Monitoring Success:

Creating Sustainable Systems
for Measuring the Organizational
Performance of a Community Project

Quincey Farmer

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| Acknowledgements

First giving honor and glory to my Lord and Savior Jesus Christ who is the head of my life…

I would love to thank my family for their tutelage and guidance. A special acknowledgement goes to my grandfather who was only afforded the opportunity to achieve a middle school education. Through it all he has led as the patriarch of our family and I am particularly grateful for showing me the value of task completion, grit, and resolve in tough situations.

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To the black males who make up the 2% of America's educators, may my legacy be a promise that you too can do it.

To Peabody College at Vanderbilt University, thank you for being accessible and open. Thank you for listening and applying what you have learned from me as I impact the world in positive ways using what I have learned from you.

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To the Learning Scientists, I am inspired. Your organization is based in a cause that is supported by your commitment to society. As I have studied your organization, please know I am ever more ready to improve the lives of others much like you have and continue to do. Stay committed.

To myself, Quincey J, Farmer, never forget you did this. Continue to set goals and set out to achieve them. Continue to grow and love yourself unapologetically.

To all, I say thank you!

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Executive Summary

The Learning Scientists is a community project founded in 2016 that focuses their work on the mission of making research on the science of learning more accessible to students and educators. This community project has developed into an online platform that provides products and services that improve study habits, pedagogical practices, and knowledge retention without the aim of making financial profit. Their work has been used within the instruction of a broad spectrum of students from elementary schools to medical schools. Their mission is based in the belief that awareness around concepts of cognitive psychology can improve both learning outcomes and attitudes towards testing. To support their mission and work, understanding how clarifying how success is defined for this organization and establishing sustainable systems for measuring organizational performance is the problem of practice.

A bipartite conceptual framework guides the research and methodology of this improvement project. Dess and Robinson (1984) provide that organizations can be evaluated using a goal approach (what the organization seeks to do), a systems resource approach (how the organization acts to accomplish goals), and a constituency approach (how the organizations work benefits their target audience). The following research questions were developed based on the Dess and Robinson framework:

How can we measure OP based both on the development of 1.) explicit goals, objectives, and a mission statement and the 2.) implied goals as informed by the vision of the Learning Scientists Members.

In what ways can The Learning Scientists' established methods and mediums for communicating to its target audience be measured to inform the organization of OP?

In what ways can The Learning Scientists assess the needs of its target audience to increase engagement and impact among their audience?

A mixed methods approach culminated in a survey of n=53 audience members. This survey yielded several significant findings such as 96% of respondents identifying as educators and that most respondents were not American. Additionally, overall respondents responded favorably to the accessibility of this organization's content while opportunities for the organization to assess the efficacy of their delivery methods and their advertising and promotion strategies are present.

The second part of the framework is led by the work of Allen and Myer (1996). A huge consideration in this improvement project around creating sustainable systems for monitoring performance was given to aligning strategies and operations to the needs, utility, capabilities, and resources of the members of the organization. Allen and Myer offers insight into the role of commitment among members of an organization. They developed a three-part nomenclature of commitment. Allen and Myer suggest that commitment should be evaluated through the lens of affective commitment (how one's emotions and identity drives their work within an organization), continuance commitment (how one's perception of the economic costs of remaining with an organization drives their work) and normative commitment (how one's sense duty driven by morals or sense of social obligations drives their work).

A survey of n=4 was administered among the members of the organization and yielded significant findings using Allen and Myer's framework. The members' collective connection of being individuals within an underrepresented subgroup of cognitive psychologists, based in their identification as women, drives commitment to this organization. Moreover, a sense of duty to improve the lives of learners through the dissemination of accessible research on learning science drives commitment to the organization. The findings also show that work-life balance is a motivator to remain committed to the organization.

From these findings, four recommendations are presented to the organization. The findings suggest a need to rephrase and realign their mission and vision statements to support and reflect the fact that most of their work is consumed by educators who impact students through instruction, as opposed to directly by students, and to clearly define what success means for them. Secondly, metrics such as sales conversion rate, customer lifetime value, and net promoter score are suggested as beneficial to monitoring the organization's performance.

A third recommendation provides clear outlines and steps for measuring the metrics provided in recommendation 2 leading to recommendation 4 which provides guidelines for establishing methods for effective communication around these metrics among members of the organization.

Introduction

The Learning Scientists is an organization self-identified as a community project rooted in the mission of improving learning outcomes by making cognitive psychology accessible to everyone. The empathy and care for learners shared by the founders of this organization showed itself in the act of kindness which evolved to a platform for sharing the greatness occurring within the field of education. Providing materials that advocate for the enjoyment of learning, creating professional development opportunities for educators, and providing a forum to showcase the current contributions of dedicated leaders in the teaching profession are just a few components of the buffet of services The Learning Scientists seek to make available to their audience. Since their inception, their materials have improved students' learning from elementary to medical school.

The Learning Scientists is managed by four cognitive psychology scientists hereafter referred to as "members": Drs. Megan Sumeracki, Cindy Nebel, Carolina Kuepper-Tetzel, and Althea Need Kaminske. The organization finds its foundation in a tweet showing social media's power as a medium to exchange knowledge and ideas in the current era. One of the co-founders, Dr. Yana Weinstein-Jones, was inspired by the thought of

not doing enough to improve learners' experiences and confidence with her knowledge and expertise around learning and cognitive function. Dr. Weinstein-Jones would notice tweets from students of all walks of life making plain their discomfort with taking tests. Noticing Weinstein-Jones' interactions on Twitter, co-founder Dr. Sumeracki joined her and proposed using the hashtag "#AceThatTest" to engage students in conversations around making learning easier for them. This hashtag would evolve to the Twitter profile, @acethattest, which currently has 26,000 followers. From that has come the production of a book, "Understanding How We Learn," a website, a podcast, and more!

The purpose of this improvement project is to serve as an investigation into how The Learning Scientists can measure their organizational performance. To do this, the project will evaluate what makes the Llearning sScientists successful so that clear objectives are formed. Once these objectives are defined, systems for monitoring their progress towards their goals will be recommended to the organization designed to be valid, reliable, and sustainable. As The Learning Scientists is a community project and not a for-profit business, creating non-financial metrics to measure success within the organization will lead to developing sustainable means to monitor performance.

Organizational Context

Since 2016, The Learning Scientists have aimed to provide students and teachers with the knowledge to empower the usage of metacognitive strategies in preparation and during testing administration. With this, The Learning Scientists provide educators and learners with research-based strategies and habits to improve their academic success. Their work advocates for a paradigm shift from assigning "learning styles" to students, which suggests students have one way of thinking or conceptualizing new information (Pashler, 2008). The learning style approach limits the creativity and flexibility of obtaining knowledge by placing rigidity in the learning process. Instead, the Llearning Sscientists' habits and strategies address the complexity with which people obtain information (An, 2017.

The researchers within the organization utilize the theories and understandings surrounding cognitive psychology to help learners understand how learning happens within the mind, ways to enrich their learning experiences and strategies for connecting schema to increasing knowledge retention. The Learning Scientists' delivery style aims to make cognitive psychology accessible to all, which they hope allows them to stand out among educational resources. This improvement project aims to understand if they are meeting the mark by evaluating how their organizational performance can be measured.

This improvement project aims to understand if they are meeting the mark by evaluating ways in which their organizational performance can be measured.

The organization's researchers have created six overarching themes that categorize their learning strategies and materials. These themes are designed to be flexible guiding principles. Referred to as "The Six Strategies of Effective Learning," these strategies are based on decades of research and include the following:

The overarching aims guide the Learning Scientists' organizational model:

- Motivate students to study

- Increase the use of practical study and teaching strategies that are backed by research

- Decrease negative views of testing

The Six Effective Strategies of Effective Learning

- Spacing (Benjamin and Tullis, 2010)

- Retrieval Practice (Roediger, Putnam, and Smith, 2011)

- Elaboration (Rohrer, 2012)

- Interleaving (Rowsan, Thomas, and Jacoby, 2014)

- Concrete Examples (Mayer and Anderson, 1992)

- Dual Coding (Pomerance, Greenburg, and Walsh, 2016)

Their subscribers base includes students, educators, and educational leaders worldwide, including The United States, The United Kingdom, and New Zealand. The organization offers a buffet of products and services to facilitate its mission. These products and services include:

- Exclusive content via Patreon

- Interaction via Twitter @AceThatTest

- Directory of External Educational Experts in field such as Instructional Design, Desirable Difficulties, and Standardized Testing

- Blog by the Learning Scientists

- Guest Blog

- Book: Understanding How We Learn by Dr Yana Weinstein and Dr Megan Sumeracki

- PowerPoint Slides and Videos for Teaching the Six Strategies of Effective Learning

- Poster, Bookmarks, and Stickers

- Podcast

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This improvement project will understand the impact of the products and services used to deliver content around The Six Strategies of Effective Learning. This project seeks to understand appropriate methods to measure performance and progress towards its goals as defined by the organization's vision and aims. Their goals are non-financial and based on the aspiration to positively impact educators and learners. If possible, the project's secondary aim will be to utilize the gathered data and information to provide insight into the organization's current performance as a baseline to compare future measures. As the pandemic of 2020 introduced an era of online collaboration across multiple industries and fields, through monitoring organizational performance, this improvement project hopes to create guidance for the survival and enhancement of organizational management systems within The Learning Scientists organization.

Problem of Practice

Effective organizational management includes creating mission statements, vision statements, and communicating explicit goals. Successful implementation requires the duty of measuring performance. Goals should be flexible based on the organization's ability and reach. Without methods to concretely measure organizational performance, the organization becomes vulnerable to a decrease in impact, reach, purpose, and existence.

Currently, The Learning Scientists are without measures to monitor their performance.

Several negative consequences are associated with a lack of sustainable systems for measuring organizations' performance. An analysis of scholarly works provides examples of these consequences across various industries and organizational contexts. Resources are wasted, employee morale is at risk, and legal risks arise when the organization is not monitored effectively (Kettner, 2017).

A lack of clear objectives and metrics provides opportunities for evaluations or perceptions of individual employee performance to present as biased. This can result in a decrease in rapport and collegiality between employees and superiors. (Aguinis, 2013). On the other hand, effective monitoring of organizational performance can quail these negative implications suggested by Kettner and Aguinis by reducing costly surprises, increasing communication within the organization, auditing task completion, and ensuring the proper acquisition and allocation of resources (Saleem, 2010).

As a young organization, The Learning Scientists can significantly benefit from defining key performance measures for the organization. The definition of success is open for interpretation by the organization's members as it is communicated through the mission and vision but must be clearly defined. For this improvement project, 'members' were defined as the collective of the four cognitive scientists responsible for the content and actions of The Learning Scientist (Drs. Sumeracki, Nebel, Kuepper-Tetzel, and Kaminske).

This project surveyed members to gauge their alignment and promotion of The Learning Scientists' vision and aims. A survey of the audience was conducted to gain data on their interaction and satisfaction with the content produced by this organization. The term "audience" defined as the collective of individuals who access, consume or utilize the products and services of The Learning Scientists for research purposes, to improve some aspect of their lives, or some other specified reasons. The audience survey was conducted for insight into consumer needs to assess the validity of the organization's vision and ensure appropriate metrics are designed. These data were utilized to inform recommendations for creating a sustainable system for measuring organizational performance and ways to maintain the procedures for measurement throughout the future.

Literature Review

In preparing to create a sustainable system for measuring performance with The Learning Scientist organization, a review of the literature surrounding organizational performance in practice was conducted to inform this improvement project's strategies. Scholarly texts were sought to define organizational performance and its importance and relevancy in organizational management. Assessing examples of the practice of creating success metrics across industries and reviewing challenges to measuring performance within the literature will help create strategies for maintaining the systems that will be developed.

Therefore, I attempt to answer the following questions with the content of the literature:

Literature Review Guiding Questions

⚛ How is "organizational performance" defined?
What is the importance of collecting performance data?

⚛ What are examples of industry-specific defined metrics of organizational performance designed around goal-oriented success measures?

⚛ What challenges have organizations faced in measuring organizational performance?

The research into the topic was not industry-specific to gain global insights around measuring organizational performance. Therefore, I reviewed literature discussing performance measurement among non-profit organizations, business, and educational firms to illustrate how success is defined and monitored within organizations vividly.

How is "organizational performance" defined and what is the importance of collecting performance data?

The first step in putting together a system to measure organizational performance is to understand how organizational performance is defined. Understanding how organizations and industries define their standards of success is foundational in creating performance measures for The Learning Scientists. Secondly, understanding how scholars have assessed the importance of measuring organizational performance will inform such decisions as to how strict measures should be, the frequency and depth to which the organization should be assessed, and the design process in creating systems for measuring organizational performance.

The literature offers no standard definitions or explanations about organizational performance and how it is measured. What is agreed upon is that performance measures are specific to the organization's context. This is significant because the literature supports creating measures tailored to The Learning Scientists' goals and definition of success. Only a few studies agree upon a description and means of measuring performance, classifying the discussion as one that continues to lack closure (Kirby, 2005). The positive relationship between organizational culture and performance is exemplified as the beliefs and attitudes employees have towards the organization have implications on the organization's productivity and effectiveness (Abu-Jarad, 2010). Sixty studies, spanning more than 7000 organizations, found a direct link between market culture and business performance (Gallagher and Brown, 2007). Market culture drives organizations to understand the market they are in (how similar organizations perform), become valuable to customers, and promote a belief among members of the organization that customer satisfaction is essential (Gallagher and Brown, 2007). A few studies have differed in their approach to defining organizational performance by stating that profitability measures should be the primary measures of performance (Nash, 1993). Supporters of this notion suggest specific aspects of profitably such as profit margin, return on equity, and sales growth, as key indicators of how organizations perform (Robinson, 1982; Galbraith & Schendel, 1983; Abu Kassim, 1989). A 2009 study on knowledge management within organizations suggests that the strategic competitiveness of an organization should be evaluated by looking at performance through three indicators: product leadership (competition based primarily on product or service innovation), customer intimacy (competition based on understanding, satisfying

and retaining customers), and operational excellence (competition based on efficient internal operations; Zack, McKeen, and Singh, 2009). These three indicators apply to the desired momentum of the Learning Scientists. As they seek to understand their audience (customer intimacy) in ways that will inform their construction of content (product leadership), the formation of critical metrics and methods for collection (operational excellence) will be helpful in their continued success.

Measuring organizational performance is becoming an integral part of business management and supervision. It is essential to organizations' success and longevity and has found a consistent place in recent industrial activity (Richard et al., 2009). Moreover, performance measurement has become commonplace among scholastic literature and business reviews. Organizational performance as a metric was the most common dependent variable among the four leading management journals between 1998 and 2000 (Boyd et al. 2005). Similarly, another study of 213 papers in publications such as the Journal of International Business found that 29% of articles included organizational performance as either a dependent, independent, or control variable (Richard et al., 2009). This metric as a dependent variable was found in 23% of the total combined

articles produced over three years among the Strategic Management Journal, the Academy of Management Journal, and Administrative Science Quarterly (March and Sutton, 1997).

Studies show that measuring performance can encourage healthy competition in organizations where high-performing members set the standard for others to aspire (Green, 1995). Measuring performance within organizations affirms their purpose or the need to redirect focus, reminds organizations which their target audience is, what their audience needs, and what products and services are needed to meet these needs (Tillman, 2008). Measuring performance provides an understanding of competitive survival and provides historical context into how the organization has adapted to feedback from its environment (March and Sutton, 1997). The positive benefits of measuring organizational performance on strategic planning support this notion as organizations are impacted by a straightforward means to clarify and communicate strategies through the organization. Measuring performance allows for the, alignment of the specific capacities of members of the organization to strategies, and informs opportunities for innovation and the revision of plans (Kaplan and Norton, 1996).
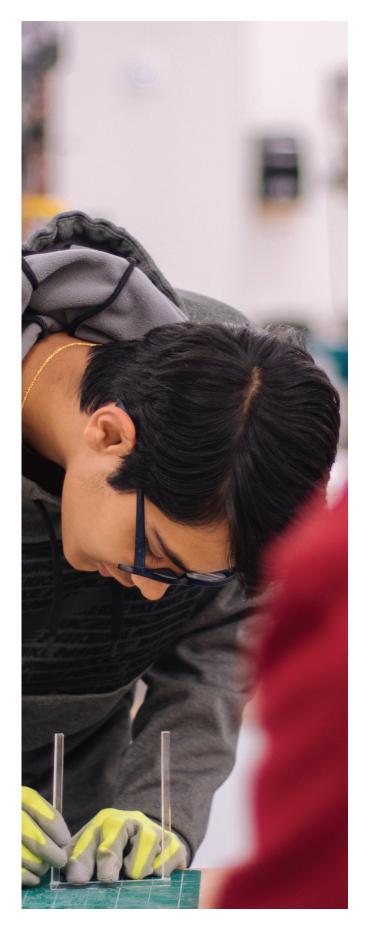
What are examples of industry-specific defined metrics of organizational performance designed around goal-oriented success measures?

Without a standard definition of what organizational performance is and how to measure it, it is essential to seek out examples in the literature which showcase the metrics various organizations have designed to measure their success. The Learning Scientists is not a for-profit organization, so the ability to rely solely on metrics common to for-profit businesses and organizations as a focal point will not be advantageous for this improvement project. For example, assessing the bottom line of revenue for The Learning Scientists would not help but having a method to measure their impact on learners will. Organizations are "instruments of purpose," and measurements of performance powered by goals aligned to purpose are key (March and Sutton, 1997). However, as a not-for-profit organization, a financial analysis may help measure the output of resources to facilitate the provision of services or creation of products against the expenditures for general management, and fundraising would be a good measure of performance for an organization that is not for profit (Henderson, 2002).

There are non-financial measures for-profit organizations utilize that present valuable examples of tailoring performance measures to organizational goals and purposes, showing there is some commonality between for-profits organizations and community projects like The Learning Scientists. A 1998 study of services for breast cancer in Canada details ten years without assessing the quality of such services (Goel, 1998), showing that The Learning Scientists are not rare in experiencing a phase of limited or no assessment. Understanding their purpose of treating patients and adding to the knowledge of breast cancer care, the Canadian Breast Cancer Research Initiative provided such metrics as the wait time a patient experiences from their referral, surgical consult, diagnostic, and surgery, as well as the proportion of patients participating in clinical trials (Gagligardi, 2007). A 2017 study designed to create performance measures for rural emergency medical services provides us insightful examples of non-financial means for measuring performance aligned to their purpose, furthering the importance of measuring performance based on valuable metrics. They identified the capacity to recognize and diagnose trauma as an organizational purpose. Defining this purpose resulted in the measurement of the percentage of EMT's who receive training on recognizing and responding to myocardial infarctions and stroke as a method of monitoring organizational performance. Additionally, measuring the percentage of emergency response agencies who can bill third-party payers to

monitor their capacity for reporting data also became an important data point for monitoring performance (Gale, 2017).

A separate 2017 study aimed at measuring instructional practices and how students respond to these practices created a three-band system to do so. The study first categorized the types of instruction (interactive, constructive, active, or passive), the method of delivery (explanation or facilitation), and student response to instruction (value, positivity, participation, distraction, and evaluation; DeMonbrun, 2017). A study on developing non-financial means to monitor the performance of partnerships among supply chains developed such metrics as changes in market penetration, improvements in access to technology, the acquisition of external knowledge through research and development strategies, and customer satisfaction (Rezaei, 2017). These studies show that non-financial metrics to measure organizational performance are those that are aligned to the purpose, function, and intended impact of the organization. This concept will help design metrics for The Learning Scientists.

What challenges have organizations faced in measuring organizational performance?
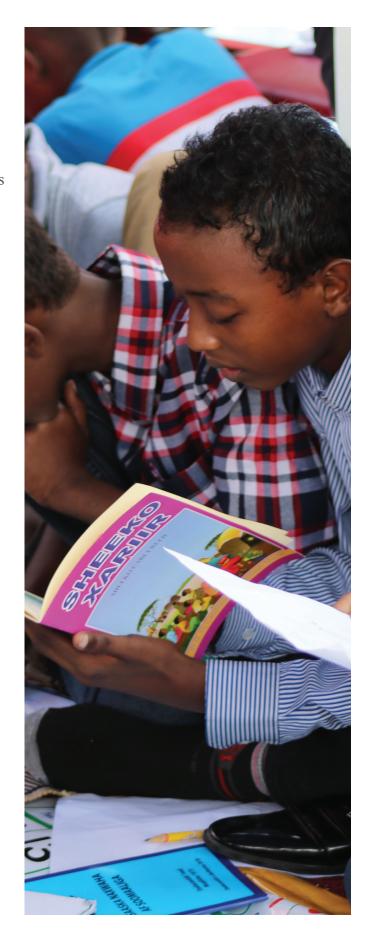
The literature has provided insight into the definition and importance of measuring organizational performance. Additionally, the literature provides examples of how organizations have created metrics tailored to their definition of success. To supplement this data, it is essential to understand the challenges organizations have faced in measuring their success and scholarly recommendations to alleviate these challenges. This information helps in the diagnosis of the factors that have caused a phase of no monitoring within organizations and insight on how to prevent future challenges in monitoring success for The Learning Scientists.

In a study of four non-profit organizations, Carnochan (2013) found three main obstacles in measuring organizational performance: 1.) Defining client outcomes due to variance in customer needs, 2.) Maintaining data due to a lack of capacity, and 3.) Understanding employee perspectives, analyzing employee perspective data, and communicating findings. The lack of skill in maintaining data shows up in practice in ways such as measuring too many things, measuring the wrong things, and torturing data with disaggregation to get results without understanding the data's value (Lengacher, 2009).

A 2015 study on the ineffective monitoring practices of the Indonesian government provided solutions to challenges with the accessibility (the extent to which indicators are understood and affordable to monitor), reliability (the extent to which all relevant subjects are accurately monitored with timely, credible, and independent data), and validity (the extent to which indicators are aligned to what seeks to be measured under governmental impact) of their systems for monitoring success (Lewis, 2015). Solutions included transitioning from monitoring year to year to monitoring over longer intervals to address reliability and controlling for factors outside of governmental control that may influence the progression towards their specific goals to enhance the validity of success indicators. A 2012 study of "knowledge-intensive organizations" (organizations in which members of the network have high degrees of expertise, education, or experience utilized to create, distribute, and apply knowledge as their primary focus) such as the Learning Scientists, agrees that challenges arise in creating metrics that gauge consumer success after interacting with the knowledge products such as the blogs, posters, and podcasts (Jaaskelainen and Laihonen, 2012). In this case, users can say they perform better in class after using the six

strategies, but how much they have improved may not be quantifiable. This issue will also exist as a limitation of this improvement project. Due to the inability to control for the variance of demographic data among their audience and the nature of the Learning Scientists' work, limitations are present in understanding how content outside of what the organization provides also helps improve their audience. However, Jaaskelainen and Laihonen offer two strategies that align to the work of creating systems for monitoring for the Learning Scientists, which are 1.) ensuring that the organization is clear on what aspects of the audience members will be improved by their products and services and 2.) creating factual data to develop success measures. These two steps will be essential to this improvement project as we evaluate The Learning Scientists' aims and develop ways to measure progress towards those aims.

Conceptual Framework

Operational performance is a metric that needs to be monitored with fidelity to ensure an organization's survival, range of activity, and impact (Aarons, 2009). Operational performance, which can be expressed by fiscal and non-fiscal means, is considered a key outcome of organizational objectives and an indicator of the accessibility of these objectives and goals. While one significant contribution of monitoring operational performance (OP) is profitability, this is not always the case. The Learning Scientists is an organization who aims to improve aspects of people's lives with no desire for financial gain. Therefore, the following two-part framework was designed to assess how goals, systems, and procedures within the organization and the needs of the audience can be synthesized to understand how to create ways to measure success. While the definition of success for an organization like The Learning Scientists is based on the improvement of the lives of its audience, the conceptual framework is also designed to understand how current aspects of the organization align with the members' identities, aspirations, and utility.

The first component of the conceptual framework is used to understand the organization's audience perceptions. Dess and Robinson, Jr. (1984) offer a framework with three major components to assess OP: the goal approach, the systems resource approach, and the constituency approach. The goal approach seeks the measure OP on both explicit and implied goals, which can be inferred by the culture of an organization and the people's behavior. The organization's explicit goal is to make cognitive psychology accessible to more people. A conversation with a member revealed an implied goal is for the content to be equitably accessed internationally, especially in locations where high-stakes testing is engrained in the culture, such as The United States. The systems resource approach aims to conceptualize OP based on the organization's factors for survival. This component will assess the efficiency and impact of how the organization presents and distributes their content. The constituency approach states the organization is as successful as its ability to fulfill both internal and external constituents' needs. This component of the framework encourages us to conduct a needs-analysis among the audience members to understand how the organization has improved lives through access to cognitive psychology and potential new opportunities and means to do so. This provides the means to ensure the organization understands what they are doing (the goal approach), how they are doing it (the systems

resource approach), and the value of their actions (the constituency approach). These components, together, will provide a vivid picture of the organization's success in impacting its audience in positive ways.

The Conceptual Framework Informed by Dess and Robinson (1984)

The Goal Approach

Rests the measure of OP on both explicit and implied goals, which can be inferred by the culture of an organization and the people's behavior.

Systems Resources Approach

It aims to conceptualize OP based on the organization's factors for survival.

Constituency Approach

Bases success on fulfilling the needs of both internal and external constituents.

Using the tripartite framework offered by Dess and Robinson, the following research questions will be used to provide sense-making for the current perception that The Learning Scientists operational performance results in a more significant impact in the lives of the audience:

The Research Questions and Associated Framework Domain

Question 1
The Goal Approach

How can we measure OP based on the development of 1.) explicit goals, objectives, and a mission statement and 2.) implied goals as informed by the vision of the Learning Scientists members?

Question 2
Systems Resources Approach

In what ways can The Learning Scientists' established methods and mediums for communicating to its target audience be measured to inform the organization of OP?

Question 3
Constituency Approach

How can The Learning Scientists assess the needs of its target audience to increase engagement and impact among their audience?

The second part of the conceptual framework evaluates the perception of the members. This part evaluates aspects of the member's commitment to the organization. Commitment is defined as an individual's desire to remain focused and attached to their work (Grube & Castaneda, 1994). As stated earlier, the organization's success will be defined by the members therein. To create a sustainable system for measuring success, the system must be in line with the capacity of the members. The system must meet the needs of the members to meet the needs of the audience.

Allen and Meyer's (1996) Organizational Commitment Scale informs this part of the conceptual framework and will be used as a tool to curate questions that evaluate these aspects of the member's lives. The Allen and Meyer scale has been used worldwide across multiple industries due to its positive evaluation of reliability and validity (Alam, 2011).

Allen and Meyer suggest that the three arenas of commitment to an organization (affective, continuance, and normative commitment) are conceptually distinguishable yet equally valuable in assessing one's commitment to a cause (Allen and Meyer, 1991). The following figure defines these three arenas of the Allen and Meyers framework.

Allen and Meyer Commitment Scale Framework

1. **Affective commitment:** An individual's emotional attachment, involvement, and identification with an organization (sic), their values and goals are aligned with the organization's (sic) values, goals and mission. The individual remains because they want/ desire to. The individual can also do work voluntarily.

2. **Continuance commitment:** An individual's perception that the social and economic costs of leaving are higher than that of remaining, the individual remains because they think they need to.

3. **Normative commitment:** An individual's perceived obligation/sense of duty to remain in an organization (sic), which could be related to social pressure and moral imperatives. The individual remains because they think they ought to.

The questions within the first category, affective commitment, seek to understand how emotional attachment and affinity play a part in the members' work (O'Reily and Chatman, 1986). The second category, continuance commitment, helps us understand commitment as a reflection of one's need to remain with an organization for personal survival (Shore and Wayne, 1993). Continuance commitments reflect on the decision to remain consistent with activity due to acknowledging some loss from discontinuing the activity (Becker, 1960). In the case of a non-profit such as The Learning Scientists, it seeks to understand what aspects of engaging in this work without seeking monetary compensation continue to encourage the member's.

The last domain, normative commitment, can be defined as a commitment based on a perception of an organization's obligation, such as remaining with an organization because they have invested financially in your education (Williams, 2004). Normative commitment can also keep an individual tied to their organization due to a sense of duty even when satisfied with the organization's engagement is in jeopardy. A 2010 study of normative commitment shows that basing decisions on normative commitment may be the most complicated when two duties clash. By studying healthcare workers in an influenza outbreak, who had to decide between their sense of duty to combat the impact of the outbreak and their commitment to keeping their family safe, an example of the potential for internal conflict caused by competing duties is provided (Damery, 2010). To determine the appropriate system that will maintain a commitment to the organization, it is essential to avoid overwhelming or creating a shift in the importance of the duty of providing access to cognitive psychology research. Understanding how members feel committed to The Learning Scientists informs how extensive or simplified metrics and standards of success are designed within the proposed system for monitoring organizational performance.

| Project Design

Methods

Two surveys werer used to gain more insight and data needed to explore the topic of measuring organizational performance at The Learning Scientists. Reflecting on the conceptual framework, one survey was designed to collect quantitative and qualitative data on the function of explicit and implicit goals (goal approach), the role of systems within the organization (systems approach), and consumer needs (constituency approach; Dess and Robinson, 1984). This survey was administered to The Learning Scientists' audience (hereafter referred to as the 'Audience Survey'; see Appendix A within the organization. The other survey was administered to The Learning Scientists' members (hereafter referred to as the 'Member Survey'; see Appendix B). The member survey results were analyzed using the Allen and Meyer framework on commitment. Understanding how and why the members are committed will inform decisions that create a system for monitoring success that does not overwhelm the members and decrease their commitment.

All four members responded to the Member Survey. Participants for the Audience Survey were notified of the survey via two mediums. A guest blog describing my background and partnership with the organization included a link to the survey and a request for responses. Additionally, The Learning Scientists made three tweets over about two months about the survey with requests for participation. The audience (n=53) responded to all or part of the survey. Due to the nature of this recruitment approach, the inability to calculate response rates becomes a limitation. The Learning Scientists currently have about 26,000 followers. However, it is impossible to note how many people saw the tweet, how many people saw the blog post, and how respondents came from which advertisement method.

Each survey was designed to create a mixed-methods approach to this improvement project. Each survey contained a series of closed-ended questions presented in either multiple-choice format, choose all that apply format, or questions asking respondents to use a Likert-scale to rate their thoughts. Each survey also contained a series of open-ended questions designed to act as a contactless interview as this improvement project was completed in the era of social distancing and Covid-19. The survey was anonymous, and no follow-up questioning practices were necessary after the response. A more in-depth description of each survey will be discussed next.

Audience Survey

The Audience Survey included a total of 17 questions. The questions were designed to gauge the organization's impact against their mission to motivate students to learn, increase the use of research-based best practices rooted in cognitive psychology for teaching and learning, and decrease negative views around testing. The survey was divided into Section A and Section B. I created the questions in section A of the Audience Survey. These questions were designed to gain demographic data on the respondents and ask the respondents questions about their engagements with specific realms of The Learning Scientists' offerings. The questions asked about satisfaction with the products, the systems by which the organization advertises and disseminates their products and services (Dess and Robinson's systems resource approach), and the impact of The Six-Strategies of Effective Learning (Dess and Robinson's goal approach).

Section B was designed to gain data regarding consumer needs (Dess and Robinson's constituency approach). To design questions for this section, a search among educational organizations for a tool that has been used to understand professional development and talent development preferences from teachers and students was conducted. The Central New Mexico Community College (CNMCC) "2018 Professional Development Needs Survey" was chosen for its content and alignment to the current model of The Learning Scientists by asking questions about technology, diversity, and assessment which are all aspects of learning and creating systems for learning for which the organization advocates for. The bank of topics addressed within CNMCC's survey gives insights into learners' current needs, which the organization may be able to support using cognitive psychology research.

Member Survey

The Member Survey was a total of 24 questions. The Mission Commitment Performance Questionnaire inspired these survey questions. It was initially designed for a network of non-profits that the author did not identify but did address by the pseudonym PROUST (Patel, 2015). This questionnaire was selected for its alignment in analyzing The Learning Scientists commitment through the Allen and Meyer Framework (Allen and Meyer, 1996). To measure organizational performance and success, commitment to the organization is gauged as an indicator of happiness and satisfaction with the organization's work.

Additionally, I utilized a member check process to validate my results. This process included sharing preliminary data with members to align the data to their experiences. This process helped add context about the current structures and processes that influenced the survey responses. Also, aspects of organizational culture were vital in ensuring that recommendations would be feasible and attainable. This is an essential step in qualitative research. It helps prevent researchers from imposing bias based on their interests or perspective external to the actual arena of study (Mason, 2002). This bias can unintentionally occur as qualitative researchers are often both the data collector and analyst within their study (Miles

and Huberman, 1994). Several scholars support this method as a respected process as it provides a means to validate and assess the accuracy of qualitative data (Doyle, 2007).

These measures were evaluated to define and articulate appropriate measures of success to develop goals and strategies for The Learning Scientists and systems to monitor them.

Data Analysis

As a reminder, the Dess and Robinson (1984) framework was used to design the research questions driving this improvement project involving the goal approach, systems resource approach, and constituency approach. This survey was designed to assess the audience's satisfaction with the organization's products and services as well as a gauge of outstanding needs the organization may be able to address with cognitive psychology. The second framework is that of Allen and Meyer (1996), centered around commitment used to design the Member Survey, which involved affective commitment, continuance commitment, and normative commitment (Patel, 2015).

Audience Survey Questions

Part A:

Part A of the survey was designed to address the goal approach and systems resource approach of Dess and Robinson's (1984) framework. To create systems to monitor success, the questions addressing the goal approach provide insight into how well the organization meets its vision currently, which can inform the metrics within the monitoring system to be developed. The questions addressing the systems resource approach give us insight into how efficiently and current structures allow the organization to deliver its content. The questions addressing the constituency approach seek to understand if the organization is meeting its organization's needs, which may encourage metrics that monitor organizational improvement. Each question's nature provides the opportunity for overlap among the three components of Dess and Robinson's framework. The following figure shows a categorization of each question based on the framework. Further explanation of the categorization system used to analyze each question can be found in Appendix C.

Categorization Method of Part A of Audience Survey

Goal Approach Questions

(1) (2) (6) (7) (10) (11) (12) (13)

Systems Resource Approach Questions

(5) (7) (9) (10) (14) (15)

Constituency Approach Questions

(3) (4) (6) (7) (8) (11) (12)

Part B:

The responses gathered in Part B of the Audience Survey (Appendix A) were designed to create a bank of data from which The Learning Scientists can pull for future planning. This strategy further addresses the constituency approach of Dess and Robinson's framework. By giving the audience a chance to express what professional needs they have, data is gained by which to compare the current offerings of the organization to gauge how well they are meeting the needs of the audience—these questions derived from the CNMCC Professional Development Needs Survey. Topics include teaching both in the classroom and online, diversity and awareness considerations, and building capacity with educational technology. While CNMCC's survey does not provide an exhaustive list of all topics discussed within education, it provides a solid baseline of ideas.

Some of the ideas may be in line with what the organization already offers. Some ideas may lead to innovative strategies to improve current efforts towards improving attitudes towards testing. These responses will be referenced in the recommendations section of this project.

Member Survey

Due to the Member Survey's intimate nature, there was not a huge need to work to codify each response. With only four members in the organization, more attention was placed on hearing the voices that power the machine behind the organization's work to see what drives them and this work. The questions were analyzed to understand why the members commit to this work and why it makes them happy. Information of this context will inform the structures within recommendations for creating systems for monitoring their organizational performance. An analysis of the role identity and core values play in the work these women put into the common goal of improving attitudes towards testing will be vital in ensuring that recommendations are tailored to their needs and utility.

Questions 1-16 were closed-ended in nature, providing quantitative data. Questions 17-24 were open-ended and give insight into the emotions (affective commitment), economic considerations (continuance commitment), and their moral and sense of duty around The Learning Scientists' mission. The following chart shows a categorization of the Member Survey Questions based on the framework designed by Allen and Meyer (1996).

Categorization of Member Survey Questions based on Allen and Meyer

Goal Approach Questions

(1) (4) (6) (7) (10) (14) (15) (16) (18) (19) (23) (24)

Systems Resource Approach Questions

(12) (13) (14) (18) (19) (20) (23) (24)

Constituency Approach Questions

(1) (2) (3) (4) (5) (6) (7) (8) (9) (11) (13) (17) (21) (21)

By analyzing the responses with the framework as listed above, there is much insight to glean on how this work aligns with their personal commitment to improving outcomes for learners. This information will help create recommendations around what can be measured, what should be measured, and what systems can be created to monitor these metrics that complement the organization's needs.

| Findings

Utilizing the frameworks of Doss and Robinson (1984) and Allen and Meyer (1996) to analyze the responses to the survey question was instrumental in developing findings from the three research questions. This section will first report findings from the Member Survey to assess the needs, values, and perceptions and what drives commitment among the developers and contributors to the products and services of The Learning Scientists. Secondly, this section will report the consumer's needs, values, and perceptions.

Member Survey Findings through the Allen and Meyer (1996) Framework

Affective Commitment

Finding 1: The Learning Scientists' work is highly rooted in individual and collective identities. This builds emotional security, especially among the members around their work and purpose.

All members responded that the organization's work has a personal meaning that they could spend the rest of their life working towards.

All members feel a sense of belonging within this small community and believe that any problem faced by the organization is their problem. As this improvement project began in 2020, respondents were asked about their perception of success in 2019, and 100% felt as if they were successful. It is worthy to note that "success" was not explicitly defined and was open to interpretation.

All four members of The Learning Scientists are women, an underrepresented population in the field of cognitive psychology (Klatzky, 2015). While 50% of new cognitive psychology doctoral degrees are awarded to women, women are highly underrepresented in the field post-graduation in areas such as publications (Klatzky, 2015). The members also noted their identities as professionals and family-oriented women.

This organization is a bonding agent among the community as members stated being happy with the fact that they feel understood and routinely intervene and assist each other when one cannot fulfill to influences in their lives outside of the organization.

"It is gratifying to be in a "room" of like-minded, fun, intelligent women and to feel like we are making a difference... even a small one."

"My background as cognitive psychologist and knowledge of learning and memory contributes to the success."

"Because my graduate training involved applying cognitive psychology to education, I was able to meet the other learning scientists and develop a common passion."

Continuance Commitment

Finding 2: commitment to the organization is empowered by a collective sense of duty and social responsibility among the members. They feel as if they are empowered and enhance lives with their work and have a social responsibility to do so.

• The members agree that they are united under a shared mission, but only 75% believe the shared mission helps drive decision-making within the organization and personal decisions.

• All of the members reflected on their identity as cognitive psychologists concerning duty, stating the organization is "tailor-made for them." This may mean that members remain committed to the organization because it provides a forum to enhance learners' lives through cognitive psychology research.

• One member believes that there is a manner to fix systemic issues in education through the advocacy of understanding learning and cognition.

"We have all continued doing research in this area to some degree, but my background in teaching undergraduates made it clear that there was little translation of what we know about how people learn to the students who could benefit. This led to a desire to fix the systemic issues that created the problem, and I have worked toward that in a variety of ways through the Learning Scientists and elsewhere."

"I'm a cognitive psychologist whose training and research focuses on human learning and memory, and as a professor and educator, I am interested in the application of that research to improve teaching and learning. Furthermore, for me personally, I believe strongly in making that information accessible and in fostering collaborations and partnerships with educators."

Normative Commitment

Finding 3: Work-life balance is key to the utility of the members.

The members reflected on their positions as mothers, wives, professors, and career-oriented women who commit to the Learning Scientists while attending to other commitments. They agree that the collaborative nature of the organization drives commitment. They stated that they feel unsuccessful when their lives prevent them from meeting necessary deadlines. This reflects the role of internal conflict between the duty to work and the duty to personal affections such as family, as Demery (2010) discussed. This will influence recommendations by putting efficiency at the center of all consideration around improving performance measurement strategies. No recommendations should be created in a way that promotes further conflict between duties.

"I feel totally safe handing off a workshop or an email to anyone on the team. We also all have the same level of commitment to the project. It's important to us, but we have full-time jobs and family. So we fill in for each other all the time. If someone has a rough week and is overwhelmed, they can reach out and someone else will help pick up the slack. No one feels guilty or upset about it because we've all been there. In other professional settings, I would take on too much and then end up feeling burned out because I either couldn't trust that someone else could pick up the slack when necessary, or that I would be letting everyone down if I admitted to having a rough week. Working with the Learning Scientists is completely different."

"I think we collectively discuss the emotional investment in the group and our collective satisfaction with LS work/life balance, but we do not talk much about overarching goals or how to measure them. That said, I'm not sure we WANT reaching goals as we all have separate jobs and lives."
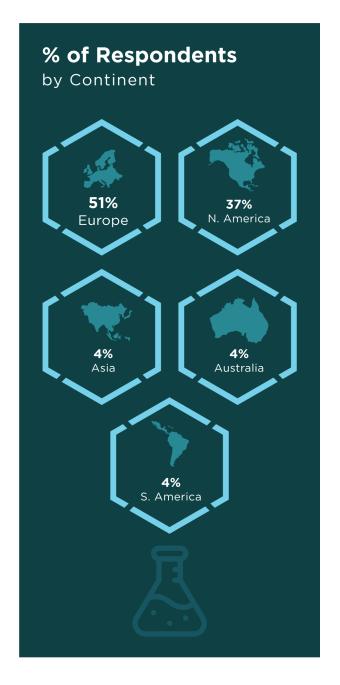
The Research Questions and Analysis of Audience Survey Responses through the Framework of Dess and Robinson (1984)
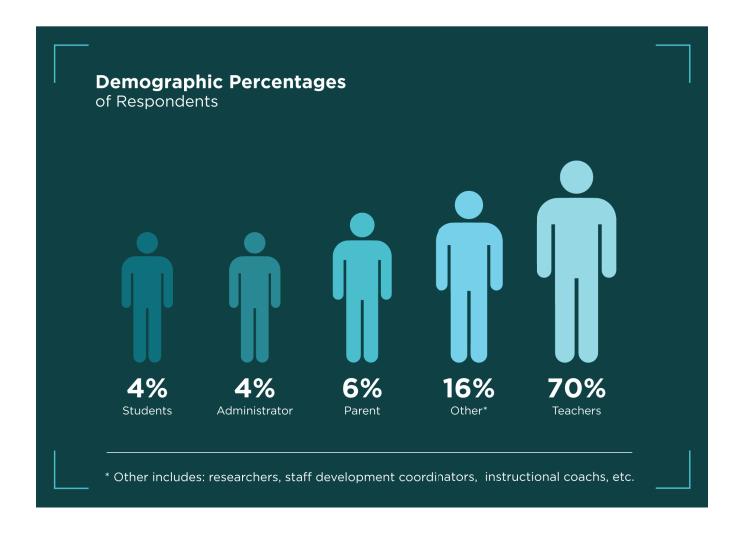
Question 1
The Goal Approach

How can we measure OP based both on the development of 1.) explicit goals, objectives, and a mission statement and the 2.) implied goals as informed by the vision of the Learning Scientists Members?

Finding 4: Demographic data shows that Americans do not make up most individuals within the audience. Neither do students.

Most respondents came from European countries such as the United Kingdom, Belgium, and Portugal. Respondents also reported being located in China, Brazil, and New Zealand. While not an explicit goal stated in the objectives or mission statement, members have expressed an implied goal of increasing their audience base in the United States of America.

% of Respondents
by Continent

51%
Europe

37%
N. America

4%
Asia

4%
Australia

4%
S. America

While students are the first identified group in the vision statement, they make up a significant minority of respondents with only n = 2. They favor well among teachers and other educational professionals. The Learning Scientists must review the current vision to see if it is actually in line with their work outcomes. A vision adequately aligned to the organization's work and purpose will aid in creating the most appropriate metrics for monitoring success.

Demographic Percentages
of Respondents

4%	4%	6%	16%	70%
Students	Administrator	Parent	Other*	Teachers

* Other includes: researchers, staff development coordinators, instructional coachs, etc.
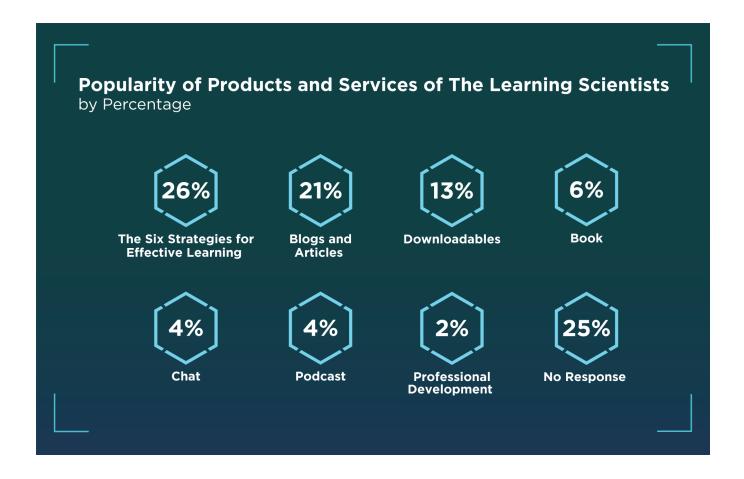
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Finding 5: The Learning Scientists successfully make cognitive psychology research accessible to the audience. This results in the retention of individuals in the audience over time.

69.8% of respondents have been engaged with The Learning Scientist's products and services for three or fewer years. 30.2% have engaged with The Learning Scientists for three or more years. Considering that the organization is 5 years old at the time of this study, in some way, the content remains relevant to individuals over time. This relevancy to individuals overtime reflects the accessibility and positive impact of the organization. Further investigation into what is most impactful to audience members is answered in the following findings.

Audience members were asked what they enjoy most about The Learning Scientists' content. Their responses were analyzed for commonalities and coded into six categories. The categories and their response rates are listed in the following figure.

Favorability of Characteristics of The Learning Scientists
by Percentage

36%
Accessibility

30%
Content Variety

9%
Relevance and Applicability

2%
Ease of Navigating Site

15%
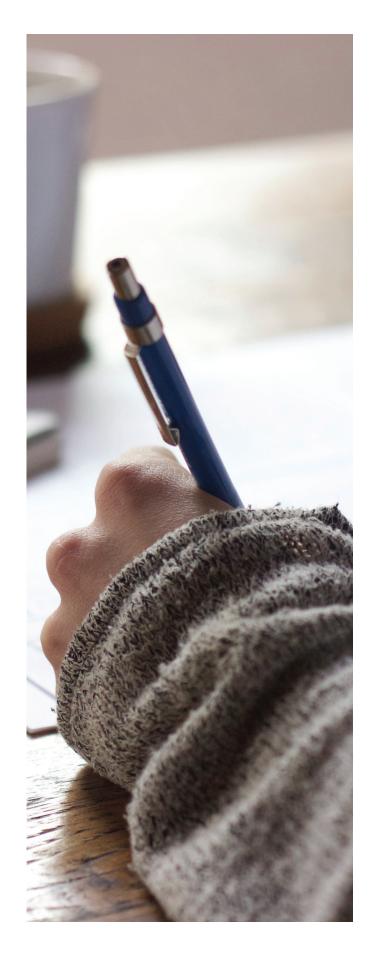Knowledge Acquisition

2%
The Members

There is varying popularity among the products and services of The Learning Scientists. Of the Learning Scientists' products and services, consumers find The Six Strategies for Effective Learning, blogs, and downloadables most interesting. Analyzing this from the goal approach can inform strategies to reach more audience members. This information may also lead the members to wonder how they can enhance the popularity of other features.

Popularity of Products and Services of The Learning Scientists
by Percentage

26%
The Six Strategies for
Effective Learning

21%
Blogs and
Articles

13%
Downloadables

6%
Book

4%
Chat

4%
Podcast

2%
Professional
Development

25%
No Response

Respondents respond favorably to the clarity of The Six Strategies of effective learning and their ability to improve attitudes towards testing. Of the audience, 55.8% indicated content was straightforward to understand, while 13.5% chose somewhat easy, and 26.9% chose easy. 2 respondents or 3.8% were neutral. No respondents stated that the content was difficult, somewhat difficult, or extremely difficult to understand.

Most respondents indicated that their attitudes towards testing have improved.

Of the audience, 24.4% reported that their attitudes significantly improved while 42.2% improved. 33.3% of respondents were neutral, while no one reported that their attitudes towards testing declined.
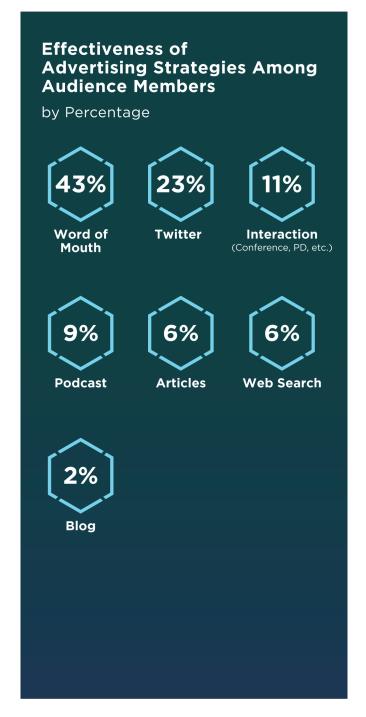
Question 2
Systems resource approach

In what ways can The Learning Scientists' established methods and mediums for communicating to its target audience be measured to inform the organization of OP?

Analyzing the data through the systems resource approach framework yielded two key findings:

Finding 6: Word of Mouth is the leading advertising method among audience members.

Word of mouth (WOM) is the leading advertising method and promotes The Learning Scientists products and services, while blogs, articles, and web searches are least effective in advertising strategies. At the same time, WOM advertising has many benefits, such as being free and adding credibility to organizations through testimonials of the impact. It is limited in scope in that the receiver of the information must be emotionally moved to try out the product or service (Sweeny, 2008). Other limitations of word of mouth include its lack of ability to be measured, the spread is limited to small networks of people, and it takes time (Dagenhard, 2019). The Learning Scientists may consider other advertising strategies if and when increasing their audience base becomes a goal.

Effectiveness of Advertising Strategies Among Audience Members

by Percentage

43%
Word of Mouth

23%
Twitter

11%
Interaction
(Conference, PD, etc.)

9%
Podcast

6%
Articles

6%
Web Search

2%
Blog

Finding 7: Some content delivery methods are more popular among the audience than others. Blogs and posters are the most popular mediums for receiving content among consumers. Patreon and the downloadable stickers are the least popular among consumers. While insightful, the limitation of this finding is that it only reflects survey respondents' usage. While these are the facts, specific ways to count and record how many people use Patreon will help understand the application of this data point. The same will be valid for the downloadable stickers and the other methods for delivering content. Methods for gaining and recording this data will be addressed within the recommendations.

Popularity Rate of Mediums for Delivering Content Among Audience
by Percentage

24% Blog	**20%** Posters	**14%** Podcast
11% E-mail	**15%** Book: *Understanding How We Learn*	**3%** Bookmarks
8% PPT	**0%** Patreon	**1%** Sticker
3% Talks & Workshops	**1%** Other	

Finding 8: A decrease in active communication strategies among the members has occurred. (Active communication, for this study, is defined as the structured and purposeful exchange of dialogue in real-time, including settings that are virtual, in-person, or a combination of the two. This is contrary to "passive communication," which would be defined as communication using methods in which the responder responds at their convenience, such as email or text message.)

The members were asked their thoughts on when they feel The Learning Scientists are unsuccessful. The theme of communication was consistent among 75% of the responses:

"When we have a failure of communication that gets in the way of achieving our goals or when we are unable to maintain our commitments either due to being overcommitted or to not having efficient processes in place."

"When we are unable to communicate (which does not really happen anymore)."

"When our personal lives and/or full-time jobs become very busy and we miss deadlines or fail to respond to emails in a timely fashion."

A member check of these responses revealed that consistent communication was once a part of the organization's culture. This finding is important because effective communication as a structure and system within organizations provides a sense of security when members know the organization's trajectory. Moreover, effective communication promotes cohesion, boosts morale, and promotes an opportunity for celebration, promoting a positive work ethic (Richards, 2019). One factor limiting the ability to use active communication is the varying time zones in which the members live. For context, 6 hours is the largest time difference between any two of the four members. Currently, passive communication is the dominant method to exchange ideas in group emails, group chats, and shared calendars through the Google suite of applications.
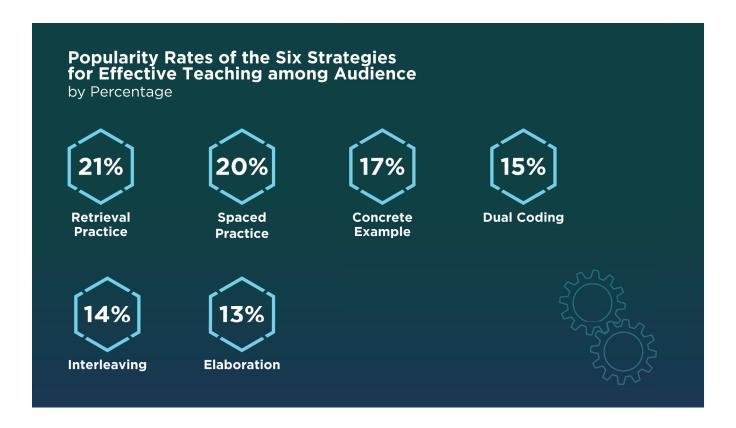
Question 3

Constituency Approach

In what ways can The Learning Scientists assess the needs of its target audience to increase engagement and impact among their constituents?

While data from the previous two research questions certainly provide information about consumer needs as much as they do about the organization's goals and systems. Findings in previous sections, such as the need for accessible, relevant, and applicable content, inform this section. Generally, consumers benefit significantly from simple, clear evidence-based how-to's they can quickly put into practice. However, the constituency approach yielded significant findings:

Finding 9: While overall, the products and services of the organization improve outcomes for learners, content around retrieval practice and spaced practice are most impactful or popular.

While not too much different in popularity, retrieval and spaced practice lead among the Six Strategies of Effective Learning. When considering the audience's needs, this data point gives some insight into which of the Six Strategies of Effective Learning are most impactful. To be successful in its mission, the organization will enhance its success by aligning its work to the audience's needs to make sure its content is explicit and accessible, and useful. Or is it because the organization focuses more on these two specific strategies, intentionally or unintentionally? The retrieval and spaced practice strategies could be more popular because they are the easiest to implement or utilize. An investigation into why these two strategies are the most popular to the organization would help the organization. Knowing this could inform the construction of qualitative metrics of success for monitoring performance, such as audience perceptions of clarity and audience perceptions of usefulness.

Overall, the content of The Learning Scientists works for consumers. As stated earlier, most consumers report that the content is easy to understand. Appendix D provides a bank of responses about how content has improved learning among the audience. Appendix E provides a bank of responses from the audience detailing scenarios in which the content around The Six Strategies of Effective Learning was used.

Question: How have the Six Strategies for Effective Learning improved your learning?

(Appendix D)

Sample Responses:

Note: Responses have not been edited for grammar or spelling and are presented in their authentic state to preserve the authenticity of the responses.

"When I started using retrieval practice to study, it changed the outcomes of my studying. I understood the material at a deeper level, to the point I could teach it to others."

"As a history teacher I find students are less stressed about whether they will learn the facts over time as they can just see themselves doing it."

"This has helped me see beyond my own learned biases to incorporate proven strategies while working with students."

Question: Describe a scenario in which you have used any or all of the "Six Strategies for Effective Learning". (Appendix E)

"Writing about cancer science for a general audience, I made the use of the concrete example idea by coming up with a metaphor-based in everyday life that could make the cell science I was explaining more easily accessible to people without science knowledge."

"I start many classes with a short retrieval practice; I ask students to create models of the central dogma and then ask them to annotate."
"I use every available opportunity to recap previous learning e.g. when lining up, when preparing for lunch, before hometime etc with small bites of the previous learning."

Recommendations

With the success of The Learning Scientists' current methods and goals as expressed by the survey data, there are some opportunities for improving the organization's ability to attain its goals. The following recommendations are a non-exhaustive set of suggestions based on the respondents' feedback. The recommendations will offer ways for The Learning Scientists to improve its efforts to align its work to its vision and methods to monitor progress.

Recommendation 1: Begin by assessing the organization's mission and vision for its alignment to organizational goals or to find opportunities to revise organizational goals. A vision and aim statement aligned to organizational purpose will help create sustainable systems for monitoring success.

a. Both the vision and aims of the organization features students first:

"Our Vision is to make scientific research on learning more accessible to students, teachers, and other educators."

"We aim to :

• Motivate students to study

• Increase the use of effective study and teaching strategies that are backed by research

• Decrease negative views of testing".

However, Finding 4 shows us that students are not the bulk of their audience base-educators are. A member check of Finding 4 shows that this data point is not surprising to members. The organization began helping students directly at the forefront of their mission but found themselves working with educators more. This is not problematic as members believe they have a more significant impact by working with individuals responsible for student learning. These individuals have the bigger picture as architects of learning experiences and benefit students by implementing the Six Strategies of Effective Instruction into their instructional practices.

A change in the vision and mission's language would have to be a decision agreed upon by the members who are responsible for the work. However, I recommend deleting the first two points of the aims and using the following language to articulate the work of the organization clearly:

"The learning scientists aim to empower educators to increase the use of effective teaching strategies that are backed in cognitive psychology research to improve learning outcomes for students and improve their study habits."

b. The learning scientists believe it is important to make all six of their strategies accessible to students, teachers, and other educators. Finding 5 shows us that the six strategies are the most popular aspect of the organization's work. Finding 5 shows us that most respondents in the audience rated the organization high for its ability to make their content accessible but show lower appreciation for their content's applicability. Finding 9 shows us that of the six strategies, retrieval practice and spaced practice are the most used or applicable. Finding 5 also shows us that although these two main strategies lead the pack, most of the audience reported improved feelings of testing. However, only a few indicated that their attitudes significantly improved. A third of those

same respondents were neutral, leading one to wonder if their other strategies were more explicit could the organization impact more people.

As mentioned earlier, the findings are not only set to inform organizational needs. However, they are set to provide baseline data so that further iterations of this survey can be compared to assess progress. Therefore, I recommend that the organization assess why the other four strategies do not present as applicable. This should be done by reviewing the current response rates and setting an attainable improvement goal such as a five-percentage point increase per year. Then, I suggest that the organization surveys the audience with consistent frequency to monitor changes in this data as a note of their progress. This can be implemented by administering the same survey used in this study as the questions are not time-bound.
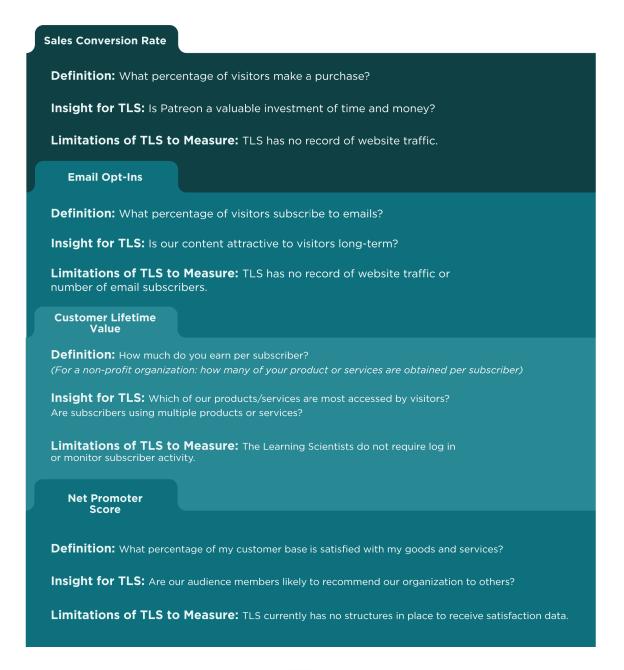
🧠 **Recommendation 2:** Create quantifiable metrics and attainable goals adequately aligned to the organization's vision and aims.

Finding 2 reveals a collective sense of duty and ability to enhance lives through the members' work. There is a level of social responsibility embedded in the work to curb the effects of systemic issues on learners' experiences. Finding 3 shows a member who believes that while valuable discussions around emotions and work-life balance occur among the group, there is little discussion about overarching goals. Having quantifiable data to support how well the organization is doing will support conversations about emotions and work-life balance. One member reported wanting to know how they can enhance what they are already doing by adding more things. Knowing how well the organization is doing can bring fulfillment to the members furthering their sense of duty and commitment to the work. When asked about feeling unsuccessful within the organization, one member responded that tracking the organization's progress would be helpful.

While The Learning Scientists (TLS) is a community project, content, and knowledge around measuring online platforms have suggested eCommerce organizations' metrics. The following chart provides a few examples of those helpful to online platforms as well as questions that they could answer based on the products and services provided by The Learning Scientists to illustrate the impact appropriate measures can have on planning and decision making and current limitations within the organization preventing these measures from occurring (Rice, 2021):

Examples of Key eCommerce Metrics and Possible Insights for The Learning Scientists

Sales Conversion Rate

Definition: What percentage of visitors make a purchase?

Insight for TLS: Is Patreon a valuable investment of time and money?

Limitations of TLS to Measure: TLS has no record of website traffic.

Email Opt-Ins

Definition: What percentage of visitors subscribe to emails?

Insight for TLS: Is our content attractive to visitors long-term?

Limitations of TLS to Measure: TLS has no record of website traffic or number of email subscribers.

Customer Lifetime Value

Definition: How much do you earn per subscriber?
(For a non-profit organization: how many of your product or services are obtained per subscriber)

Insight for TLS: Which of our products/services are most accessed by visitors? Are subscribers using multiple products or services?

Limitations of TLS to Measure: The Learning Scientists do not require log in or monitor subscriber activity.

Net Promoter Score

Definition: What percentage of my customer base is satisfied with my goods and services?

Insight for TLS: Are our audience members likely to recommend our organization to others?

Limitations of TLS to Measure: TLS currently has no structures in place to receive satisfaction data.

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In addition to the suggested metrics above, the members were asked what metrics they believe would help understand their performance as an organization. Their responses included metrics that measure audience engagement with the website and blogs. Additionally, members suggested knowing the frequency of talk/conference/consulting requests and utilization rates of their strategies in educational settings. The following recommendation will provide solutions for measuring these metrics.

Recommendation 3: Create methods to monitor metrics.

This section provides methods for monitoring the metrics suggested in Recommendation 2. Squarespace Analytics will be referenced several times as this software powers their website. An alternative to this program would be GoogleSite Analytics.

a. Sales Conversion Rate

The Learning Scientists have two features that audience members must pay for: Understanding How We Learn and Patreon.

• Book-Use Squarespace Analytics to assess site traffic over time and divide book sales within that same time frame by traffic number.

• Patreon-divide the number of new subscribers within a time frame by the amount of website traffic within that same time frame.

b. Email Opt-In Rate

• Within SquareSpace is the Email Campaign Dashboard. This dashboard provides quick access to key performance indicators such as the number of emails delivered and opened. This dashboard also reports if a link in the email is clicked to report the email's effectiveness. This dashboard reports the number of unsubscriptions within a specified time frame.

c. Customer Lifetime Value

• One aspect of Squarespace that serves as a limitation to this metric is an absence of a feature that requires individuals in the audience to log in to track specific activity.

• However, Squarespace does allow you to track downloads which can be compared against site traffic.

• Squarespace requires site managers to place downloadable materials within a file storage area or file storage page. Once the files are there, they can be tracked. Once tracked, the Web management bar's traffic overview section provides download analysis for all tracked files.

d. Net Promoter Score

• Administer the Audience Survey (Appendix B) on a frequency agreed upon by members to gain qualitative and quantitative data on audience satisfaction and willingness to tell others about TLS products and services.

e. Frequency of talk, conference, and consulting requests.

• There are two options for housing these requests in one efficient place. Squarespace offers the form

feature, allowing audience members to enter the members' information requested. The members can set up a form for these requests.

• Another option would be to use google forms. The members already use GoogleSuite as a medium for communication. The GoogleForms application provides a succinct way to gain and house data from the audience.

🧠 **Recommendation 4:** Create effective systems of communication of metrics.

Finding 8 reveals that most members value communication to understand their success. Most members revealed that most feelings of a lack of success are grounded in a lack of communication. On the other hand, Finding 3 shows us that the decrease in communication may be arising from an internal conflict of duties within members, as discussed with the realm of normative commitment. This need for work-life balance is the rationale for only suggesting the five metrics present in recommendation 3. This section will provide recommendations for efficiently monitoring these metrics without affecting work-life balance.

a. Meet consistently at a comfortable pace. Meetings involving active communication (as

defined in Finding 8) held within short time frames of another, such as weekly or monthly, is not advantageous for fostering commitment among this organization. Meetings that are too frequent would result in a imbalance between duties leading to a decrease in commitment. Meeting too infrequently results in a lack of opportunities to communicate progress. The organization must find the perfect rhthem.

Current passive communication strategies are supporting the ongoing work of the organization. However, it is recommended that members meet for active communication of goals quarterly or semi-annually. To make scheduling across time zones an efficient task, online tools such as doodle.com, timeanddate.com, and worldtimebuddy.com help suggest appropriate times for all members within their respective locations.

b. Distribute responsibility evenly
Each member should be responsible for reporting 1-2 metrics at these quarterly and semi-annual meetings. There are four members, which means that each person will have at least one metric to monitor or support while one member may have 2. To aid in balancing responsibility, one additional metric can be given to The Learning Scientists' collaborators not identified as members

based on the definition offered by this research (communications advisor and visualizer).

c. Create a rubric by which to assess the metrics. The members should be responsible for setting quantifiable goals against each metric. The members must reflect on their standard of success for measures such as what percentage of email opt-ins and what net promoter score defines the organization as on track. Once these standards are set, I suggest using a rubric for each metric indicating the organization is beginning to meet a goal, developing, proficient, or distinguished in meeting their goal.

d. Celebrate the wins!
Finding 1 shows us that there is an emotional attachment to this organization shared across members. Finding 2 shows us that duty and social responsibility are embedded in this work. Passive communication is not effective in celebrating the wins towards duty and social responsibility embedded in this work. As part of the active communication strategy, a time for celebrating must be included in the meeting. Celebrating the wins boosts morale and affective commitment and drives conversations about how well systems and structures are working, what strategies for reaching educators are working, and what opportunities exist for enhancement within the organization.

| Discussion

I begin this section with another recommendation for The Learning Scientists: stay committed! Of all of the responses, it was most intriguing to see how purpose, empathy, and the will to be change agents in students' and educators' lives aligned with the members' sense of being within their professional fields and lives. Even more resounding is the formation of a community around such a cause.

This sense of community and duty has such a positive impact on the learners and educators. Most responded with overwhelming positivity to the organization. There were celebratory notes of their efforts and impacts on learners, and there were notes of constructive criticism by reporting what has and has not worked for them. The Learning Scientists should create simple, straightforward ways to continue incorporating the audience's voice into their collective decision-making process.

This improvement project uncovered details about what the organization is doing well and areas where improvement opportunities exist. This improvement project suggests ways to continue gaining knowledge about its impact. The survey used for this project can be used as a guide for efficiently developing questions for further investigation. The bank of open-ended responses regarding how the content has improved their lives as learners and specific scenarios in which the content was helpful aid in the continued efforts of providing cognitive psychology in a variety of contexts, a skill for which the organization is celebrated. I hope these banks are seen as a gift from me to this outstanding organization for partnering with me. The gift is hearing the many voices of people impacted by their giving of expertise and time.

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Appendix A

Audience Survey

The following survey questions were administered to audience members and of products by the Learning Scientists. The "audience" is defined as the collective of individuals who access, consume or utilize the products and services of The Learning Scientists for research purposes, to improve some aspect of their lives, or some other specified reasons. The questions in Section A were created for this study in order to gain demographic data of respondents and direct feedback on their usage of content from The Learning Scientists. The questions in Section B are based on a curation of questions listed on the Central New Mexico Community College "2018 Professional Development Needs Survey". This particular survey was selected for its ability to assess the needs of the audience against categorical lists of topics aligned to learning environments and educational experiences.

Section A:

1. Which title best explains you as you use content and resources from The Learning Scientists.

a. student

b. teacher

c. parent

d. administrator

e. other (please explain)

2. In which country do you most use content and resources from The Learning Scientists? (If in The United States of America please also include your state)

3. How long have you engaged with the content and resources of The Learning Scientists?

4. What interests you about content and resources from The Learning Scientists.

5. How did you hear about The Learning Scientists?

6. What do you most enjoy about The Learning Scientists?

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7. What has been the most interesting content, resource, or engagement with The Learning Scientists you have experienced thus far?

8. Which of the following evidence based "Six Strategies for Effective Learning" have you used to teach or study? Choose all that apply.

a. Spaced Practice
b. Retrieval Practice
c. Elaboration
d. Interleaving
e. Concrete Example
f. Dual Coding

9. Through which medium do you access and use downloadable content about the evidence based "Six Strategies for Effective Learning" from The Learning Scientists? Choose all that apply.

a. Posters
b. Podcast
c. Blog
d. Email
e. Bookmarks
f. PowerPoints
g. Patreon
h. Sticker Templates
i. Talks and Workshops
j. Book: "Understanding How We Learn" by Drs. Yana Weinstein and Megan Sumeracki.
k. Other (please explain):

10. Please rate the ease of understanding the "Six Strategies for Effective Learning" using the downloadable materials.

a. Extremely Easy
b. Somewhat Easy
c. Easy
d. Neutral
e. Difficult
f. Somewhat Difficult
g. Extremely Difficult

11. Explain how any or all of the "Six Strategies for Effective Learning" has improved your learning?

12. Describe a scenario in which you have used any or all of the "Six Strategies for Effective Learning".

13. Explain your opinions on testing since utilizing any or all of the "Six Strategies for Effective Learning".

14. Which of our External Education Experts have you communicated with about learning science? Choose all that apply.

a. Holly Shapiro, PhD: Reading Expert
b. Veronica Yan, PhD: Desirable Difficulties and Mindset Expert
c. Richard Phelps, PhD: Standardized Testing Expert
d. Paull Kirschner, PhD: Instructional Design and Collaborative Learning Expert
e. Stacey Finkelstein, PhD: Feedback and Motivation Expert
f. Christopher Madan, PhD: Neuroscience Expert

15. Please explain other areas of learning science you would like for the Learning Scientists to provide External Education Experts contacts for.

Section B:

Please select all the subjects regarding teaching and learning you would be interested in pursuing.

Teaching Strategies
• Active learning strategies
• Flipping the classroom
• Collaborative learning or team-based learning
• Experiential learning theory and practice
• Leading effective class discussions
• Writing strategies for content classes
• Adult learning theory/practice
• Education basics for faculty new to teaching
• Other (please explain):

Teaching Distance Learning (DL) Courses
• Quality teaching in distance learning education
• Quality Matters: Rubric for DL Courses
• Techniques for increased student engagement and participation in online classes
• Strategies for improving online discussion forums
• Academic integrity in online classes
• Other (Please explain):

Diversity Awareness and Skills

• Accommodations for students with special needs

• Working with deaf students and interpreters

• Universal design

• LGBTQ Safe Zone

• Veteran students

• Women in non-traditional careers

• Teaching across cultures

• Multicultural awareness/identity/race/ privilege/equity

• Teaching students who speak languages other

than English

• Teaching the Developmental Learner or struggling student

• Teaching in the multi-generational classroom

• Other (please explain):

Technology in the Classroom

• Teaching with mobile devices and apps

• Teaching in the BYOD classroom (bring your own device)

• Social media in teaching

• Web-enhancing a face-to-face class: teaching methodologies

• Information literacy for students

• Using simulations in the classroom

• Virtual reality in teaching

• Other (please explain):

Assessment

• Course/program assessment (summative assessment)

• Classroom assessment techniques (formative assessment)

• Rubrics

• Using tests and low-stake quizzes to enhance learning

• Grading: policies and feedback to improve student learning

• Backward design in curriculum development

• Other (please explain):

Soft skills (for students and/or teachers)

• Encouraging a growth mindset

• Soft skill development: responsibility, motivation, time-management, stress management

• Promoting academic integrity, online and face-to-face

• Mindfulness in the classroom

• Building professionalism skills in students

• Professionalism skills for faculty

• Creating rapport with students

• Communicating with students

• Coaching students to academic success

• Leveraging classroom dynamics to engage students

• Other (please explain):

Other Teaching Topics

• Building critical thinking skills

• Service Learning

• Teaching sustainability

• Teaching High School dual-credit students

• Trends in Adult Basic Education (ABE)

• Issues and strategies for late-career faculty members

• The future of teaching and learning

• Classroom management skills: do's and don'ts

• Dealing with a confrontational student

• Impacts of trauma on learning

• Other (please explain):

16. Please explain how The Learning Scientists can improve.

17. Other thoughts?

| Appendix B

Member Survey

The following survey questions are inspired by the Mission Audit Instrument (Bart, 2009) and the Mission-Commitment-Performance Questionnaire (Patel, 2015). These questions were administered to members of The Learning Scientists. For the purposes of this improvement project, 'members' is defined as the collective of the four cognitive scientists who are responsible for the content and actions of the The Learning Scientist (Drs. Sumeracki, Nebel, Kuepper-Tetzel, and Kaminske).

Some questions were omitted as they were deemed irrelevant for the present organization. The questions were answered using a Likert Scale. Questions 1-11 use a Likert scale with 1 meaning "not at all" and 5 meaning "to the greatest possible extent". Questions 12-16 use a Likert scale with 1 meaning "strongly disagree" and 5 meaning "strongly agree". Questions 17-24 are open response questions.

1. To what extent does The Learning Scientists' current mission statement serve as a uniting point for everyone in The Learning Scientists?

2. To what extent are you satisfied with The Learning Scientists' current mission statement?

3. To what extent is The Learning Scientists "clearly understood" by everyone in The Learning Scientists?

4. To what extent does The Learning Scientists' current mission statement create a shared "sense of mission" among individuals in The Learning Scientists.

5. To what extent does The Learning Scientists' current mission statement serve as a guide to help people make decisions?

6. To what extent does The Learning Scientists' current mission statement influence you own personal behavior/actions?

7. To what extent does The Learning Scientists' current mission statement influence the behavior/ actions of individuals throughout The Learning Scientists?

8. To what extent did the majority of participants of The Learning Scientists' activities/workshops/interactions experience some growth as a result of services provided in 2019? *Please answer this question based on your own involvement, whether at a local or international level.

9. To what extent did the quality of The Learning Scientists' activities/workshops/interactions offered improve in 2019? *Please answer this question based on your own involvement, whether at a local or international level.

10. Generally, to what extent were participants of The Learning Scientists' activities/workshops/interactions satisfied with the services provided in 2019? *Please answer this question based on your own involvement, whether at a local or international level.

11. Overall, to what extent has The Learning Scientists been successful in meeting its mission/objectives in 2019? *Please answer this question based on your own involvement, whether at a local or international level.

12. I would be very happy to spend the rest of my life involved with The Learning Scientists.

13. I really feel as if The Learning Scientists problems are my own.

14. I feel a strong sense of belonging to The Learning Scientists.

15. I feel emotionally attached to The Learning Scientists.

16. The Learning Scientists has a great deal of personal meaning to me.

17. How would you define organizational performance with respect to the work of The Learning Scientists?

18. When are The Learning Scientists as an organization successful?

19. When are The Learning Scientists as an organization unsuccessful?
20. Define how your education, expertise, background, and/or personal interests shape your involvement and contributions to The Learning Scientists.

21. What are current data points used to measure organizational performance at The Learning Scientists?

22. What data would you be interested in knowing to inform your understanding of organizational performance at The Learning Scientists?

23. Why did you join the Learning Scientists?

24. What do you most enjoy about your work with the Learning Scientists?

| Appendix C

Coding System for Part A of Audience Survey

1. Question 1 seeks to understand demographic data about the respondents and their identification within the education environment. This question will inform the goal systems approach by comparing the raw numbers of each category.

2. Question 2 seeks to understand demographic data about the respondents regarding their location. This was an open-ended question and responses were categorized and coded by their associated continent or nearest continent, such as respondents from New Zealand being included in the Australian count and compared to inform the goal approach.

3. Question 3 investigates consumer longevity and informs the constituency approach as it can be assumed that those who have remained engaged with content do so because it continues to fit their needs.

4. Question 4 also aligns to the constituency approach as it seeks to understand what needs are currently being met or should be met by consumers as the consumers state their needs. The responses can be analyzed as currently being met by services or not currently met by services. These open-ended responses were analyzed for common themes and were coded by one of four categories: 1. explanations of cognitive psychology concepts, 2. applicable research made transparent, 3. "how to's" and evidence-based practices, and 4. materials and resources.

5. Question 5 is aligned to the systems resource approach by investigating how effective each of The Learning Scientists current advertising strategies are by comparing them to each other. These open-ended responses were analyzed for common themes and coded by one of the following categories: 1. peer/colleague, 2. blogs, 3. web search, 4. Twitter, 5. in-person interaction such as conference, consultation, or professional development session, 6. Article, and 7. Podcast.

6. Question 6 seeks to align to both the goal approach and constituency approach as it informs how well current products and services are working. This open-ended question was analyzed for common themes and coded by one of the following categories: 1. Accessibility of content, 2. Relevancy and Application of Content, 3. Knowledge acquisition, 4. Personal or Affective

Connection to the Four Cognitive Psychologists, 5. The Content and Variety, 6. Site Functionality.

7. Question 7 informs the goal approach, systems resource approach, and constituency approach. By seeing the popularity of their content and how each is accessed, all three of these approaches are addressed. These open-ended questions were analyzed for common themes and were coded by one of the following categories: 1. Chats, 2. Downloadables, 3. Blog and Articles, 4. The Six Strategies of Effective Learning, 5. Book: Understanding How We Learn, 6. Podcasts, and 7. Professional Development.

8. Question 8 informs the Learning Scientists of which of the Six Strategies are most popular among consumers and therefore provides data aligning with the constituency approach. Since consumers could choose more than one, the 6 categories are only compared to each other to understand popularity.

9. Question 9 informs the Learning Scientists of which of the current mediums for delivering information are most popular among consumers which is aligned to the systems resource approach. Since consumers could choose more than one, the 11 categories are only compared to each other to understand popularity.

10. Question 10 aligns to both the goal approach and systems approach as the question informs how well they are making cognitive science accessible and by which method(s) gives them the greatest ability to do so. The 7 close-ended categories were compared by their frequency and popularity.

11. Question 11 aligns with the goal approach and constituency approach. These responses were not categorized and coded but rather left as a bank of responses to provide content to reflect on when building recommendations for future content and articles from the organization due to their specificity in nature.

12. Question 12 aligns with the goal approach and constituency approach. These responses were not categorized and coded but rather left as a bank of responses to provide content to reflect on when building recommendations for future content and articles from the organization due to their specificity in nature.

13. Question 13 aligns to the goal approach as it plainly asks if the goal of improving opinions around testing by making cognitive science accessible is being accomplished.

14. Question 14 supports the systems resource approach in directly analyzing one specific service that The Learning Scientists offers: The External Education Experts. This information could inform how The Learning Scientists may seek to collaborate with these experts in the future.

15. Question 15 informs the Learning Scientists of other ways they can network with external experts outside of those already present.

Appendix D

Bank of Responses to Question:

Explain how any or all of the "Six Strategies for Effective Learning" has improved your learning?

Note: Responses have not been edited for grammar or spelling and arepresented in their authentic state to preserve the authenticity of the responses.

Has made me think about the cognitive processes involved in learning and I've explicitly taught tudents about the strategies too.	I've become a lot more comfortable with activities that don't result in immediate progress, and I've been capable of understanding deeper and holding information for longer.	Not my learning but we have included Study Tips in entry level courses because we realize that not all students have developed strong study skills. The students have reported that learning about new strategies and approaches is very valuable to them.
It completed overturned what I knew to be effective learning—game changing.	I now force myself to elaborate and answer internal questions on a regular basis. It has opened my eyes to my own learning.	They allowed me to trust the process of learning and not torture myself.
It helped monitoring students progress.	The powerpoints are easy to show to students, in a format that is simple and not overwhelming. Gives good examples for each strategy.	Made explicit the strategies so I can advise students.
As a faculty member, not sure how to answer this.	I create learning and have used them there.	I often use retrieval to try and consolidate newly learned content
Retrieval practice: I understood the beneficial effect of the remembering effort.	spaced practice--I always knew I should cram, but having clearly explained reasons makes it easier to avoid.	Given confidence in using and promoting retrieval in various forms for my students

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Appendix D continued

When I started using retrieval practice to study, it changed the outcomes of my studying.
I understood the material at a deeper level, to the point I could teach it to others.

I am to teaching them.
I already use them, only by chance.
And with I became a doctor although my memory is not quite impressive. I always wondered why I achieved having high grades. But only by chance, I think, I have used retrieving, elaboration and dual coding all my life.

This has helped me see beyond my own learned biases to incorporate proven strategies while working with students

Retrieval practice: I understood the beneficial effect of the remembering effort.

spaced practice--I always knew I should cram, but having clearly explained reasons makes it easier to avoid.

Given confidence in using and promoting retrieval in various forms for my students

I have incorporated the idea of spaced learning into my practice and am now looking at how to ensure effective interleaving.

As a high school teacher, mainly of accelerated learners, it supports my teaching choices with evidence.

The strategies have improved my students learning and retention.

Retrieval practice - students thave better retention

It has made me more aware of the value and necessity for spaced practice.

A developed understanding for how the process of learning can be enhanced.

Teaching for long-term memory and teaching pupils how they learn for independent study.

It has allowed me to persevere during difficult learning.

As a history teacher I find students are less stressed about whether they will learn the facts over time as they can just see themselves doing it.

Appendix E

Bank of Responses to Prompt:

Bank of Responses to Prompt: Describe a scenario in which you have used any or all of the"Six Strategies for Effective Learning".

Note: Responses have not been edited for grammar or spelling and are presented in their authentic state to preserve the authenticity of the responses.

Student asks me how they can improve exam performance. We use six strategies to discuss how.	I use every available opportunity to recap previous learning e.g when lining up, when preparing for lunch, before hometime etc with small bites of the previous learning.	Writing about cancer science for a general audience, I made use of the concrete example idea by coming up with a metaphor based in everyday life that could make the cell science I was explaining more easily accessible to people without science knowledge.
I start many classes with a short retrieval practice; I ask students to create models of the central dogma and then ask them to annotate.	Most if not all of my lessons now contain some form of retrieval practice.	All my life for me and now starting with my own children and also with my medicine residents.
Have kids use principles of classical conditioning to create a learned behavior.	I have used various strategies across curriculum while working with youth in an Alternative High School setting within a correctional facility.	I have given a presentation on "being an expert learner" by using metacognitive learning strategies and show your powerpoint slides (with credit, of course).
Quizes and questioning in the classroom.	Daily retrieval practices - my students absolutely love them (seriously!).	Lesson design. Note taking strategies, final exam revision, digital portfolios-metacognition and general reflection.
In creating online programmes.	In an assembly for students on effective learning strategies.	I regularly use a starter activity that asks students to recall information from preivous lessons over different timescales e.g. last week, last term and last year.

Appendix E continued

I use powerpoint slides before lectures with my students, as part of a series on metacognition tips. I also mention them when particular topics work well with particular strategies, and in discussing prepping for upcoming exams.

I use this material as part of our tutor training process and encourage our tutors to share with the student they are working with (at the college level).

Our high school has combined all six of the strategies with our character education program (also addressing executive functions) during explicit instruction during our advisory period.

I have used spaced retrieval to demonstrate to disheartened learners they can learn 20 definitions in 15 minutes and recall and apply them in the classroom.

I set a retrieval test most lessons but don't record the grades; not an assessment but a learning opportunity. Some are spaced. Some need elaboration.

I work in faculty development so review them with faculty.

When planning course materials I am aware of ensuring interleaving in the course.

I use retrieval practice every time I study for an exam. I host retrieval practice sessions for my students prior to exams using quizlet.

We have intentionally designed courses to include Retrieval Practice.

Teaching emergency medicine residents.

Retrieval practice at the start of every lesson (spaced and interleaved quizzes). Spaced retrieval activities for homework.

These questions need essay responses!! See my Twitter @JonesLearnUK where I've done a 45 min videos on how I've used these in my teaching! :-)

Y11 and 13 lessons, developing retrieval roulette excel documents for core questions for retrieval, using retrieval practice for homework on Teams.

Animating diagram on PowerPoint to highlight details of a process.

Student asks me how they can improve exam performance. We use six strategies to discuss how.

Most if not all of my lessons now contain some form of retrieval practice.

I haven't but I've explained them all to students.