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The Application of Theory of Action in the Formulation of Opportunity to Learn Strategies

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Abstract
This paper focuses on the application of theory of action in the formulation of opportunity to learn strategies. The strategies are explicitly outlined based on three domains of opportunity to learn, that are content coverage, teaching practices and teaching quality. The explicit strategies for each opportunity to learn domain are believed to help teachers visualize specific actions that can be implemented in order to maximize students' opportunity to learn, and hence improve students' achievement. Furthermore, the visible, clear and systematic delineated strategies can be used as guidelines to uncover any undesirable results that require prompt refinement.
Keywords: *Theory Of Action, Opportunity To Learn, Content Coverage, Teaching Practices, Teaching Quality*

Introduction

Opportunity to learn, which echoes classroom teaching and learning processes, has been continually receiving great interest among researchers over the past five decades (Heafner & Fitchett, 2015; Herman & Klein, 1997; McDonnell, 1995; Minor, Desimone, Phillips, & Spencer, 2015; Wijaya, Van den Heuvel-Panhuizen, & Doorman, 2015). This is partly due to the fact that opportunity to learn and student achievement are cogently interrelated, as revealed in many previous studies globally (Kurz, Elliott, Kettler, & Yel, 2014; Linda Haggarty, Pepin, Haggarty, & Pepin, 2002; Minor et al., 2015; Reeves & Major, 2012; Wijaya et al., 2015). Apart from that, opportunity to learn is also often used to determine the quality of learning environment, and hence student achievement (Wang, 1998; Wang & Goldschmidt, 1999).

Even though voluminous studies have been devoted in the past decades to analytically examine the role of opportunity to learn in the teaching and learning processes, however little attention has been paid to the application of theory of action in an attempt to maximize students' opportunity to learn, and hence students' achievement (Gearhart et al., 1999; Herman & Klein, 1997; Jaafar, 2006; Kurz et al., 2014; OECD, 2012). Thus, this paper explicitly focuses on the development of opportunity to learn strategies based on the theory of action, that can be used as practical guidance by schools and teachers to improve students' achievement.

Theory of Action

The theory of action has been introduced by Argyris and Schon in 1985 (Argyris et al. 1985). The main concept of the theory of action is human as a designer of action. To achieve the desired results, individuals often design their actions based on their surroundings, perform such actions and consequently monitor the effectiveness of their actions. Actions taken by the individuals are usually based on their knowledge of how the results can be achieved (Argyris et al. 1985). Concisely, the theory of action can be described as follows (Argyris et al. 1985):

"In situation *s*, to achieve consequence *c*, do action *a* "

The theory of action is divided into two, namely espoused theory and theory-in-use. The espoused theory refers to the elements that are believed to be hold by individuals, while the theory-in-use is the elements that can be interpreted from individuals' actions (Argyris et al. 1985). In general, Argyris et al. (1985) suggested that individuals' actions give rise to effective impact if there is congruence between the espoused theory and the theory-in-use.

Specifically, to facilitate an individual in designing and implementing actions more effectively, Argyris et al. (1985) has proposed the theory-in-use model as shown in Figure 1:

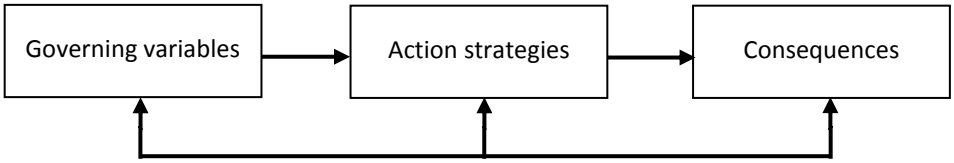

Figure 1. Theory-in-use Model
Source: Argyris et al. (1985)

Notably, the theory-in-use model consists of three vital components, namely the governing variables, action strategies and consequences. Table 1 below shows the brief explanation for all the three components.

Table 1 Descriptions of components in the theory-in-use model

Component	Description
Governing variables	Factors to be considered but limited to what can be done.
Action strategies	A series of steps that are used to ensure the implemention of the governing variables.
Consequences	Intended consequences is the ones that are as expected. Uninended consequences are the ones that are unexpected.

In general, when action strategies produce intended consequences, there is a congruence between what is expected and the actual results. On the other hand, when the result is of

unintended consequences, then there exists a mismatch between what is expected and the actual results. To address the unintended consequences, an individual can perform two types of actions, i.e. whether to change the action strategies (known as single loop) or change the governing variables (known as dual loop), as shown in Figure 2.10.

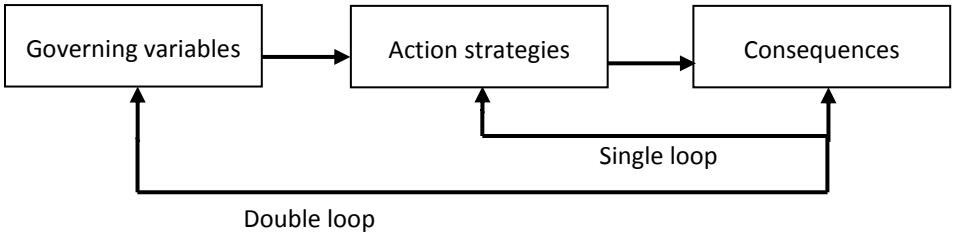

Figure.1 Theory-in-use single loop and double loop model
Sumber: Argyris et al. (1985)

2. Why Theory of Action Matters?

It is customary to note that reform strategies that are undertaken by schools or teachers may not successful and effective in producing the expected results (Darling-Hammond, 2007; EOGOAC, 2015; Milner, 2012; Wang, 1998; Welner & Carter, 2013). One of the reasons often quoted is the misalignment between the implemented strategies and the problem that are to be solved. Without the congruence between the strategies and the problem faced, therefore the results are often erratic. To unravel this issue, the theory of action can be employed since it provides a framework for understanding the impact of a set of action strategies taken by an individual based on a variety of factors (Argyris et al. 1985).

In the context of classroom teaching and learning processes, teachers create their actions based on classroom environment and their knowledge about how they can achieve the learning outcomes. Teachers' actions can produce either intended or unintended results. If the result is not as expected, teachers have the opportunity to improve their strategies. Hence, the theory of action can be used as guidelines in formulating various action strategies that can be implemented by teachers to maximize students' opportunity to learn, and consequently improve students' achievements. In other words, by explicitly laying out the action strategies, teachers would be able to monitor and ensure that their action strategies are rightly matched the problem that they are facing. In addition, teachers would also able to rectify any ineffective strategies and ensure that the outlined strategies would produce intended results.

3. The Formulation of Opportunity to Learn Strategies

In this study, opportunity to learn variables are based on the PISA 2012 framework, which consist of three main domains: content coverage, teaching practices and teaching quality (OECD, 2012). Specifically, each domain comprises several subdomains as exhibited in Table 1.

Table 1: Domain and subdomain for opportunity to learn variables

Domain	Subdomain
Content Coverage	Experience with applied mathematics tasks at school
	Experience with pure mathematics tasks at school
	Familiarity of mathematical concepts
	Giving varieties of mathematics tasks in the classroom and during assessment
Teaching Practice	Teacher-directed instruction
	Student orientation
	Formative assessment
Teaching Quality	Cognitive activation
	Support during mathematics teaching
	Teacher support
	Disciplinary climate
	Classroom Management

Source: OECD (2012)

Using the theory of action, the action strategies are formulated according to the above subdomains of opportunity to learn. Precisely, the strategies are adapted from the list of items for each subdomains of opportunity to learn, as stipulated in the PISA 2012 framework (see OECD 2012 for further details). The intended results of the charted strategies are accordingly drawn from various findings from the literatures.

Table 2 shows the action strategies for **content coverage** domain.

Table 2: The action strategies for **content coverage** domain.

If teachers support students by….	then…	Source
i. Designing dan providing worthwhile applied mathematical tasks that can actively engage pupils in learning and challenge pupils' thinking; ii. Designing dan providing worthwhile pure mathematical tasks that can actively engage pupils in learning and challenge pupils' thinking; iii. Emphasizing on the mathematical concept building; and iv. Giving varieties of mathematics tasks in the classroom and during assessment,	students will learn in more meaningful manners and their curiosity would be enhanced. Hence, this may help increase students' level of achievement.	Boscardin et al., 2005; Breckenridge, 1919; Cheng, 2013; Gottfried, 2016; Ma & Wilkins, 2007; McNamar, 2000; Ministry of Education Singapore, 2012; Murphy, 1988; Reynolds & Walberg, 1992; Schmidt, Cogan, & McKnight, 2010; P. Sullivan, Zevenbergen, & Mousley, 2003; Tarr, Grouws, Chavez, & Soria, 2013; Wijaya et al., 2015.

Adapted from OECD (2012).

The action strategies for **teaching practice** domain are exhibited in Table 3.

Table 3: The action strategies for **teaching practice** domain.

If teachers support students by….	then …	Source
• Practicing *teacher-directed instructions*, such as: i. Set clear goals for students' learning; ii. Encourage students to communicate their thinking or reasoning; v. Ask students questions to ensure their understanding of what was taught; vi. Make students recall content taught in previous lesson before commencing a new lesson; and iii. Inform students the objectives of the lesson.	students would have finer and clearer understanding of what are being taught, and consequently their level of achievement may increase.	Adams & Engelmann 1996; Borman et al. 2003; Hanover Research 2014; Hattie 2009; Mathes et al. 2003; Miranda & Russell 2011; Rowe 2006; Ryder, Sekulski & Silberg 2003; Taylor & Bilbrey 2012.

continued…

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If teachers support students by….	then …	Source
• Practicing *student-oriented instructions*, such as: i. Assign tasks according to students' abilities; ii. Emphasise on project works; iii. Encourage students to solve mathematical problems collaboratively with other friends; and vii. Take into account students' opinion when preparing a lesson.	students would be more actively engaged in doing mathematics, and this may help increase their achievement.	De Jesus 2012; De La Paz & Hernández-Ramos 2013; English & Kitsantas 2013.
• Practicing *formative assessment*, such as: i. Inform students of their progresses and performance levels in mathematics; ii. Provide students with feedback on their strengths and weaknesses in mathematics; iii. Highlight teachers' expectations when students do assignments or take assessments (quizzes, tests, examinations); and iv. Guide students on how to succeed in mathematics.	students would be able to self-assess their understanding, find out their weaknesses and take actions to correct their mistakes. By doing all these, students would be more motivated, and hence this might improve their achievement.	Chappuls 2009; Hanover Research 2014; Hussain et al. 2012; McMillan, Venable & Varier 2013; Moyosore 2015; Sadler 1989; Wiliam, Harrison & Black 2004.

Adapted from OECD (2012)

For teaching quality domain, the action strategies are displayed in Table 4.

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Table 4: The action strategies for **teaching quality** domain.

If teachers support students by….	then…	Source
• Practicing *cognitive activation*, such as: i. Ask questions to make students reflect on the problem; ii. Assign problems that require students to think thoroughly; iii. Encourage students to solve complex problems creatively by using their own procedures ; iv. Allocate non-routine problems that can be solved using various methods; v. Assign problems in variety of contexts to ensure students' understanding of mathematical concepts; vi. Guide students to reflect and learn from their mistakes while solving mathematical problems; vii. Inspire students to communicate clearly the way they solve mathematical problems; viii. Assign problems that offer opportunity to apply students' existing knowledge and skills in new real life contexts; and ix. Allocate problems that can be solved in multiple methods.	students would be able to rationalize, justify and make reflections on the steps taken to solve problems, and all these may help increase their achievement.	Baumert et al., 2010; Scheerens, Luyten, Steen, & Thouars, 2005.
• Providing *support during mathematics teaching and learning,* such as: i. Demonstrate passions in students' learning; ii. Provide assistance to students when needed; iii. Carry on with lessons until students understand; and iv. Give freedom to students to convey their opinions.	students would be more motivated to do mathematics, and this may help increase their achievement.	Klem & Connell, 2004; Pianta & Hamre, 2009.

Continued…

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If teachers support students by….	then…	Source
• Providing *general support,* such as: i. Motivate students to work hard; ii. Offer continuous and consistent helps to students when necessary; iii. Assist students with their learning; and iv. Appreciate and listen to students' opinions.	students would be more motivated to do mathematics, and this may help increase their achievement.	Klem & Connell, 2004; Pianta & Hamre, 2009; Reeve, 2006.
• Establishing positive disciplinary classroom climate*,* such as: i. Ensure students pay attention; ii. Control learning environment to avoid disruptions (noise and disorder); iii. Ensure minimum time wasted due to students' negative behaviours; and iv. Encourage students to show respects to each other so that they can work together.	students would be able to learn mathematics more efficiently and effectively, and this may help increase their achievement.	Díaz Larenas 2012; Jones et al. 2016; Sullivan et al. 2014.
• Establishing positive classroom management*,* such as: i. Ensure students listen to teachers' instructions; ii. Ensure class is in organized and well-ordered manner; and iii. Uphold punctuality (begin and end lessons on time).	students would be able to learn mathematics more efficiently and effectively, and this may help increase their achievement.	Egeberg, McConney & Price 2016; Erdo et al. 2010; George Lucas Educational Foundation 2011; Lock & Babkie 2006.

Adapted from OECD (2012)

5. Conclusion

Formulation of opportunity to learn strategies based on theory of action can help teachers improve students' achievement. By visibly delineating the action strategies, teachers would be able to meticulously scrutinize and hence align between the strategies and the problems faced. In other words, when action strategies are evidently defined, any detrimental results can be identified, and consequently rectification could be taken promptly.

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