transmit and transform knowledge in learning situations. Thus, problems and challenging situations are stimulus for teachers to learn not only to adapt but also to create new knowledge and new instructional habits.

Problem-based professional development creates a broader definition of learning, in which learning conceptualized as transformation of knower and knowledge through renewal definition of their relationship (Opfer & Pedder, 2011). As a complex process, learning always defined by how learner sees knowledge and how they convert it into new shapes.

**Evaluation-integrated professional development**

As learning is growth, teachers need information about where they stand before and after professional learning occurred. Process of collecting information about teachers' initial skills is part of evaluation\ system. This information is an important material needed in deciding how professional development should be conducted. In collecting information as part of the design of professional development, teacher participation is central (Desimone, 2011; Patton, Parker, & Tannehill, 2015). Reflection on how professional development designed showed that teachers rarely involved in determining what problems would be addressed, what innovation would be at center of professional development, and how the innovation would be implemented in teacher's classroom (Petrie & McGee, 2012; Bernhardt, 2015; Guskey, 2021).

By the end professional development programs, there is always a need to make sure that professional development has an effect on teachers and student learning. Judgement about professional development effectiveness can be based on the comparison of teacher skills and the goal of professional development programs. Therefore, evaluation can not be separated from any professional development program. Judgement about professional development effectiveness is needed in order to persuade policy makers to sustain and scale out the professional development initiatives. Effort to assure that professional development initiative is effective rarely supported by strong evidence so the initiative rarely survives for a longer period of time (Guskey, 2009).

In general, evaluation serves two primary reasons; for measurement and for development (Marzano & Toth, 2013). The first reason pertains to judgement about how teacher performs in classroom. Its mainly function is to determine how good teacher teaches. The latter is more

emphasizes effective use of evaluation as part of teacher empowerment. By this, we mean that information from teacher evaluation is conceptualized as entry point to performance refinement. An when performance refinement brings about teacher change in terms of their skills improvement, then it is growth.

**Professional development is ongoing learning by doing**

Learning through experiences are modes of learning in which learner develops dialectical relationship with environment. Through the dialectics, learner develops knowledge and skills based on reality. Problem based learning is an important mechanism needed by human for recognizing the challenges and uncertainties in their living environment. Problem recognition is first step in conducting learning as adaptation activity. By recognizing the problem, adaptive action will be more suitable with environment requirement.

Development of professional capacities is a demand for teachers. Unfortunately, teacher professional development rarely supported by sufficient learning process. Effective learning for professional development is indicated by mutual adaptation, that is adaptation of external innovation and context in which the innovation will be implemented (Guskey, 2021). Every form of innovation is a product of context, therefore it is environment-bound. As it is contextual, innovation should be translated according to new context where it will be implemented. Process of adapting innovation to teacher's workplace needs learning ability of teachers in terms of critical reason to innovation being offered. Critical reason is teacher's ability to explore the evidences of given innovation effectiveness. Then, the innovation should be scrutinized to find out its compatibility with the workplace of teachers. The above process is conducted through a set of trial. And trial is a mode of learning recommended by constructivism philosophy.

John Dewey offered a schema of trial consists of problem recognition, hypothesis formulation, solution plan, solution implementation, experiencing consequences, and reflection (Noddings, 1998). Through these processes, innovation adapted by teachers and can be deemed as effective tool to develop teachers' professional competencies.

Process of finding and examining innovative products based on context is an ongoing activity in teacher's daily life as professional worker. The dynamics of teacher's daily activities require teachers to have sensitivity and learning ablity. Learning ability is embodied in teachers' capacities to adjust their selves and to change environment in creating effective learning condition. In constructivism point of view, learning is an adaptive process through which human develop self-adaptation to environmental changes. The change that is continuously occurred required continuous adaptation. Therefore, constructivism implies continuous learning.

## ■ CONCLUSIONS

Constructivism postulated that learning is an active process through which learners develop habits to make effective adaptation to their environment. Because environment is constantly changing, learner will be frequently faced with problems and challenging situation. The ability to solve problems or overcome challenging situation required learners to develop incremental skills. Development of incremental skills brings about growth. Thus, growth is primary purpose of learning.

As a basis for teacher professional development, constructivism can have important implication. Several implications of constructivism can be seen as general guiding principles for professional development designers. The

implications are as follows: growth is ultimate purpose of teacher professional development initiatives, problem-based professional development, evaluation-integrated professional development, and ongoing professional development through learning by doing.

The implication mentioned earlier is theoretical principle for guiding professional development initiatives. Therefore, it needs to be examined through systematic investigation in order to prove its effectiveness on teachers' professional development. The research can be targeted to formulate a more practical steps in developing professional development programs, in what context does it effective, and what condition needed to support the implementation.

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