# An Integrated Approach to Defining a System-Level Theory of Action for Formative Assessment

By the Formative Assessment for Students and Teachers (FAST)
State Collaborative on Assessment and Student Standards SCASS)

The FAST SCASS thanks Christine Lyon for her assistance with the preparation of this paper

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# **Background**

In response to growing national interest in formative assessment, in 2006 the Council of Chief State School Officers (CCSSO) formed the Formative Assessment for Students and Teachers (FAST) State Collaborative on Assessment and Student Standards (SCASS). The purpose of the FAST SCASS was—and continues to be—to provide guidance and resources to state-level policymakers on formative assessment. In 2015, the Hewlett Foundation saw potential in this work and awarded a two million dollar grant - the Formative Assessment for Students and Teachers-Educator Resources (FAST-ER) grant - to the FAST SCASS. One of the outcomes of the grant was to provide an in-depth professional learning opportunity to increase the expertise of FAST SCASS members in formative assessment. As a result, the FAST SCASS sponsored a 3-day meeting in Portland, Oregon focused on "Research and Promising Practices in Assessment for Learning." The three presenters at this meeting were Christine Harrison (United Kingdom), Jill Willis (Australia), and Bronwen Cowie (New Zealand). One of the main outcomes of the meeting was a recommendation for the development of a theory of action that outlined the system-wide inputs required to bring about changes that are consistent with formative assessment at both the teacher and learner levels (CCSSO, 2016). In response to the call for a theory of action, the FAST SCASS commissioned a working group of members to draft a systemlevel theory of action for formative assessment (FA).

Historically, the concept of a theory of action has been discussed in the context of program evaluation. This literature recommends making the underlying assumptions about how a program or product is expected to work—the theory of action—explicit (Chen, 1990; Weiss, 1998). The theory of action for a specific product or intervention lays out a set of hypotheses that explain how the intervention is supposed to work. It not only identifies the components and the ultimate goals of a product, but the intermediate outcomes or causal mechanisms that are responsible for leading stakeholders to the ultimate goal. A theory of action is useful at various levels of a system because it identifies relevant research questions, improves stakeholders' abilities to understand and interpret the data, and provides structures for generating recommendations (Weiss, 1998).

However, traditional program evaluation-oriented theories of action focus on evaluation, and their linear nature does not allow users to consider complex relationships within a system. In June, 2017, Christine Harrison, Jill Willis, and Bronwen Cowie returned for a one-day follow-up session with the FAST SCASS. During this session, they advocated for the adaptation of Bronfenbrenner's (1989) ecological systems theory for the purposes of developing a theory of action for formative assessment. Bronfenbrenner's ecological system (1989) has been used in previous research to describe the complex systems involved with educational practices and policies (Johnson, 2008); it is consistent with sociocultural theories of learning (Moss, 2008); it aligns with recent views on formative assessment calling for consideration of the underlying theory of learning and privileging the sociocultural viewpoint (Penuel & Shepard, 2014); it and allows for the identification of key stakeholders and relationships within the larger system (e.g., teachers are located in individual classrooms but are influenced by school- and district-level

policies; educator preparation programs prepare preservice teachers but those teachers must work with men- tor teachers and are hired by districts). The last point is especially important, since the FAST SCASS members believe that for formative assessment to be consistently, systematically, and rigorously implemented across the system, all stakeholders must hold a common definition of formative assessment, have access to discipline-specific resources, and have opportunities to engage deeply with, and learn about, formative assessment practices. Therefore, considering stakeholders as independent actors and decision-makers underestimates the complexity of the system. Overall, the ecological perspective takes account of the unique features of the context, focuses on the interdependence and symbiosis within and between the levels, and allows system boundaries to be understood as permeable. The one weakness of this approach is that, while it illustrates the complexity of a system, it does not provide enough information about causal mechanisms to guide the evaluation of a program at the system level.

Given the strengths and weaknesses of each approach, a decision was made to take a two-pronged approach and develop two complementary theories of action: an ecological theory of action and a traditional, program-oriented theory of action.

## The Process

During 2016-2017, the FAST SCASS working team reviewed various types of documentation, including the original FAST SCASS definition of formative assessment (CCSSO, 2008), articles on developing a theory of learning for formative assessment (Penuel & Shepard, 2014), and foundational practices in the development of a theory of action. The team also met with experts in the field to discuss the benefits of an ecological theory of action. During the February 2017 meeting, the working group followed a process defined in previous work (Leusner & Lyon, 2008) to brainstorm responses to two questions – "Why do we think formative assessment is important?" and "What is necessary to make it possible at the system level?" Exemplar member responses to both questions are summarized below.

Formative assessment is important because it has the potential to:

- create self-directed and independent learners
- increase student achievement
- ensure that we meet the needs of all students where they are and move them forward
- create improved instructional insight
- increase instructional decisions that are based on evidence of learning
- improve teacher knowledge
- improve knowledge of disciplinary content and how kids learn that content
- improve teacher retention

For formative assessment to be possible at the system level, the system must include:

- informed and committed leadership that is knowledgeable regarding what FA looks like and doesn't look like
- policies that support/focus on formative assessment (understanding and resolution of any conflicts through review and reprioritization)
- improved assessment/data literacy
- buy-in
- a culture of "no mistakes" that supports risk-taking among teachers to improve practice
- improved communication across levels of the system
- the integration of formative assessment as part of educator preparation programs (EPPs) requirements
- FA explicitly and intentionally modeled by faculty within EPPs
- confident and self-fulfilled teachers

# Levels of the System

The initial brainstorming lists provided the starting point for the development of both theories of action. The lists were used to identify the important levels of the system. Five levels of the system were ultimately identified: students, classes, districts, communities, and the state. Each is described briefly below.

#### **Students**

The ultimate purpose of formative assessment is to use evidence of learning to inform teaching and learning in order to advance learning. Therefore, the ultimate users of, and those impacted by, information must be students. There are two types of students in the system: K-12 students and preservice teachers. Preservice teachers are included in the system since they will ultimately be responsible for enacting formative assessment in K-12 classrooms. Therefore, they must be exposed to high-quality practice and provided with learning opportunities that allow them to understand the enactment of the process and its nuances.

#### Classes

A second level of the system relates to the classes within which formative assessment occurs and the teachers that are responsible for enacting it. Those responsible for enacting formative assessment include, but may not be limited to, faculty who teach preservice methods, measurement or assessment courses; domain-specific teachers who have classes composed of students with different needs; K-12 specialists (e.g., reading specialists, intervention specialists, English as a Second Language coordinators, etc.), and teachers who work within

self-contained classes and teach across subject areas. Each of these stakeholders needs to be provided with opportunities to learn about formative assessment, space to implement formative assessment within their context, and materials to support that implementation.

#### **Districts**

Within the U.S. context, all classes are situated within a larger context that includes either a district or a larger institution. Within K-12 settings, the larger context is both the school level (e.g., school administrators, teacher leaders, content area specialists, professional learning communities, etc.) and the district level (e.g., district administrators, shared resources, etc.). For preservice education classes, the context is the larger Educational Preparation programs (EPPs) which includes faculty committees, the dean of education, assistant deans, and other administrative staff.

#### **Communities**

Schools, districts, EPPs, and states are situated in the communities they serve, which may include knowledgeable change agents such as educational consultants and educational organizations such as research facilities, CCSSO, colleges, and universities. For K-12 education this includes the students and their parents. However, school board members, advocacy groups, and local governmental agencies play a key role in supporting schools, initiatives, and policies. Within EPPs, faculty and students must work with local schools to secure mentor teachers and coordinate district placements for student teaching and the collection of all necessary requirements for certification.

#### State

The last level of the system comprises state-level stakeholders. These stakeholders are the furthest away from the actual implementation of formative assessment, but have a key role in developing consistent policies, providing professional learning and resources, and creating buy-in across the system. Key stakeholders at this level can include Department of Education staff, policymakers, and state-level legislators. While the state context is ultimately situated within a national context that includes additional stakeholders, the purpose of this theory of action is to communicate a theory for the state-level adoption and support of formative assessment. Therefore, the national level is not considered at this time.

# **Key Inputs and Outcomes**

In addition to the identification of key stakeholders, the brainstorming session also identified key inputs that were necessary for the system to act consistently, appropriately, and effectively, as well as intermediate and end outcomes. Across the brainstorming sessions, four key inputs were identified. The first is committed stakeholders across all levels of the system who work in concert with experienced, knowledgeable change agents and organizations. This includes, but is not

limited to, DoE staff, policymakers, knowledgeable change agents, school boards, administrators, teachers, and EPP faculty, staff, and mentor teachers. Second, once there is committed leadership, a common definition of formative assessment must be adopted. The group argued that for formative assessment to be implemented across the system in effective and aligned ways, stakeholders at all levels of the system must hold a common, coherent, and complete definition of formative assessment. Third, ensuring that all stakeholders understand and internalize this definition requires professional learning opportunities for all stakeholders at various levels of the system. Finally, discipline-specific resources for the implementation and enactment of formative assessment must be developed and made available throughout the system, but most importantly, at the district, class, and student level to support the enactment of these process.

If the supports flow through the entire system, three broad levels of outcomes could be expected. With appropriate support throughout the system, we would expect to see increased buy-in from all stake holders. As teachers, administrators, communities and state-level staff come to a common agreement on the definition of formative assessment, its importance, and how to enact it, increasingly consistent policies will be developed, intentional and ongoing use of formative assessment and quality teaching practices will occur in all classes (e.g., K-12, preservice, etc.), and teaching quality will improve. As a result of these changes, we would expect both increased student achievement and preservice teacher quality. At this point, the outcomes become cyclical, with increases in student achievement, teacher quality, and preservice teacher quality leading back into the system and creating increased buy-in for formative assessment practices and policies that are consistent with their implementation.

The ultimate outcome identified by the group was the development of engaged, self-directed, and life-long learners. It was emphasized that "learners" be inclusive of all stakeholders within the system. Through engagement with high-quality formative assessment, K-12 students become more engaged and self-directed; teachers and preservice teachers see the value in learning about formative assessment and continue on their path to improving their practice; and administrators across the community continue to learn throughout the process. These ideas were then used to develop both the ecological theory of action and the program evaluation theory of action.

# An Ecological Theory of Action

The diagram for the ecological theory of action is presented in Figure 1 below. This diagram shows the five levels of the system and illustrates how students are nested within classes, which are in turn nested within districts, and so on. There are two sets of arrows running through the diagram. One set flows through the system from the state-level down to the student-level, while the other set flows from the students up through higher levels. These arrows illustrate how the levels of the system interact and how decisions, supports, or stakeholders within one level of the system can impact formative assessment understanding and implementation within another level of the system (e.g., students exposed to formative assessment in one class may request it in other classes; a new district administrator could encourage professional learning focused on

formative assessment or remove necessary supports; state level policies can either support or hinder the enactment of teaching practices, etc.).

The large arrow at the top of the diagram identifies the system inputs that are required for implementation throughout the system and illustrates how these must flow through the entire system. The arrows around the outside of the diagram show the hypotheses posited above regarding the development of increasingly consistent and prioritized policies, the intentional and ongoing use of formative assessment and quality teaching practices, increased student achievement and preservice teacher quality, and increased buy-in. Finally, the arrows do not end and can be viewed as a repetitive cycle with the final output referring to engaged, self-directed, and life-long learners.

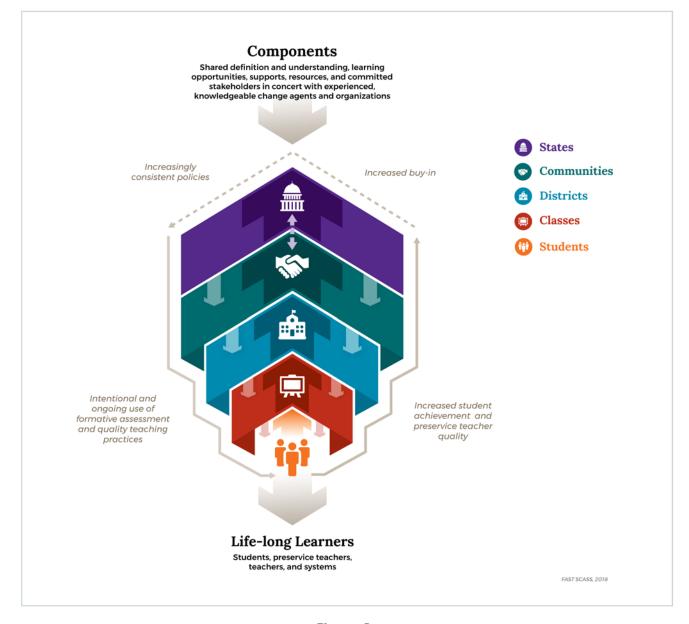


Figure 1.

An ecological theory of action for the implementation and support of formative assessment practices across a state.



## States.

State-level stakeholders include Department of Education staff, policymakers and state legislators. They play a key role in developing consistent policies, professional learning, and creating buy-in across the entire system.



#### Communities.

Schools, districts, educator preparation programs, and states are situated in the communities they serve, which may include knowledgeable change agents such as educational consultants and volunteers and educational organizations such as research facilities, CCSSO, colleges, and universities, etc.



## Districts.

All classes are situated within a larger context. For K-12 students, the larger context is the school; for preservice teachers, the context is the educational preparation program.



#### Schools.

Classes are where the enactment of formative assessment takes place. This level of the system includes ALL teachers, whether they are in educational preparation programs learning how to implement formative assessment, or teachers using formative assessment to improve learning in their classrooms.



#### Students.

The ultimate purpose of formative assessment is to use evidence of learning to inform teaching and learning. Therefore, the ultimate users of, and those impacted by, the information are students. There are two types of students in the system: K-12 students and preservice teachers.

The goal of this diagram is to illustrate the complexity of the system by calling out the interdependence within and between multiple levels of the system and to show how system boundaries are permeable-changes in one level of the system and impact other levels of the system both positively and negatively. However, this theory of action does not make clear the exact causal mechanisms that are hypothesized to occur within each level of the system as resources and support are put into place. Therefore, while Figure 1 can communicate to stakeholders an overall view of the system and its complexity, it is not sufficient to help guide stakeholders in an evaluation of efforts to implement such a system. For that reason, a complementary program evaluation theory of action is proposed (Figure 2).

# **Program Evaluation Theory of Action**

In a traditional program evaluation-oriented theory of action, a logic model is used to show the key stakeholders (i.e., levels of the system), program components, the

intermediate outcomes, and the ultimate desired outcomes. Arrows are then used to show the connections among the stakeholders, program components, and outcomes. The final logic model describes the sequence of activities thought to bring about change, and how those activities are linked to the results the product is expected to achieve (Hora, Millar, Arrigoni, & Kretchmar, 2009). Through the logic model, stakeholders can make explicit the chain of reasoning and events or outcomes that a program intends to set in motion (Rennekamp & Engle, 2008).

The program evaluation-oriented theory of action was also developed using the results from the initial brainstorming activity described above (Figure 2). The left-hand side of the graphic identifies the key levels of the system (i.e., states, communities, districts, classes, and students) and the components that are hypothesized to be necessary for formative assessment to be implemented in ways that can impact teaching and learning at scale.

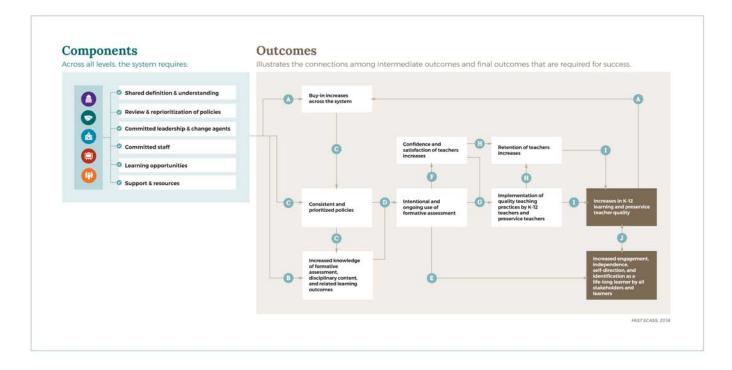
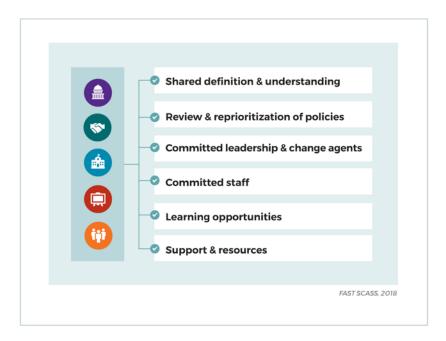


Figure 2.

A program evaluation-oriented theory of action for the implementation.

Six high-level components necessary for effective system-wide implementation of formative assessment are identified in this theory of action (Figure 3) and are further explicated below.



**Figure 3.**Components required across all levels of the system.



### **Shared Definition & Understanding.**

Stakeholders across all levels of the system need to develop a shared definition and understanding of the critical components of formative assessment and its components.



#### **Review & Reprioritization of Policies.**

Policies must be reviewed and prioritized with a focus on the conditions that are necessary to support the implementation of formative assessment across the state and within EPPs, districts, schools, and classrooms. For example, this may include a review of existing pacing guides to ensure that teachers have sufficient room to revisit topics if the evidence of student understanding indicates that all students have not met desired learning goals. Similarly, it may necessitate the integration of formative assessment practices into the requirements for novice teachers for preparation program completion.



#### Committed Leadership and Knowledgeable Change Agents.

DoE staff, policy makers, knowledgeable change agents, legislatures, local government agencies, school board members, advocacy groups, district administrators, teacher leaders, and EPP faculty, deans, and supporting staff must

be committed to learning about, advocating for, and supporting the implementation of formative assessment. In addition, knowledgeable change agents such as educational consultants and educational organizations (e.g., research facilities, CCSSO, colleges and universities, etc.) may work with key stakeholders to support the implementation of formative assessment across the system.



#### Committed Staff.

K-12 teachers, specialists, coordinators, preservice faculty and lecturers, and mentorteachers must be committed to learning about, and implementing, formative assess- ment. For this to be effective it must occur within a culture that values the continuous improvement of practice and allows space for risk-taking among teachers and staff.



## **Advanced Learning Opportunities.**

Stakeholders across the system must have opportunities to engage in professional learning related to formative assessment, assessment and data literacy, and disciplinary knowledge. To be effective, these learning opportunities should be collaborative (e.g., within and across grade levels, content areas, schools, etc.); should be content, unit, and topic specific; should provide models, examples, and exemplars; and should help stake-holders to integrate formative assessment with new standards and curriculum.



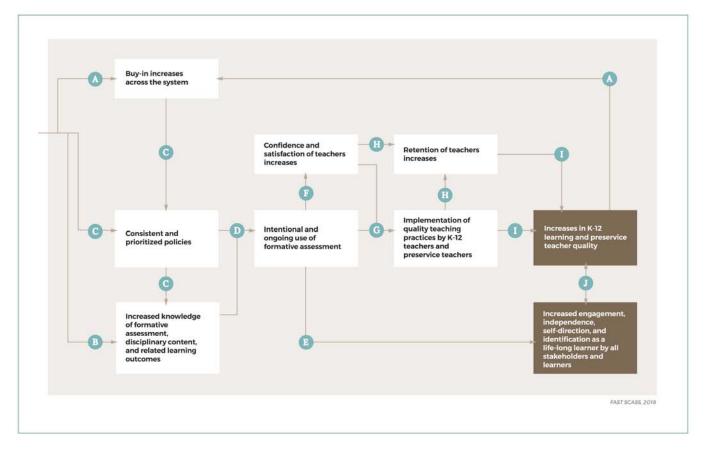
## **Support & Resources.**

State and district stakeholders will need to prioritize the development and provision of supports and resources for practicing teachers. Specifically, teachers benefit from access to shared curricular materials that explicitly incorporate formative assessment.

While this theory of action identifies each level in the system, it does not illustrate interdependence among levels. It is much more explicit about what one would expect to see if certain components were implemented consistently and appropriately within the system. In this way, the diagram allows for a more fine-grained examination of the impact of different decisions. For example, it is hypothesized that "the advancement of learning opportunities" related to formative assessment should result in "increased knowledge of formative assessment" and "intentional and ongoing use of formative as- sessment." These explicit statements allow for key stakeholders to systematically examine the efficacy of efforts related to formative assessment across the state, and each statement can be supported with existing empirical research.

<sup>1</sup> Disciplinary content refers to an individual's understanding of subject matter concepts and how these concepts relate to the larger body of knowledge. This goes beyond simple accumulated bodies of knowledge and refers to a unique set of ideas about what it means "to know" something and how that knowledge is generated within a specific discipline. Disciplinary content knowledge is the common or core knowledge held by all professionals who use a specific content in their work. It does not refer to behavior management or other related topics.

Figure 4 below provides a larger view of the outcomes expected if the necessary components are implemented consistently and effectively. Each box identifies one specific outcome and the arrows illustrate how outcomes work together to achieve the ultimate goals.



**Figure 4.**Detail of Outcomes and Hypothesized Claims.



#### Claim A.

When there is a shared understanding and definition of formative assessment and its importance; the review and reprioritization of policies; committed leadership, knowledgeable change agents, and committed staff; learning opportunities, support, and resources; and demonstrated improvements in student learning, buy-in for the implementation of formative assessment increases across the system.



#### Claim B.

When there is a shared understanding and definition of formative assessment and its importance; the review and reprioritization of policies; committed leadership, knowledgeable change agents, and committed staff; and learning opportunities, support, and resources, there is increased knowledge of formative assessment, disciplinary content, and related learning outcomes.

Claim C.

When there is a shared understanding and definition of formative assessment and its importance; the review and reprioritization of policies; committed leadership, knowledgeable change agents, and committed staff; and learning opportunities, support, and resources, consistent and prioritized policies are put into place.

Claim D.

long learners.

When policies support the implementation of formative assessment and stakeholders at all levels of the system have knowledge of formative assessment and its relationship to disciplinary content, the intentional and ongoing use of formative assessment to improve learning and teaching will increase in quality and frequency.

Claim E.

When teachers implement formative assessment in intentional and ongoing ways, learners are more engaged, independent, self-directed, and consider themselves life-

Claim F.

When teachers implement formative assessment in intentional and ongoing ways, they are more confident and satisfied.

When teachers implement formative assessment in intentional and ongoing ways, and are more confident and satisfied, the implementation of quality teaching practices increases for both experienced and novice teachers (including preservice teachers).

Claim H.

When teachers are more confident and satisfied and the implementation of quality teacher practices increases, teacher retention increases.

Claim I.

When the implementation of quality teaching practices increases and teacher

retention increases, student learning increases.

When student learning increases, learners are more likely to be self-directed, engaged, independent, and consider themselves life-long learners AND when learners are self-directed, engaged, independent, and consider themselves life-long learners, student learning increases.

# **Looking Across the Two Versions**

The sections above propose two complementary versions of a system-level theory of action of the statewide adoption and implementation of formative assessment. While there are differences in how the theories of action are represented, and may be used for different discussions and with different stakeholders, the content is consistent in a number of ways. First, each theory of action show the same five key levels of the system (i.e., states, communities, districts, classes, and students), using the same icons and colors. Second, the key components needed for effective adoption and implementation of formative assessment are consistent across the theories of action. Third, both diagrams posit that a common definition of formative assessment, committed stakeholders (i.e., leadership and staff), learning opportunities, and support and resources are critical for all stakeholders across the system in order to encourage a systematic implementation. Fourth, while the program-oriented theory of action explicitly identifies several intermediate outcomes that are not present in the ecological version, the key outcomes across the models are consistent. Fifth, both models hypothesize that the effective implementation of the critical components will lead to consistent and prioritized policies that support the implementation of formative assessment; the intentional and ongoing use of formative assessment and quality teaching practices; increased student achievement and preservice teacher quality; and increased buy-in across the system. In addition, both models are cyclical, with increases in student achievement and preservice teacher quality leading to increased buy-in, which will further support efforts to continuously improve practice. Finally, both models have the ultimate goal of developing learners who are more self-directed, engaged, and who consider themselves life-long learners. These consistencies were purposefully designed to provide resources that can be used in different ways and with different stakeholders but that ultimately support the same end goal.

## Discussion

There are multiple ways to describe the theory of action for any complex topic. Traditional approaches allow for the identification of specific causal mechanisms that can be evaluated, but do not provide insight into the complexity of the system and how interactions occur within and between levels of a system. For these reasons, we have proposed an integrated approach that would utilize both an ecological theory of action and a complementary program evaluation theory of action. We believe that the ecological theory of action will be extremely useful when discussing formative assessment at different levels of the system and planning interventions and policies that support increased and improved teacher practice and student learning, whereas, the program evaluation theory of action can be utilized after programs are in place to ensure that the system is working as intended.

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