Reconceptualization of the Relationship between Formative Assessment and Summative Assessment

ABSTRACT: Formative Assessment (FA) and Summative Assessment (SA) constitute two indispensable parts of any effective assessment system. As FA was proposed as an alternative to SA, there has been an academic concern about their relationship since the birth of these two concepts. Although many well-known studies have been carried out for FA, or, SA, or both, there has been contrasting views and misunderstandings about the relationship between FA and SA. It is argued in this paper that the confused relationship between FA and SA stems from the fact that it is either conceptualized from the perspective of function or from the perspective of process alone. The relation between FA and SA is very fine, far from clear-cut and a clarified relation between them is necessary for both our right understanding of FA and SA as well as the realization of the balance between FA and SA in practice as advocated by many educational policies. This paper aims to: (1) carry out an analysis of the function-based perspective and process-based perspective; and (2) re-conceptualize the relationship between them by combining the two perspectives together. The study results suggest that: (1) both FA and SA are, first of all, assessment and therefore share the same neutral assessment processes of elicitation of learning evidence, interpretation of evidence, and use of assessment results; (2) the purpose governs the how each process should be carried out and the extent to which summative or formative function is performed depends the how the processes are carried out; and (3) formative use of SA is more feasible than summative use of FA in practice.

KEY WORDS: Relationship between formative assessments, function perspective, process perspective, contrasting views, misunderstandings, and re-conceptualize.

INTRODUCTION
Since B.S. Bloom, J.T. Hastings & G.F. Madaus [eds], in 1971, borrowed the term “formative”, coined by M. Scriven (1967) for program evaluation and brought it into classroom assessment, formative assessment has experienced more than 40 years of development. In the past 40 years, a lot of academic and financial investments has been made into the field of FA (Formative Assessment); and the value of FA for promoting learning has been widely recognized and accepted.

Now, it has been promoted by many countries like USA (United States of America), UK (United Kingdom), and New Zealand as part of their national educational policy. However, in spite of more than 40
years development of formative assessment, there has been much inconsistency on how FA is conceptualized in dominant literature, especially in its relation to SA or Summative Assessment (Wiliam & Black, 1996; Black & Wiliam, 1998a, 1998b, and 2003; Popham, 2008 and 2011; Stobart, 2008; Bennett, 2011; Wiliam, 2011; and Huang & Luo, 2014).

Since FA was born in the development of SA as an alternative to it, the study of its relation to SA will surely contribute to our understanding of FA; and, therefore, has been much explored in assessment community. Up to now, the relationship between them have been studied and discussed either from function perspective or from process perspective. Unfortunately, instead of agreement, the studies and discussions have produced more disagreements than agreements and even misunderstandings.

In function-based discourse, there are contrasting ideas about whether SA and FA are competing or complementary. In the process-based discourse, in addition to the competing or complementary argument, there are tendencies to mis-conceptualize SA as the first step of FA while feedback as FA, which ignores the impact of the purpose on human assessment activity and downplays the assessment essence. This diverse and misleading understanding of relationship has caused many difficulties for both researchers and practitioners, making it hard for assessment knowledge to be exchanged, accumulated, and practiced.

This paper attempts to clarify the relationship between them by examining the existing understandings and proposing a new perspective of purpose and process combined to look at it. It is hoped that the clarification will pave way for better development of both FA and SA in the future.

METHOD

The purpose of this study is to critically examine the existing understanding of relationship between FA (Formative Assessment) and SA (Summative Assessment) for re-shaping it in a more sensible way. To achieve this purpose, the research is carried out in following steps: (1) FA-related literatures from 1967 to 2014 are collected; (2) The literatures are examined for the discourses regarding relationship between FA and SA; (3) The discourses are analyzed and then put into two categories: function-oriented and process oriented; (4) The two categories are analyzed for its contributions and weaknesses; and (5) A new perspective of understanding is proposed and elaborated based on previous analysis.

RESULTS AND DISCUSSIONS

First, Relationship between FA and SA from Perspective of Function. Because dominant FA (Formative Assessment) discourse defines FA in terms of function, the relation between is much explored in terms of the function.

Spectrum & Continuum Metaphor. The relation between FA (Formative Assessment) and SA (Summative Assessment) was characterized by D. Wiliam & P. Black (1996) as two ends of spectrum and continuum as below:

However, these two scenarios, the classroom discussion and the formal test, are best regarded as two ends of a spectrum. There are many intermediates (Wiliam & Black, 1996:540).

[...] summative and formative functions are, for the purpose of this discussion, characterised as the ends of a continuum along which assessment can be located (Wiliam & Black, 1996:544).

As seen from figure 1, at one extreme (the formative) the problems of creating shared meanings beyond the immediate setting are ignored: assessments are evaluated by the extent to which they provide a basis for successful action. At the other extreme (summative) shared meanings are much more important (Wiliam & Black, 1996:544). However, for either summative or formative purpose, there is a cyclical process of assessment.

According to M. Taras (2007), there are three positive aspects of this conceptualization: firstly, the need for elicitation of evidence for assessment shows an attempt to gather enough evidence in order to make an ethical judgment; secondly, discussion of the consequences of assessment makes us aware of the ethical and social dimension of assessment; and thirdly, the
focus on FA that is learning, not SA that is assessment (Taras, 2007).

But, this conceptualization entails a necessity of two processes for two different functions. In this conceptualization, SA and FA become two separate and distinct processes. According to D. Wiliam & P. Black (1996), as long as a distinction is maintained between the elicitation and the interpretation of evidence, formative functions need not be incompatible with National Curriculum assessment. After elicitation, one interpretation will produce SA and to obtain FA, a new and different interpretation is required. Clearly, what they describe is not a change from FA to SA, but a change of criteria to describe two processes of assessment.

M. Taras (2007) argues that the first process of their FA is actually SA, but taken intermittently at different parts of the course and aggregated to form a profile. Their SA is again SA, but considered so because it is at the end of the course. According to this work, providing SA involves one process and providing FA involves a new beginning (interpretation) and a different focus since it will use different criteria and provide new information. See figure 1.

This is both time-consuming and repetitive. In the words of M. Taras (2007), this means the links between SA and FA seem to be lost resulting in unnecessary duplication of the process. As a result, FA and SA are put in a competing relation.

**The Backside Metaphor.** J. Biggs (1998) compared D. William & P. Black’s conceptualization of relation between SA and FA to two trees. They are separate entities and it is the separateness of the two that is emphasized. On the basis of criticism of D. Wiliam & P. Black (1996) conceptualization of relation, J. Biggs (1998) proposed a metaphor of the backside of an elephant to conceptualize the relation. See figure 2.

The image that J. Biggs (1998) proposes is of one beast, with the appendages as mirror images of each other. As the figure 3 implies, each limb must work with the other in order for the whole to work; the animal is stronger as it is better balanced and without one back leg the elephant would fall over. Therefore, the relationship and links are what dominate and not the marginality of the differences (Taras, 2007). J. Biggs (1998) used the context of Hong Kong to illustrate how SA (Summative Assessment) and FA (Formative Assessment) work in support of each other to promote...
effective student learning.

The contribution of J. Biggs (1998) in illuminating the relation between FA (Formative Assessment) and SA (Summative Assessment) lies in that it removes the line or boundary separating the two (Stronach, 1996:365 and 368). This makes it a very good metaphor to describe both the relation between SA and FA; and also to denote the inseparable link between the two. M. Taras (2007) believes that just as important is his attempt to be “supportive” of and D. Wiliam & P. Black’s position (1996), when J. Biggs (1998) is in fact diametrically opposed to it:

I hope my comments can be seen as deriving from a similar starting point as Black and Wiliam, but instead of seeing FA and SA up close as two different trees, I would zoom to a wider angle conceptually. Then, in the broad picture of the whole teaching context — incorporating curriculum, teaching itself (an excellent feature of their review), and summative assessment — instead of two tree-trunks, the backside of an elephant appears (Biggs, 1998:108).

Although J. Biggs (1998) provides a different relationship for SA (Summative Assessment) and FA (Formative Assessment), it suffers from two weaknesses: firstly, as D. Wiliam & P. Black (1996); and P.J. Black & D. Wiliam (1998a and 1998b), he formulates the relationship only in terms of function (Biggs, 1998). We know that they are interrelated and can work together to support each other. But, we don’t know how they work independently or we don’t know what their processes are like respectively and how they fulfill their respective function; and secondly, M. Taras (2007) believes that it suffers from another weakness that it places FA and SA on the same footing hierarchically. M. Taras (2007) claims that since SA can stand alone, but there can be no FA without SA (be it implicit), then SA must be hierarchically more important and that it must come first.

In one word, J. Biggs (1998) stresses the complementary relationship between FA and SA. But, his stress is from the perspective of whole assessment system and based on the idea that both summative and formative function must be fulfilled for the working of the system (Biggs, 1998).

Cao’s Complementary Proposal. Like J. Biggs (1998), R. Cao (2012) also proposes complementary relationship between FA (Formative Assessment) and SA (Summative Assessment). Her proposal is based on the belief that all assessments are formative assessment. Specifically, any assessment is supposed to have impact on learning and so SA and FA are complementary in the sense that they can both be used to support learning (Cao, 2012). Again, this conceptualization shed new light on relation between SA and FA in terms of function, but fails to illuminate their relation in terms of process.

Second, Relationship between FA and SA from Perspective of Process. M. Taras (2005 and 2007) made an attempt to explore the relation between SA (Summative Assessment) and FA (Formative Assessment) in terms of process by making a closer revisit to M. Scriven (1967) and D.R. Sadler (1989).

The change in the distinction between the two to that of functions originates in the work of B.S. Bloom, J.T. Hastings & G.F. Madaus [eds] in 1971. In the context of mastery learning, they used FA in their cyclical bite-sized aspects of learning to provide feedback and therefore support learning. This distinction was inherited by many leading scholars of FA (Wiliam & Black, 1996; and Black & Wiliam, 1998a and 2003). And then, due to their
influence, function is widely recognized as the distinguishing feature of relation between FA from SA.

However, this was not what was intended by M. Scriven (1967), when he coined the terms. When he first made this distinction, M. Scriven did not concern himself primarily with the functions, but with the process of assessment. Indeed, he specifically warned against focusing on functions as opposed to the process (Scriven, 1967:41). As for the process of assessment, M. Scriven (1967) gave such definition:

The activity consists simply in the gathering and combining of performance data with a weighted set of goal scales to yield either comparative or numerical ratings, and in the justification of (a) the data-gathering instruments; (b) the weightings; and (c) the selection of goals (Scriven, 1967:40).

Assessment is a complex process with all the elements used to make the judgment in constant interplay. The result is the judgment that can be compared to a standard or a number on a standardized scale.

Drawing on M. Scriven (1967) and D.R. Sadler (1989), M. Taras (2005) presented a comparison between summative and formative steps as shown in table 1.

M. Taras (2005) characterizes relation between FA (Formative Assessment) and SA (Summative Assessment) in ordinary language below:

More precisely, and perhaps more accurately, a summative assessment will produce feedback which, when used, results in formative assessment:

### Table 1:
Comparative Steps for Summative and Formative Assessment

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1. A weighted set of goal scales.</td>
<td>1. Concept of standards, goals or reference levels.</td>
</tr>
<tr>
<td>2. Gathering and combining of performance data.</td>
<td>2. Compare actual level with standard</td>
</tr>
<tr>
<td>3. To yield either comparative or numerical ratings.</td>
<td>1 + 2 = SA</td>
</tr>
<tr>
<td>4. In the justification of: (a) the data-gathering instruments; (b) the weightings; and (c) the selection of goals.</td>
<td>Feedback possible only after SA.</td>
</tr>
<tr>
<td>1 + 2 + 3 + 4 = SA</td>
<td>3. Appropriate action to close the gap.</td>
</tr>
<tr>
<td>Feedback possible only after SA.</td>
<td>1 + 2 + 3 = FA</td>
</tr>
</tbody>
</table>

According to M. Taras (2010), making a judgment according to specific parameters is assessment, or summative assessment at that point in time. This assessment will produce feedback. The feedback may remain as an implicit judgment within the person’s head, otherwise, any manifestation or communication of this judgment will provide information. The criteria, the standards, and the goals will be used to make the judgment and measure the shortfall from the ideal. Information produced will provide feedback which is required to improve the work. The use of this formative feedback by the learner will result in formative assessment and bring the work closer to the ideal.

FA (Formative Assessment) requires mandatory use of feedback, while SA (Summative Assessment) not. What differentiates summative and formative assessment is that the latter is used by the learner to update and improve the work (or, at the minimum, to understand what would need to be done and how). Summative assessment does not exclude feedback (or Knowledge of Results) and even a number grade or physical reaction will provide information no matter how minimal. Often, in higher education, graded work is the main source of feedback (Taras, 2006).

Because assessment is such a universal and constant process, with an infinite means of describing it, much of it is implicit, automatic and taken for granted, and, therefore, the obvious and the basic premise of the process tends to ignored. F. Coffield & S. Edwards (2009) have shown how lack of engagement
with the basic premises of “good” assessment principles results in shoddy practice and research.

M. Taras’ presentation of steps involved in assessment process shed light on how assessment is carried out, making the might-be-implicit process explicit. And this proposal that SA happens before FA or SA as precondition for SA adds support to conceptualization as complementary rather than competing (Taras, 2007).

To further clarify the relation, M. Taras (2007) proposed it could be metaphorically expressed as a single cake. See figure 4.

And elaborated it as below:

We would expect it to be made more palatable and decorative according to the context of use (as with criteria, standards, etc.). This would imply a complete cycle of SA and FA. If SA and FA are separated, we are left with an incomplete and unbalanced product, in the same way as an elephant would be unstable if either SA or FA is expected to stand alone. Furthermore, separating them has led to a view that they are essentially two separate entities, as in the two trees metaphor. The focus on functions (and functions can be very different) has led to the belief that SA and FA are difficult to reconcile. This could give us an image of two halves of different cakes (see figure 5) which do not fit together well, because they are essentially different cakes (Taras, 2007:65).

Simply speaking, the cake metaphors stresses two things for relation of FA (Formative Assessment) and SA (Summative Assessment). The first is that they are inseparable processes. Second FA is more than function like the icing and cherries on the cake and a decorative addition to the assessment process. But, there are several weaknesses in M. Taras (2007)’s conceptualization of relation between FA and SA.

Firstly, SA equals assessment. According to M. Taras (2010), making a judgment according to specific parameters is assessment, or summative assessment at that point in time. This assessment will produce feedback. The feedback may remain as an implicit judgment within the person’s head, otherwise, any manifestation or communication of this judgment will provide information. Here, M. Taras confuses, assessment process, a neural process with a SA, which, implies its intended use and therefore is value-laden (Taras, 2010).

Secondly, use of feedback equals FA. While D.R. Sadler (1989) conceptualize FA as 1 + 2 + 3, M. Taras (2010) take use of feedback as FA as if the process leading to feedback would not have impact on improvement of learning. In other words, FA quality is only the result of the appropriate action and has nothing to do with the quality of process itself.

Thirdly, use of feedback is not mandatory for SA. This reveals a partial understanding of use and feedback. As mentioned before, assessment will produce feedback. The feedback may remain as an implicit judgment within the person’s head, otherwise, any manifestation or communication of this judgment will provide information.

I argue that even it remains in the person head, it is kind of use as it might change the assessor’s idea about instruction, offering him internal feedback (cf Nicol & Macfarlane-Dick,
As long as there is assessment, there is information produced and it being there is kind of use, which cannot be avoided and will have impact on the assessor.

Fourthly, difference in functions equals difference in criteria. As a matter of fact, difference in functions means change in almost all aspects of assessment activity, throughout the three constant steps of assessment process. This point will be further developed in the following part.

Third, Reconceptualization of the Relation by Combining Function and Process Perspectives. Just as P. Black & D. Wiliam (2009) emphasize too much on function to ignore process, M. Taras (2010) stresses too much on process to underestimate the impact of function on every aspect of assessment process. A reasonable conceptualization of relation between FA (Formative Assessment) and SA (Summative Assessment) should be based on both function and process, to examine how the process can be different or similar to serve their respective purpose. Exactly speaking, we propose to examine FA from the perspective of assessment process governed by purpose. Such examination will reveal that relation between FA and SA is neither competing nor complementary, but inclusive: FA is inclusive of SA.

Assessment process consists of three major steps: elicitation, interpretation, and use. This process is neutral and universal for any kind of assessment. In other words, each of these three steps is indispensable for either formative assessment or summative assessment. However, as any human activity is controlled or guided by purpose, each step of assessment process is subject to the intended purpose of assessment activity, like summative purpose or formative purpose in this study. These different purposes have different requirements for each step of the process. For example, as mentioned before, M. Taras (2007) believes that change of function between summative and formative actually means change of criteria.

But, we are inclined to believe that things are much more complicated than M. Taras (2010) thinks. Change of criteria doesn’t only happen as SA changes to FA, but also takes place within the process of assessment itself when it comes to FA. Construction of learning intention and success criteria is a dynamic process (Yang, 2012). So is its application. It might be set up before start of assessment cycle and then changes as it is applied in the process of assessment: elicitation, interpretation, and use. Specifically, it can and should be used for development of instrument, interpretation of learning evidence, and application of assessment results.

In SA, it might remain stable; while in FA, it is and should be allowed to vary in order to meet the needs of student’s learning in specific context. What is more, not all learning intentions and criterion can be materialized feasibly in the SA, for example, it is almost impossible to assess affective quality of test-takers in the typical form of SA. However, in FA, there is a greater possibility of materializing different learning intentions.

Table 2: Differences between SA and FA

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Summative Assessment</th>
<th>Formative Assessment</th>
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<tbody>
<tr>
<td>Purpose</td>
<td>Public, collective, specified</td>
<td>Private, individual, negotiated</td>
</tr>
<tr>
<td>Agent</td>
<td>Administrators</td>
<td>Administrators, teacher, students</td>
</tr>
<tr>
<td>Time</td>
<td>Specified time limit</td>
<td>Anytime</td>
</tr>
<tr>
<td>Space</td>
<td>Controlled space</td>
<td>Anywhere</td>
</tr>
<tr>
<td>Instrument</td>
<td>Limited</td>
<td>Unlimited (all activities)</td>
</tr>
<tr>
<td>Object of assessment</td>
<td>Student outcome: product</td>
<td>Student outcome: product process and classroom interaction</td>
</tr>
<tr>
<td>Judgment level</td>
<td>Judgment for gap</td>
<td>Judgment for gap, reason and solution</td>
</tr>
<tr>
<td>Interaction between assessor</td>
<td>None or limited</td>
<td>Intensive interaction</td>
</tr>
<tr>
<td>and assesee</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expertise demand</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

2006).
and success criteria given the freedom of time, space, and agents of in each step of assessment process. In other words, the different purposes have an impact on almost every aspect of assessment as shown in the table 2, in the form of difference between FA and SA.

Seen from table 2, the impact of purpose on assessment process is not only confined to criteria. In every aspect of assessment, which is present in every step of assessment process, it can be said that FA (Formative Assessment) is inclusive of SA (Summative Assessment). This is obvious in most of the aspects and what might require further explanation is why there is a higher expertise demand for FA than SA.

In SA, development of instrument, interpretation of evidence, and use of the results, all have impact on the quality of assessment. The same is true for FA. The existing literature have revealed that to development quality summative assessment is no easy at all, having to take into consideration of reliability, validity, fairness, practicality, etc.

FA, the bridge between assessment and learning, is even more challenging in the sense that it must respond to both assessment demand and learning demand. So, it can be said that FA is inclusive of SA; and their relation can be expressed roughly in figure 6.

What figure 6 tells us are: firstly, both SA (Summative Assessment) and FA (Formative Assessment) share the same process of assessment. In one word, any assessment process is neutral and can be used to serve either formative or summative purpose.

Secondly, how well the assessment process can serve the purpose (summative or formative) depends not only on the originally developed instrument for elicitation, but also on how the evidence is interpreted and used, especially for formative purpose. In other words, what determines formative nature of an assessment activity is not only the action taken based on assessment results. Each step of assessment process can have formative impact.

Thirdly, the steps intended for summative purpose and formative purpose are also connected. Summative steps being linked to formative steps means that the intended purpose may no lead to expected result, especially when assessment developer and user are not the same person. An assessment process developed for summative purpose may be used formatively and vice versa. But, summative steps are connected to formative steps in full line, which means all SA can be used formatively; while formative steps are linked to summative steps in dotted lines, which means not all FA can be used summative. That is to say that FA is inclusive of SA.

What is worth noting is that this is more a practice-oriented conceptualization than theoretic one, for theoretically, all assessment can be used formatively and summatively, as the assessors like. But, as proposed by L. Bachman (2004), assessment in education also needs to meet the demand of practicality. It is in this sense that all assessment designed for SA can be used for FA, and only part of FA can be used for SA. For example, it is almost impossible, given practicality requirement of SA, to use interactive FA for summative purpose.
CONCLUSION

There have been many different views about the relationship between FA (Formative Assessment) and SA (Summative Assessment) in assessment literature. By revisiting the existing literature of FA and SA, we have pointed out that the major weaknesses of existing conceptualization of the relationship lies in thinking them as competing or complementary as well as SA prerequisite for FA, and stem from too much emphasis either on function or on process.

Against this background, this paper has proposed a new understanding of the relationship from the perspective of both function and process combined: firstly of all, all assessment activities from formal tests to classroom interaction, either for SA and FA, share the same assessment process of three steps: elicitation, interpretation, and use. Secondly, FA can differ from SA in all aspects of assessment for each of the steps to serve different purposes. Thirdly, in principle, any particular assessment processes can be used for either formative or summative purpose while in reality, it is easier to implement formative use of SA than summative use of FA.

In this sense, relationship between FA and SA is neither competitive nor complementary. It might be more rational to regard FA as being inclusive of SA, at least at theoretical level. Such understanding of the relationship will presumably promote the development of development of FA and encourages the construction of balanced assessment system, including SA and FA.

However, this study is by nature a library research, and assessment is a highly contextualized activity. As a result, more empirical studies are needed in the future for exploration of better interactions between SA and FA, so as to give a full play to the potential contribution of assessment to education.

References


