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Online Language Acquisition and Leadership in Higher Education-Governed Intensive English Programs: A Rasch-Based Diffusion of Innovation Study

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ONLINE LANGUAGE ACQUISITION AND LEADERSHIP IN HIGHER EDUCATION-GOVERNED INTENSIVE ENGLISH PROGRAMS: A RASCH-BASED DIFFUSION OF INNOVATION STUDY

DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Education
at the University of Kentucky

By
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2019

ABSTRACT OF DISSERTATION

ONLINE LANGUAGE ACQUISITION AND LEADERSHIP
IN HIGHER EDUCATION-GOVERNED INTENSIVE ENGLISH PROGRAMS:
A RASCH-BASED DIFFUSION OF INNOVATION STUDY

Research has indicated accredited, U.S. higher education-governed intensive English programs (IEPs) often struggle financially due to a scarcity of resources (namely students) because of political and global economic factors and increased competition (ICEF Monitor, 2017; IIE, 2017; Ladika, 2018; Soppelsa, 2015). However, few IEPs advertise online language acquisition (OLA) courses despite the increase in online study methods at the higher education institutes governing the programs and its use by competitors. The purpose of this study was to determine the status and extent of OLA diffusion in U.S. IEPs, how IEP directors and faculty perceived OLA, and whether they perceived themselves to be the leaders in its diffusion.

Drawing on Rogers' (1962) diffusion of innovation framework to inform the instrument methodology, this study employed a quantitative, cross-sectional survey. The study used the Rasch measurement model (1960) as the framework informing the instrument's design and analysis.

All 249 executive directors and 2,492 faculty in the 249 accredited, higher education-governed IEPs were invited to participate in the study, and 328 directors and faculty from 121 IEPs opted to do so. Major findings revealed 40.5% had experimented with online courses within the last five years, and 24.8% offered it currently. The Winsteps dimensionality analysis showed each of the six innovation characteristics performed as a separate strand supporting the dimension of OLA adoption potential. The Wright map and item measures revealed respondents perceived OLA visibility (1.52 logits) as the most difficult-to-endorse characteristic followed by complexity (0.48 logits). The least challenging characteristic was articulated benefits (-0.39 logits), and the easiest item was technology confidence (-1.21 logits) followed by technology clusters (-0.65 logits). Regarding leadership in promoting OLA adoption, 53.2% of the sample claimed they were involved in its leadership at some level, and 31.1% reported leadership involvement at institutes currently lacking online English courses.

This study suggests respondents found OLA to be beneficial for their IEP with articulable results. Cost and technology confidence were not viewed as prohibitive, but respondents lacked confidence that OLA would lead to increased enrollment. Because of the high level of OLA leadership in their IEP, the adoption of online language courses appears to be moving in an upward trajectory.

KEYWORDS: Online Education, Intensive English Programs,
Rasch Measurement Model, Diffusion of Innovation,
Educational Leadership

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10/29/2019
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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

While enrollment in university and college-governed intensive English programs (IEPs) has been trending down, online education in the United States is trending upwards. The number of online courses is increasing in U.S. institutes of higher education, with 30% of all students having taken at least one online course (Seaman, Allen, & Seaman, 2018). Nonetheless, few university or college-governed IEP programs are offering online courses despite the increase in online study methods at the same higher education institutes with whom the IEPs are affiliated and its use by IEP competitors, both by institutes in native English-speaking countries and the home countries of some students (Ladika, 2018). Many U.S. universities have added online education courses with the goal of boosting enrollment, which indicates university-governed IEPs may also benefit from adding supplemental online language acquisition (OLA) courses. However, peer-reviewed research into OLA adoption in IEPs is scarce, and the rate of adoption is unreported in research even though White (2003) maintains some institutes have been experimenting with online education technologies since the 1990s.

IEPs play a necessary role in international student admissions to institutes of higher education. Prior to university and college admission, international students must learn the language sufficiently to pass mandatory language exams. The U.S. Homeland Security office ("SEVIS by the Numbers," 2018, August) reveals 5.3% of the 1,206,590 international students studying in the United States (approximately 64,466) in August of 2018 are international students studying academic uses of English at university or college-governed IEPs. These IEPs offer full-time (at least 18 hours per week; "UCIEP

Guidelines," 2017), multi-level, multi-skill (e.g., Listening, Speaking, Reading, and Writing) programs lasting one or more years for those who begin at the lowest level.

Higher education-governed IEPs face problems similar to those of their host institutes. As Bolman and Gallos (2011) describe the situation, "academic leaders at all levels and in both the private and the public sectors scramble to find talent, resources, donors, income-generating projects, and tuition dollars in an intensely competitive environment" (p. 6). IEPs share many of these challenges, such as resources, income-generating projects, and tuition dollars, in a similarly competitive environment. Bolman and Gallos further observe the increasing pressures from technological changes, changing student demographics, and increasingly challenging competitors, all of which also affect IEPs (Hamrick, 2015; Soppelsa, 2015; Ladika, 2018).

In recent years, IEP enrollment has declined, with a 17% enrollment drop in 2015, a 25% drop in 2016, and a 26-50% drop in 2017 (Institute of International Education, 2016, 2017; ICEF Monitor, 2017, Dec. 13). The Bridge Education Group (Mermel, n.d.) which analyzes U.S. IEP trends, contends enrollment dropped 37.6% from December of 2015, when it last peaked, to August of 2018. Ladika (2018) claims many IEPs have been affected by declining enrollments, which is due to several factors:

> A confluence of events — including changes to international scholarship programs, a strong U.S. dollar, a slump in Mideast oil prices, increased competition from IEPs in other countries, the current political climate in the United States, and the increased availability of English language training programs in students' home countries and online — is driving much of the decline. (p. 38)

In response, Ladika (2018) purports U.S. IEPs are offering new customized programs.

Ladika's (2018) analysis refers to the increasing number of English language programs online, though that is the limit of the author's discussion of that topic. Turner (2016) reports market trends show "growing numbers of students are using online resources for language study" (p. 34). Some countries, including those who send international students to the United States, also have expanding online study systems. For example, China, which sends the largest number of international students to the United States (ICEF Monitor, 2017, May 31), has a large and growing number of online students (Hurd & Xiao, 2010). Additionally, an increasing number of non-IEP institutes have begun to offer online study options, with some even offering a new type of hybrid program where students begin with online digital materials, such as recorded English videos and software, before receiving a limited amount of online interaction time with native English-speaking instructors. Then when they are ready, they travel to a native English-speaking country to continue their studies in person, which is what happens in EC English Language Centres ("Learn English Online," n.d.). This non-immersion to immersion hybrid program is just one example of how IEPs could benefit from OLA.

Despite the method in which international students learn academic English, if they are bypassing U.S. IEPs, that represents lost tuition through decreased enrollment. While there have always been many international students studying in non-IEP settings, this recent decrease in U.S. IEP enrollment has been affecting the solvency of U.S. IEPs (Soppelsa, 2015). IEPs need a way to draw more of these international students from non-IEP institutes into their IEPs. This need is not uncommon within IEPs, and directors are often searching for enrollment-increasing methods (Ladika, 2018). For example, in addition to offering academic English programs focused on students who want to matriculate to U.S. colleges and universities, many IEPs offer customized special program options for small groups of international students. These programs can be of any length and focused on a large variety of English language purposes, such as business, agriculture, or university admission tests. Some of these special programs are designed using grants.

While OLA is unlikely to be the final solution to enrollment problems, it could be instrumental in responding to decreasing enrollment; however, there is no research on the status of OLA diffusion in U.S. IEPs. To fill this gap in the research, a study of U.S. IEPs governed by higher education institutes is needed to learn if OLA diffusion is occurring and if not, why. Additionally, if OLA diffusion is occurring, to what extent and are the IEP faculty or directors the innovators and leaders in its diffusion. This chapter outlines the research problem, describes the purpose and significance of the study, and presents the research questions, study design, and the study's limitations.

Problem Statement

The majority of university and college-governed IEPs are self-supported (Hamrick, 2015; Rowe, 2015), which means layoffs can occur after significant enrollment drops. As Soppelsa (2015) describes, "[IEPs] may teeter on the brink of insolvency from time to time" (p. 151). In recent years, IEP resources have been strained from decreased international student enrollment due to U.S. political and global economic factors, the often-inaccurate perception that visas are hard to obtain, and increased competition (ICEF Monitor, 2017, Dec. 13). While IEPs are experimenting with ways to increase enrollment, such as hosting short-term students in customized programs, Mercado (2015) implies OLA could give IEPs an edge over U.S. IEP competitors who have been slow to adopt online practices.

Currently, there is little evidence to suggest IEPs are experimenting with OLA options despite its increased use by their competitors, by the U.S. colleges and universities which govern them, and by their students in their home countries. Further, there are no known diffusion studies describing IEP's adoption of OLA courses. Without understanding how OLA has diffused throughout IEPs and who is interested in its adoption, IEP leaders may be poorly equipped to affect OLA's adoption process in their IEPs, and IEP change agents may lack direction on how best to target their efforts to increase or decrease its adoption rate.

To understand the adoption of OLA in U.S. IEPs, this study was designed to investigate IEP leadership's perceptions of OLA for their IEPs and themselves as leaders in its diffusion in university or college-governed IEPs in the United States.

Purpose and Significance of the Study

The purpose of this study was designed to investigate the adoption status of OLA in IEPs, IEP leadership's perceptions of OLA for their IEPs, and their perceptions of themselves as leaders in the diffusion process. The results of this leadership and diffusion study can help guide change agents and other stakeholders in the development of OLA programs. For IEP change agents interested in the adoption of OLA, the survey results and discussion can equip them to strategize where to target their efforts and how to affect the adoption rate of online education in IEPs. Additionally, technology designers may become more aware of the need for customized technology to enhance online ESL class quality and efficiency. This research can help IEP leaders chart the path of change for innovations. Furthermore, Stoller (2015) postulates innovations such as OLA should be encouraged in IEPs because “it facilitates program renewal, enhances teachers’ careers, minimizes burnout, improves instruction, and allows programs to be responsive to change” (p. 37).

Being responsive to change is crucial for IEPs to be competitive in an environment where “IEP student populations have shifted rapidly, reflecting changes in economics, government policies, and political conflicts…. to adapt, IEPs must be nimble and their leaders must be prepared to deal with these changing realities” (Hamrick, 2015, p. 326-7). Should this study reveal OLA is still in the early stages of adoption, more diffusion studies would be needed to chart the complete adoption process. Together, such OLA diffusion studies can provide a picture of how OLA adoption has developed and how the perceived characteristics of the innovations relate to its adoption.

This study contributes to the field of educational leadership by investigating IEP leaders’ and managers’, including full- and part-time directors and faculty, perceptions of innovation characteristics. To better understand their leadership contexts and the problems they are experiencing with decreased enrollment, leadership theories are applied to provide a lens by which change agents may be better equipped to identify actions and responses and reframe unsuccessful change efforts.

Research Questions and Design

This study employed a cross-sectional survey using an online modified diffusion of innovation (DOI) survey instrument built on six perceived characteristics of innovation (PCI) and based on Rogers’ (1962) DOI theory as the framework informing the instrument methodology and the Rasch measurement model (Rasch, 1960) as the framework informing the instrument's design and analysis. Three research questions guided this study:

1. To what extent has online language acquisition (OLA) been adopted at university and college-governed, intensive English programs (IEPs) in the United States?
2. How do IEP directors and faculty perceive the adoption of OLA in their IEPs?
3. To what extent do IEP directors and faculty perceive themselves to be leaders in the diffusion of OLA?

The first question attempted to identify where the IEPs can be found along the adoption continuum. The second question focused on organizational characteristics of innovations (i.e., economic advantage, compatibility, complexity, visibility, result demonstrability, and uncertainty) proposed by Rogers (1962), Moore and Benbasat (1991), Frambach and Schillewaert (2002), and Tornatzky and Klein (1982). To understand the adoption decision process of directors and faculty, it is important to learn how both of them perceive these innovation attributes regarding their organization's innovativeness.

The third question explored whether IEP directors and faculty consider themselves leaders in the diffusion of OLA. Based on Rogers' (2003) DOI theory and the Rasch model (Linacre, 2019), the assumption was that participants who perceive more organizational benefits from OLA endorse more positively-worded items at higher categories (i.e., *agree* and *strongly agree*) than those who perceived fewer benefits. This means the adopters should endorse more OLA attributes than non-adopters.

Design

To answer these questions, this study utilizes Rogers' (1962) diffusion of innovation as a theoretical lens to examine the adoption of OLA and understand how both IEP directors and faculty view the adoption of OLA. The survey questions are based on Moore and Benbasat's (1991) diffusion of innovation survey questions with permission from one of the authors (I. Benbasat, personal communication, Oct. 10, 2018), but the questions are modified with Frambach and Schillewaert's (2002) and Tornatzky and Klein's (1982) research on organizational innovation characteristics which require an organization's approval before adoption, as is the case with OLA.

Nardi (2017) claims, "measuring behavior with a questionnaire is actually a measurement of what people *say* they do" (p. 86). Using a quantitative survey, participants were asked to self-report their perceptions of the characteristics of the value *OLA* because the value is not directly observable. Additionally, behavior may not be a clear sign of one's beliefs about OLA: "in instances when we cannot rely on behavior as an indication of a phenomenon, it may be more useful to assess the construct by means of a carefully constructed and validated scale" (DeVellis, 2017, p. 16).

The quantitative survey was piloted and reviewed using the Rasch measurement model (Rasch, 1960) as computed by the Winsteps® software (Linacre, 2018b), which was also used to analyze the survey results. Results of this analysis can assist IEP directors and faculty in understanding the perceived characteristics of the innovation OLA, which affect its adoption and diffusion (Rogers, 2003).

Setting and Sample

Because organizational innovation studies which focus on just a few leaders' perceptions lack "very valid measures of the concepts of study" (Rogers, 2003, p. 409), this study proposed to study an organization-approved innovation at the individual (i.e., directors and faculty) level of adoption. IEP directors and assistant directors were chosen because they are uniquely positioned to influence their IEP organization. Since IEP faculty play a key role in IEP innovations (Stoller, 1992, 2015), their perceptions of an innovation – even one which must be approved as a group before implementing – were highly relevant and necessary for the validity of the study. Thus, the executive directors (N=249) in the 249 university or college-governed IEPs in the United States received a direct request to participate in the study.

It is possible all the faculty (N=3,367) within those 249 IEPs received the survey request either directly from the researcher, when contact information was available, or from their director. However, it is also possible some directors did not forward the request, which means the total population can only be estimated. A large national sample is valuable for this study because the data reflects the "widely varying internal structures" (Thompson, 2013, p. 211) of the U.S. IEP population. A population study also minimizes sampling error. The instrument's reliability and validity were demonstrated through a Rasch analysis of the pilot survey instrument, which was created, field-tested and collected using *Qualtrics*^{XM}.

Limitations and Delimitations

OLA programs in IEPs are dependent on international factors which are not fully addressed in this study. Although this study focuses solely on U.S. IEPs, for those IEPs which have adopted or attempted to adopt OLA, their OLA students are outside the United States, and this can affect its diffusion (Rogers, 2003; Rose, 2015). Frambach and Schillewaert (2002) claim there is insufficient research on diffusion of innovations in international settings, but from what exists, they contend diffusion patterns "differ significantly by country" because there are "significant cultural effects" (p. 173).

This study focuses on OLA in general within IEPs and does not distinguish all the possible varieties of OLA, such as synchronous and asynchronous. This is also the first diffusion study of OLA in U.S. IEPs, and if this innovation is still in one of the early adopter stages, then a second study needs to occur after the diffusion has more fully diffused – if that occurs – to better understand the complete innovation diffusion process (Rogers, 2003).

The goal of this study is descriptive in nature, and the survey instrument was created for a specific population. Thus, neither the results of the survey nor the survey instrument can be generalized for use by IEPs not described in the population sample, such as independent IEPs; IEPs in a joint partnership with a university but not governed by them; IEPs which are part of an organizational, proprietary franchise; and those not physically located in the United States.

Rogers (2003) emphasizes, "pro-innovation bias" (p. 106) is also a concern when the researchers want the innovation to diffuse successfully. The pro-innovation viewpoint leads to a situation where much of the interest in an innovation is written by those who want to see the innovation succeed. This pro-innovation bias has two effects on this study. First, there is less literature available on how the innovation has failed to diffuse.

Second, those participating in the survey are more likely to recall why they adopted OLA but not why they rejected it.

Key Terms Defined

Some key terms need to be operationalized for this study.

English as a second language (ESL): when non-native speakers of English study the language in a country where English is the lingua franca, English is referred to as the second language of the student. ESL students are learning the language in an immersive setting, where most of the local people speak English, and thus they must use it often outside the classroom setting.

English as a foreign language (EFL): when non-native speakers of English study the language in a country where English is not the lingua franca, English is a foreign language in that country. ESL and EFL are nearly identical, but an EFL program only offers students the chance to speak English inside the classroom, so it is difficult to practice the language in meaningful communication.

Intensive English program (IEP): multi-level English language programs where non-native speakers of English study the language approximately 20 hours each week. Subjects include reading, writing, listening, speaking, and grammar. New students take placement tests, and at the end of each level, students complete final exams (or retake the placement test) to progress to the next level.

English for academic purposes (EAP): students in IEPs who study English with the intention of learning it for use in an academic setting.

English for specific purposes (ESP): in contrast to EAP-focused students, some IEPs have special programs for students interested in specialty uses of English, such as business, music, conversation, tourism, or a test required for university admissions like the TOEFL or IELTS.

Online language acquisition (OLA): the process of studying a language using the Internet as the primary technology. This includes online programs, courses, or tutoring sessions, live or recorded, as well as any software specifically built for online study, any website designed to help students improve their grammar or any language skill, and interacting with a language partner via the Internet. OLA also includes digital textbooks designed specifically for English language learners studying independently or in an IEP classroom. OLA may be limited to text on screen or include multimedia options, such as audio and video.

Synchronous: online students may study with an instructor live, at the same time, which is referred to as synchronous study.

Asynchronous: online students may also study with an instructor who is not online at the same time as the student. Asynchronous study includes various elements which allow students to interact with the instructor or other students at a time and place of their convenience. Such elements include discussion boards, recorded lectures, and written and recorded responses. It is common for online programs and courses to include at least some asynchronous elements.

Teaching English to speakers of other languages (TESOL): it is a sub-field within the field of linguistics. There are many Master of Arts in TESOL programs in the United States, and IEPs often require it for their instructors, though there are master's programs which offer something similar, such as a Master's in Linguistics or English, with an emphasis in TESOL. Some universities also offer it as a major or a minor.

Leadership: Leadership refers to the intertwined yet distinct processes of leadership and management as opposed to individuals' personality, skills, and behavioral characteristics (Rost, 1991; Northouse, 2019). Generally, it is "a process whereby an individual influences a group of individuals to achieve a common goal" (Northouse, 2019, p. 5). Rost (1991) claims this influence relationship only refers to leadership whereas Northouse's definition of leadership includes the actions of both a manager and a leader. Bolman and Gallos (2011) expand the definition a bit further to include "learning and exchange" in addition to influence (p. 10).

Leadership Involvement: Of note, participants were asked to describe their level of leadership *involvement*. This term was added to broaden the idea of leadership beyond position-based power to include all influence relationship activities. Any attempts to encourage others to adopt – or discourage others from adopting – OLA was encompassed through the use of the word *involvement*.

Perceptions: The research study's results are based on the self-perceptions, henceforth referred to as *perceptions*, of IEP directors and faculty regarding both the innovation OLA and their role in leading its adoption. Perceptions describe how people understand and conceptualize the "attitudes, emotions, and other internal states partially by inferring them from observations of their own overt behavior and/or the circumstances in which this behavior occurs" (Bem, 1972, p. 2). Frambach and Schillewaert (2002) and Rogers (2003) claim organization's and individuals' perceptions, respectively, of innovation characteristics affect its adoption.

Summary

This chapter provided an overview of the problem and its significance within the setting of IEPs governed by institutes of higher education in the United States. This chapter provided the reader with background information on IEPs and OLA, as well as the study's purpose and research questions. This study seeks to discover the adoption status of OLA in U.S. IEPs and to investigate IEP leadership's perceptions of OLA for their organizations and their perceptions of themselves as leaders in its diffusion in all the university or college-governed IEPs in the United States.

The second chapter provides an extensive review of the literature in the areas of IEP programs, online education and OLA, IEP leadership, and the conceptual framework for this study: Rogers' (2003) diffusion of innovations. The second chapter ends with the theoretical basis for the Rasch model of analysis.

The third chapter describes the methodology for the study, including the research design, setting and context, sample and data sources, instruments and procedures, data collection, data analysis, and the role of the researcher. Chapter three includes a detailed description of how the instrument was developed and analyzed using the Rasch model.

The fourth chapter presents the results from the survey instrument using in this study. This includes institutional demographics, a Rasch analysis of the instrument's validity as it regards the research questions. In the fifth chapter, the results are discussed, as well as contributions to the field, the limitations of the study, and the generalizability of the findings.

CHAPTER 2: LITERATURE REVIEW

This chapter includes a review of the literature most relevant to understanding the adoption status of OLA in U.S. IEPs and how IEP leadership's perceptions of OLA for their IEPs and themselves as leaders affects its diffusion in U.S. IEPs. This chapter examines five significant areas: IEP programs, online education and OLA, IEP leadership and management, the diffusion of innovation framework, and the theory behind the Rasch analysis model.

Intensive English Programs

This section provides an overview of the essential characteristics of intensive English programs (IEPs). IEPs operate within the field of linguistics in an area known commonly known as second language acquisition (SLA). Within SLA, TESOL, which stands for teaching English to speakers of other languages, is a subfield which focuses on training instructors to teach English to non-native speakers (e.g., ESL or EFL). IEPs have existed in the United States since one opened at the University of Michigan in 1941 and since the 1950's in other countries (Hamrick, 2015). IEPs often serve as gateways to university degree programs for international students but also serve students not interested in degrees (Hamrick, 2015). Rose (2015) maintains, "there are more than 600 intensive English programs (IEPs) in the United States" (p. 17), but this number includes specialized subject institutes as well as independent institutes not hosted by higher education institutes. EnglishUSA's Member Directory (n.d.) and the member list from UCIEP (University and College Intensive English Programs, "All UCIEP Members", n.d.) proffer there are 249 university or college-governed IEPs in the United States.

Characteristics

Physical. IEPs typically have four to six levels which take one to two years to complete, depending on initial student placement. Full-time students with F-1 visas are in class for 18 hours or more each week (“UCIEP Guidelines,” 2017) and are expected to interact in meaningful communication with native English speakers as much as possible in and out of class to improve their language skills. The five core skills taught at IEPs include reading, writing, listening, speaking, and grammar, but integrated skills is often a focus in all courses. Hamrick (2015) contends most IEPs are small organizations with enrollments ranging from “30-100 students” (p. 326).

University and college-governed IEPs are often self-supported and housed within the higher education institutes (Hamrick, 2015). Their location within the structure of their affiliated higher education institute varies widely (Thompson, 2013). Hamrick (2015) highlights how they may be found in academic or non-academic departments, such as continuing education departments, the international student unit, or student affairs. Even though IEP faculty teach a language, they are usually not part of foreign language departments, unless their IEP is organized under that department. Rose (2015) notes that IEPs are sometimes referred to as “cash cows” because their students often matriculate to the university where they pay out-of-state tuition.

Rowe (2015) postulates, “it is not unusual for language programs to be required to be financially self-supporting as well as fully accountable to their institution or corporation for all they do” (p. 100). Because IEPs are often a part of colleges and universities, they are also affected by every policy which affects its host university’s environment. This can constrain IEPs because university policy decisions do not always allow them to be as competitive as they may want. Jenks and Kennell (2015) propose there are substantial differences between IEPs and their host institutions; in fact, many IEPs have "unique or ill-defined ties to their sponsoring institutions" (p. 177). Nonetheless, Murray (2015) contends IEPs "often have to follow guidelines provided by the parent institution" (p. 243), which includes tuition rates, faculty salary, and classroom and office choices. Burke (2014) notes how sometimes the university is "changing more rapidly than the [IEP] organizations themselves" (p. 18). This tension between IEPs and their host organizations can affect their ability to be competitive and innovative.

Students. Rose (2015) notes, "there are more nonnative speakers of English than native speakers of English" (p. 41). This means worldwide interest in learning English remains, which is part of the motivation behind English language instruction. There are a potentially unlimited number of individuals interested in learning English, and many are willing to pay for instruction, though the number who can afford an IEP in the United States is unknown. "[IEP] students, who are the paying clients" (Hamrick, 2015, p. 17) are non-native speakers of English and most have permanent residence in countries other than the United States. Because IEP tuition is comparable to a semester at their host universities or colleges, enrollment is limited to those who can afford it. In some parts of the world, the currency exchange rates make study in the United States possible only for those who have the most money, unless a scholarship or grant is involved.

Leadership and management. Soppelsa (2015) argues, "Both [IEP] leaders and faculty members must become skilled in negotiation, compromise, and consensus building" (p. 155). This is why IEP faculty share leadership and management duties for the IEP (Bolden, Petrov, & Gosling, 2009). Soppelsa (2015) describes how IEP faculty often work together through committees to make "virtually all decisions" for the IEP (p. 139). Davidson, Tesh, and Hartmann (2015) reveal that some IEPs value specialization while others want their instructors to be able to teach all levels and skills. However, shared leadership and management is important in all IEPs which depend on the contributions and innovation of faculty:

> [IEPs] encourage communication not only vertically, but also laterally through cooperative teaching, peer coaching and observation, and joint writing and piloting of new materials [and they] … value teamwork and have established a committee structure that facilitates collaborative decision making, shared control functions, and information flow. (p. 202)

In these IEPs, which value shared decision-making models, Soppelsa (2015) asserts the faculty play a substantial role in initiating changes.

Faculty. IEP faculty often alternate management roles according to everyone's assigned specialty area, such as curriculum, assessment, or technology. In this way, they "coordinate their activities to produce and sell particular goods and/or services" (Rost, 1991, p. 145). In IEPs, students are the customers, and the service is teaching academic English skills. The ultimate production goal may be lesson plans, activities, formative and summative assessments, or feedback on student work while the services sold refer to the time spent with students, who are the paying clients. This makes IEPs "absolutely dependent on student satisfaction, [and] … extremely student- and service-oriented" (Rowe, 2015, p. 107).

IEP faculty, who are usually either staff or non-tenure track faculty, often have a low status in higher education institutes (Stoller, 1992; Thompson, 2013), and their

"[IEPs] are viewed as marginal – physically and educationally – by their host institutions" (Stoller, 2015, p. 42). This may be, in part, because the IEPs' courses are non-credit, IEPs play a pre-matriculation support role, IEP faculty typically only have a master's degree, and IEP instructors are not required to do research (Thompson, 2013). Despite this, Jenks and Kennell (2015) argue, most IEPs want to be "accepted as bona fide members of the larger academic community" (p. 177). However, lacking true "faculty" status, IEP instructors may not feel well-supported by their hosting institutions (Hamrick, 2015). Soppelsa (2015) highlights, "ESL programs are often accorded second-class status within their host institutions, and the working conditions and compensation of their faculty members may be inferior to those of peers in other departments" (p. 151). However, the actual working situation within IEPs' organizational culture and department is often very positive. In fact, Hamrick asserts, "…many IEP faculty members find their teaching circumstances quite favorable, and much of the innovation that characterizes IEP curricula can be attributed to enthusiastic and dedicated faculty" (p. 324).

However, IEP faculty also experience instability because they work for an institute whose "budgets are subject to fluctuating student enrollments" (Hamrick, 2015, p. 323). Soppelsa (2015) asserts this instability may lead to faculty reductions when student enrollment is low.

Directors. IEP directors are in a unique position, distinct from both their IEP instructors and other similarly positioned directors or department heads throughout their university or college. First, because IEP organizations "are highly susceptible to world events such as natural disasters and economic downturns and as such are easy targets for university programming cuts when enrollment slows" (Rose, 2015, p. 17), the IEPs are often in a tenuous position within the university. Thus, IEP directors must constantly negotiate their IEPs' status within their host institutes (Rowe, 2015). Additionally, according to Christison and Stoller (2015), the IEP directors' job is more complex than the typical duties of institute directors; they "must be skilled communicators, leaders, negotiators, decision-makers, innovators, and strategic planners" (p. 264). However, Rowe (2015) insists, despite the importance of IEP directors' positions, "they are themselves vulnerable" because they often lack job security (p. 109).

IEP administrators' most important ability is "to analyze the market and make decisions about the needs of prospective learners, and then modify curricula to develop new program offerings that meet learners' needs" (Hamrick, 2015, p. 326). Mercado (2015) postulates that for IEP directors, "assessing the external environment can be equally important for monitoring and charting program quality" (p. 122). This interest in identifying and assessing prospective students' needs may open directors' minds to OLA. Stoller (2015) asserts that directing change and overseeing innovation are very important duties for IEP directors. Because an IEP's external environment includes the use of OLA by competitors (Ladika, 2018), directors may already be experimenting with or even implementing it, but there is no research on OLA in IEPs to confirm this possibility.

As noted, IEP administrators' primary duty is to manage change agilely because "IEP student populations have shifted rapidly, reflecting changes in economics, government policies, and political conflicts" (Hamrick, 2015, p. 326). This requires directors and faculty to be flexible (Davidson et al., 2015). IEPs often create customized immersion experiences for short-term groups of students, which also requires faculty to be flexible enough to teach and design curriculum for new courses. Rowe (2015) emphasizes that an IEP will be more successful if the IEP director "trusts that the workers (i.e., teachers and staff) are the ones with the expertise to find ways to improve and become more effective and efficient at their jobs" (p. 71). Because the directors are constantly scanning the environment for opportunities, they are also depending on their faculty to lead innovations in curriculum, assessment, technology, and teaching methods (Stoller, 2015). Geddes and Marks (2015) describe this process: "ultimately, the success of any language program is determined by the skills and commitment of its administrative, instructional, and support staff" (p. 219). Thus, it is necessary to investigate how IEP directors and faculty perceive OLA for IEPs.

Accreditation. IEP quality is often related to its accreditation because the process can be lengthy and thorough if the accreditation process is with an agency that is accrediting the IEP independently of the university or college which governs it. The Commission on English Language Program Accreditation (CEA) "has established itself as an accrediting agency for IEPs" (De Angelis, n.d., para. 2). The Accrediting Council for Continuing Education and Training (ACCET) offers a less specific process for IEPs which is independent of their host universities or colleges. An IEP-specific process involves codifying curriculum and policy choices, as well as site visits and annual updates. All major program changes require permission. Jenks and Kennell (2015) assert, "IEPs that failed to pass accreditation reviews by CEA or by regional accreditation organizations risked losing their permission to issue student visa applications" (p. 184). Accreditation is mandatory for university or college-governed IEPs to be able to grant F-1 student visas to incoming foreign, nonimmigrant students. The Immigration and

Customs Enforcement agency (commonly known as ICE) will only grant these visas to students in accredited IEPs, and ICE suggests the CEA or ACCET to students looking for a quality IEP. The U.S. Department of State's (n.d.) EducationUSA website, in reference to the CEA and ACCET, warns, "it is highly recommended that [potential students] select a program that is accredited by one or both of these organizations" ("English Language…," para. 2).

Competition. In the field of English language learning, there are two educational applications that get the most attention: English as a second language (ESL) and English as a foreign language (EFL). ESL is taught in a country where English is the first language of the population, and EFL is taught where English is not spoken as a first language. When ESL is taught in institutes integrated into colleges or universities, they are called university and college-governed IEPs. The largest advantage of these IEPs is due to their location, as well as their real or assumed program and instructor quality. Because they are located within a country where most citizens speak English as their first language, language learners are immersed in the language and have multiple opportunities to speak it in meaningful communication. However, despite the high value on immersion experiences, not everyone can afford them.

The "marketing advantage of IEPs [to] overseas markets" (Rose, 2015, p. 17) is another advantage IEPs have over overseas and non-university-governed U.S. IEP competitors. This is because IEPs governed by colleges and universities offer their students the opportunity to bypass standardized language test requirements (e.g., TOEFL or IELTS) for university admission, but only if they graduate from the IEP program (Rose, 2015). Because some IEP students plan to matriculate to study at the university after they complete the IEP program, Rose (2015) believes this is a useful advantage. However, there are signs the standard practice of students committing to a full IEP program before matriculating to colleges and universities to pursue an undergraduate or graduate degree is declining, according to the declining IEP enrollment statistics (Institute of International Education, 2016, 2017). If international students are not interested in matriculating to a university or bypassing standardized language tests, then that represents a lost advantage U.S. IEPs have over competitors.

In contrast, EFL institutes, which may be private businesses or part of foreign universities, are ubiquitous in countries where English skill certificates are highly valued for educational and economic advancement, such as in East Asia and the Middle East. EFL institutes are one of the greatest competitors to U.S. IEPs because their local physical location allows them to offer affordable services to potential language learners without the need for airfare, visas, and foreign housing. However, the inability to offer an immersion experience is also a significant disadvantage.

Online ESL and EFL programs who offer online courses are another, albeit relatively new, source of competition for U.S. IEPs who are not offering OLA opportunities. OLA use by competitors is increasing, as is discussed in the following OLA section.

Survival. Because IEPs are self-supported (Hamrick, 2015), small changes in enrollment can lead to immediate instability, which affects IEPs' financial resources, making them highly dependent on "fluctuations in enrollment" which also contribute to the unpredictability of IEP staffing needs (Geddes & Marks, 2015, p. 221). IEP researchers (Geddes & Marks, 2015; ICEF Monitor, 2017, Dec. 13; Rose, 2015; Stoller,

2015) often attribute IEP instability to "fluctuating student enrollments" (Hamrick, 2015, p. 323) due to environmental factors like local and international economic and political issues.

The ICEF Monitor (2018, Jun. 6), who monitors IEP trends, reports IEPs' nationwide enrollment has decreased 35% from 2015 through 2017. As of early 2018, they suggest IEPs' enrollment has continued to decline. They also observe that IEPs attribute this decline to political factors. This volatile environment has a strong effect on self-supported IEPs, often leading to lower student enrollment, which means netting less profits, and which leads to less faculty, who are also the change agents and innovators of IEPs (Stoller, 2015). Loss of innovative employees leads to a lack of competitive edge, which contributes to the challenges of maintaining a quality program. In response to the constantly changing environment, IEPs need to be agile and able to change rapidly (Hamrick, 2015; Stoller, 2015).

While the recent drops in enrollment are possibly only a trend, their results exemplify the environmental instability inherent in organizations who depend on international students for income. IEP instability and recent enrollment problems highlight the need for leadership to be continually searching for ways to increase student enrollment.

***Opportunities*.** In addition to students who want to learn English for academic purposes and who also plan to stay long enough to complete a degree in a U.S. university, there are students who only study for short periods of time in what IEPs often call their *special programs*. Some of these are based on grants. They require a wide variety of curricula because the students who come to the United States for short periods of time are interested in different subjects. Some students study in IEPs' EAP programs but focus on specific subjects customized for their needs, like business English or to prepare for the TOEFL language test. These special programs point out one way IEPs are experimenting with ways to increase enrollment, and Hamrick (2015) proffers that these "ancillary activities are often developed in an effort to buffer the IEP from the negative effects of revenue fluctuations" (p. 323). Opportunities evolve as organizational needs evolve; this allows organizations to change how they search for solutions to problems (Cyert & March, 1959).

Online Language Acquisition

This section provides an overview of online language acquisition, its history, and the benefits and challenges for IEPs who embrace it. Because many students are unable to travel to immerse themselves in the language, which is the "gold standard" (Blake, 2011, p. 20) in modern language acquisition theory, they need opportunities to interact with native speakers from a distance, which Rogers and Wolff (2000) observe has been a substantial advantage and driving factor in the continual development of online language acquisition (OLA) options. Rose (2015) acknowledges that most online English learners choose the online format because they want to "interact in English" (p. 37). Despite the continued interest, peer-reviewed literature on the status of online learning within IEPs in the United States is scarce.

History of OLA

White (2003) highlights that the development of modern OLA began with pre-internet distance language learning correspondence systems using radio in the 1940's and continuing with 16mm film, television, cassettes, and CD-ROM computer programs.

Internet-based OLA began in the 1990’s but was limited to low data demand options such as chat programs and low-resolution images. However, by the 2000’s, multimedia OLA was available (White, 2003). Experimentation with distance education tools has been continual since the 1990’s (White, 2003; Rose, 2015).

OLA approaches. OLA has two general forms: asynchronous and synchronous. White (2003) claims asynchronous OLA offers several advantages, such as being “cost-effective for the institution and for the individual” (p. 9) and allowing students to access the content at a time convenient to them. However, because a quality language learning experience requires meaningful interaction using speech and writing, asynchronous courses are limited. Other options remain, such as an asynchronous delayed conversation using voice recording programs. However, with synchronous OLA, students can interact in real time, both in writing and in speech. White (2003) contends that synchronous language learners get immediate verbal feedback and “feel less isolated and gain energy and inspiration from the learning group” (p. 10). OLA may also take the form of mixed synchronous and asynchronous modalities, thus allowing students to benefit from the strengths of each (White, 2003). For example, Rose (2015) proposes IEPs use a hybrid approach to online IEP courses because this method blends synchronous meetings focused on authentic practice with recorded or written homework which the instructors respond to with feedback.

Modern OLA

Although little is known about modern OLA, IEPs frequently integrate related OLA technologies and practices into face-to-face (F2F) courses using such methods as “project-based learning, hybrid models, and flipped classrooms” (Rose, 2015, p. 20).

Including at least some OLA practices in the F2F classroom is necessary because, as Witbeck and Healey (2015) note, “no language program in today’s market can afford to ignore the use of instructional technology” (p. 289). At IEPs, which are often governed and hosted by a higher education institute, there has been little visible growth or interest in online education despite the significant growth in online learning at the higher education level with 30% of all students having taken at least one online course (Seaman et al., 2018).

Nonetheless, the demand for online language learning is increasing worldwide. Witbeck and Healey (2015) have noticed “the physical [IEP] classroom itself may be disappearing” (p. 285) in response to the increased role of online learning. For example, in 2016, the majority of IEP students were from China, Saudi Arabia, and Japan, with 19.6%, 19.3%, and 12.5% of the 108,000 IEP students, respectively (ICEF Monitor, 2017, May 31). China has an expanding online learning system, with over two million students taking online English courses in China’s largest online university system (Hurd & Xiao, 2010). Additionally, IEP competitors are employing online education elements, with market trends indicating “growing numbers of students are using online resources for language study” (Turner, 2016, p. 34). Mercado (2015) contends IEPs could gain an advantage by offering a program which “provides students access to a plethora of state-of-the-art online learning resources that other institutions cannot (or do not) [offer]” (p. 124).

However, by 2018, only a few university-hosted IEPs offered online courses. For example, Rice University’s IEP offers a part-time, three-level, online integrated-skills course with mixed asynchronous and synchronous aspects available over an eight-week session (“English Success in the Workplace,” n.d.). There is no explanation for how students completing this online course may benefit from transitioning to the immersion IEP experience. In contrast, Sacred Heart University is one of a few, or possibly the only, currently available fully online IEP which also has a F2F university-hosted program (Rose, 2015). Their online four-level program, which requires four months per level, is a mix of asynchronous and synchronous modalities, with students completing assignments online and then meeting with instructors on Skype (“About the program,” n.d.). They offer conditional admittance to the university to online students.

Non-IEP organizations also appear to be implementing OLA. IEP competitors include independent U.S. IEPs as well as foreign-based English language institutes. EC English Language Centres, which are a multi-site IEP organization and located primarily in the United Kingdom and Canada but not in the United States. They offer blended learning with “live online sessions with an EC teacher and access to our learning platform [for asynchronous learning]” (“Learn English Online,” n.d., para. 1). Their online program lasts six or twelve months and is marketed both as preparation for the students’ immersion experience and as a review for when they return to their home country. Ideally, students will be involved in a two-phase learning model where they begin with autonomous or synchronous online meetings and then can transition to a face-to-face immersion experience at one of 34 institutes abroad. Students must complete a level in their immersion program before getting conditional acceptance to one of several universities.

Opportunities for OLA

OLA may increase enrollment by attracting students while they are still in their home countries and before they have committed to an immersion experience abroad. Witbeck and Healey (2015) explain how some IEP leaders are aware of the potential benefits of having OLA programs. Rogers and Wolff (2000) also believe OLA is advantageous when it includes asynchronous tools for self-paced language learning which focuses on individual skills, such as listening and reading. However, face time while speaking and listening to the language is necessary for meaningful interaction to occur. In any form, based on the experiences of IEPs' students and their competitors, it is feasible the addition of OLA courses to IEPs with existing F2F programs could increase enrollments if it is able to open access to new, previously unreachable students.

Witbeck and Healey (2015) propose IEPs interested in offering online programs begin by integrating technology into mandatory assignments within F2F classes so instructors can be trained. They also recommend IEPs add asynchronous activities to their website "before launching into completely online courses" (p. 297). Furthermore, an IEP program will be more successful online if they begin the program with a partner institute or a grant, either of which "provides the initial funding and client base… [so] after that program is well established, it can expand" (p. 298). If OLA were a successful venture, it could lead to increased profits solely from the online tuition, but more importantly, it could recruit students to the more profitable IEP immersion programs in the United States. However, there is a gap in the research literature describing the extent to which OLA has spread throughout IEPs in the United States and how IEP leadership perceive its use.

Potential Challenges to OLA

While Witbeck and Healey (2015) acknowledge some IEP faculty are excited about technology and others are cautious, Rogers and Wolff (2000) warn that OLA may cause new challenges for language instructors. Additionally, the IEPs and students may have their own challenges.

Challenges to IEP faculty. Despite having access to some OLA technology (e.g., webcams, microphones, screen-recording software, and synchronous video communication software such as Blackboard or Zoom) through the higher education institutes which govern them, this does not mean the faculty are ready or interested in using it. Thus, faculty training is necessary (Witbeck & Healey, 2015). Some IEP faculty are also beginning from a deficit because their TESOL training program may have lacked a focus on OLA practices, though some teachers could have studied TESOL online, which is an advantage. Rose (2015) insists it is unfortunate “virtual and physical teacher preparation programs are still lagging behind in preparing teachers to teach with technology [and] with regard to mobile technologies, the training is almost nonexistent” (p. 45). In response to this lack of instructor training, Witbeck and Healey (2015) propose instructors learn first by applying OLA practices to their existing classes.

Some faculty are simply unwilling to try new technologies. Compeau, Higgins, and Huff’s (1999) one-year longitudinal study of nearly 400 users found a strong relationship between computer self-efficacy and “individual’s affective and behavioral reactions to information technology” (p. 145). They believe an individual’s perceptions of self-efficacy in regard to computer usage represent their confidence in using new technological innovations. In Noh, Mustafa, and Ahmad’s (2014) research into Malaysian library and media teachers, they learned that some faculty are challenged by their own "inertia to change, lack of willingness to take risks, being afraid to deviate from the usual educational practices and lack of awareness on the benefits of new technology" (p. 145). From the results of their study, they also found that "computer self-efficacy and personal innovativeness in information technology are very important as predictors of readiness acceptance of technological innovation" (p. 148).

Witbeck and Healey (2015) warns that some instructors fear machines and programmers will "take over the business of language teaching, putting masses of language teachers onto unemployment rolls" (p. 285). However, Witbeck and Healey dispute the likelihood of this fear becoming a reality: This "wholesale ESL/EFL job elimination by automation is highly unlikely in the medium term" because teacher-led classes are "critical to student learning" (p. 285). For some IEP students, interaction with a trained, human instructor is an important reason why they enrolled in an IEP.

Challenges to IEPs. Costs are one of the greatest challenges to IEPs. Witbeck and Healey (2015) warn IEP leaders about the expenses of starting online programs: "acquisition of technology resources, teacher training, provision of technical support, and marketing costs" (p. 298). While many of the technological resources may be available through the higher education institutes governing the IEPs, training to use them correctly is often lacking. Additionally, even if a software license is available and convenient does not mean it is free to the IEP. Course release time to develop the OLA curriculum may also be needed.

Compared with non-IEP competitors, U.S. IEPs may get a late start into the market, which could be an obstacle because OLA in IEPs requires "significant initial investments… in a competitive world market in which IEPs operate as relatively small players" and efforts so far "have not been sustainable" (Hamrick, 2015, p. 324) A similar concern is market saturation regarding software and asynchronous opportunities to learn a language. Witbeck and Healey (2015) emphasize that the plethora of free language learning materials online is also a challenge for IEPs who want to market online courses in this resource-rich competitive environment. Witbeck and Healey also warn IEP leaders about the risks in low-quality online courses: "online learners are free to pick up and choose another provider, unburdened by visa restrictions and costs of moving a residence" (p. 298). The convenience characteristics of OLA which make it easier for students to begin also make it easier for them to change programs.

Challenges to students. Potential OLA students are located throughout the world, and may struggle with some of the technological requirements, especially during synchronous online meetings. One such challenge may be found in internet access. As Witbeck and Healey (2015) note, while asynchronous online audio and video are available "almost everywhere", synchronous "audio and video conferencing are still somewhat limited by bandwidth" (p. 297). Other obstacles include irregular electricity flow (Rose, 2015). Rose also claims students who have these first world obstacles may be intimidated by speaking English for the first time to native speakers and doing so in a digital classroom. Rose (2015) explains that costs may also be an obstacle for students. The cost of maintaining adequate internet speeds, and perhaps even the cost of IEP tuition could be a concern in some world economies.

One early OLA program exemplifies the potential challenges of OLA for IEPs and students. A study using mixed synchronous and asynchronous modalities was piloted by Rogers and Wolff (2000) at Penn State University and focused on students studying upper intermediate Spanish. Despite recognizing the need for communicative competence in the language, the researchers opted for cassette tape audio and limited the use of spoken Spanish due to technology, bandwidth, and budget issues. Instead, their online Spanish program emphasized reading online about the culture, writing emails, computer-based grammar software, and synchronous online chat room activities. They found their largest obstacles were due to technology failures, time, finances, and institutional limitations. Additionally, because cutting-edge technology is too expensive for most students, "the diverse capabilities and shortcomings of students' own personal computers provided significant limitations to what we could realistically expect them to do for the class" (p. 51). These shortcomings have continued to plague OLA programs over the last 20 years (Garing, 2002).

Even though, "on the whole, IEPs have resisted technology as a primary means of delivering instruction" which Hamrick (2015) believes is caused by students' expectation of a "more advanced, personalized, and nuanced instruction than technology is able to offer" (p. 324), OLA may offer IEPs an advantage over competition, or at least it may minimize the effects of their competitors' advantages. Because many IEPs are competing for resources in a "highly competitive environment", they need "a competitive edge, as characterized by a well-defined niche in the market" (Mercado, 2015, p. 124), and OLA may offer that niche despite the obstacles. There are signs the IEP approach to OLA is changing, yet there is no research to describe its diffusion throughout IEPs in the United States.

IEP Leadership and Management

This section provides an overview of leadership theories most relevant to the description of leadership, management, and employee relationships typically found in IEPs. This includes the needs and motivations of employees (Herzberg, 1966; Maslow, 1943), interactions between managers and subordinates (McGregor, 1960), types of power and influence (French & Raven, 1959), decision making strategies (Cyert & March, 1959), and a comparison of the definition and roles of leaders and managers in organizations (Rost, 1991; Northouse, 2019). This section also examines the leadership of IEP directors and instructors in general and specifically regarding innovations and the adoption of online education (Stoller, 1992). Additionally, organizational change (Burke, 2014), change agents (Jones, 1969; Tichy, 1974; Ottaway, 1983), and obstacles to change (Lewin, 1947; Lasswell, 1958; Argyris & Schön, 1978, 1996; Burns, 1978; Foster & Kaplan, 2001; Burke, 2014) are considered in the context of OLA and IEP leadership and management.

Motivation and Needs

Because the leaders and managers of IEPs are the sources of innovation (Stoller, 1992, 2015), it is important to consider how the organization meets their needs. Herzberg's (1966) two-factor theory of motivation focuses on the needs of employees by ranking them into two distinct groups: *hygiene* needs and *motivators*. Herzberg postulates hygiene factors, which are more basic needs like a dependable salary, benefits, and job security, must be met before the motivators becomes relevant. Motivators include recognition for achievement, promotions, and professional growth. Despite the importance of the motivators on careers, if the hygiene factors become threatened, then

Herzberg contends the motivators will be abandoned, which allows the hygiene factors to be prioritized.

Maslow’s (1943) earlier work had a similarly-purposed hierarchy, where physical needs are of primary importance, social needs are in the middle, and self-development is at the top, meaning one’s full potential can only be reached once the lower levels have been accomplished. This means leaders who hope to motivate their employees toward greater production will take into consideration all their employees’ needs (Bolman & Deal, 2008).

Employee and Management Relationships

McGregor’s (1960) *Theory X* and *Theory Y* are important for understanding the interaction between employees and their managers and leaders. McGregor (1960) proposes Theory X managers and other leaders can alienate their employees by imposing top-down decisions on them and trying to motivate with fear and threats, but Theory Y managers respect their employees enough to encourage them to participate in the leadership process, which also serves as a form of motivation. Additionally, McGregor believed managers’ assumptions about employees can become a kind of self-fulfilling prophecy, wherein employees become what their managers expect them to be.

Thus, a Theory X approach to managing employees is especially destructive because it assumes the worst or least of their abilities and actions. McGregor (1960) explains how Theory X can be implemented in two ways: the *hard* version and the *soft* version, though both had the immediate or eventual effect of alienating employees. The hard version of Theory X focused on punishment-based coercive control, severe punishment for those who break the rules, and threats of punishment to those who appear to consider doing so. This often led to limited creativity, poor production, anger, hostility, and sabotage. On the other hand, soft Theory X focused on trying to make everyone happy by avoiding conflict. This resulted in a false appearance of harmony, along with strong feelings of indifference, which had similar effects on motivation and production.

In contrast to the Theory X approach, the Theory Y approach (McGregor, 1960) advocated the creation of an ideal working situation for employees by helping them to achieve their goals so they will, in turn, care about the organization's goals. Theory Y attempts to do what soft Theory X was unable to do: help the employees to become satisfied in their work by treating them well and considering their needs in authentic ways. By seeking to satisfy employees' self-interests, organizations will also satisfy their own goals because the employees will adopt the organization's goals for themselves because they mutually benefit each other.

Power and Influence

French and Raven (1959) propose leaders benefit from understanding the sources of power and influence, which everyone in an organization uses to some extent. With regards to position-based power, authority figures are often able to lead and make decisions on behalf of others due solely to their legitimate positions (e.g., elected, hereditary, appointed, or purchased). This includes power over human resources and fiscal decisions as well as controlling the physical work environment. Nonetheless, this authority is often not enough for leaders to control the decision-making environment, which leads to a power gap between their legitimate authority and the authority they need to accomplish their goals.

This power gap can be filled with alliances, rewards, expertise, and reputation (French & Raven, 1959; Bolman & Deal, 2008). In alliances and networks, according to Bolman and Deal (2008), individuals become assets to each other, with each offering something the others need. They are allies who have ties which may have been built in any number of ways, such as through mutual interest, hardship, birth, friendships, and debt. Another power source is the ability to reward people for completing tasks or approving decisions (French & Raven, 1959). Being able to regulate rewards means having the ability to control who receives the best opportunities for improvement. Employees who can give awards may not be in a position of great power themselves, but they can use their position to benefit themselves inside or outside of their organization. French and Raven (1959) contend that expertise and knowledge-based power forms thrive best in times when they are in high demand but limited supply. This power can translate to better positions and more power in their organizations. Bolman and Deal (2008) propose that reputation-based power is awarded to individuals who have a history of success. This is true even if the success is not derived from their individual choices or skills but because of their network of allies or luck. Nonetheless, this can be very powerful if observers make assumptions about how the individual gained power. In this way, reputation can be more powerful than expertise, but discovery of the truth remains a risk.

Organizational Decisions

Cyert and March (1959) claim leaders make organizational decisions based on who benefits the most, so those with power will work to ensure they and their allies benefit. Organizations exist to maximize salaries for their employees. Thus, it is necessary for employees to form coalitions with the power to bargain and negotiate for the best possible deal. This means even the most powerful individuals in an organization typically need support from the majority, and without that support, even the most powerful leader can fail or harm their organization, especially if they ignore the power gap.

Cyert and March (1959) believe organizations can only survive if they can keep their employees happy enough to stay and contribute. Because decisions rarely make everyone happy, Cyert and March recommend awarding special incentives to employees on the side; otherwise, because no deal helps everyone equally, some would never negotiate an agreement. Additionally, Cyert and March identified three strategies for effective decision-making. The first is to recognize decisions will be inconsistent because each voice in a conflict will decide based on how the decision benefits themselves and their allies. Second, they claim leaders need to pretend the environment is simple and then make decisions based on that fiction. This is important because the environment is always complex, so without this concession, decisions would never be made in a timely manner. Third, in response to the overwhelming challenges of fully solving problems, Cyert and March believe it is often not possible to solve them, so, instead, leaders should solve a related problem, which can postpone a crisis and appease some. Additionally, organizational goals need to evolve, which allows them to change how they search for solutions to problems. Cyert and March's (1959) decision-making system allows for organizations to manipulate their decision-making process to be as flexible as possible to meet its constantly changing needs.

Managers and Leaders

Within IEPs, the roles of leader and manager are often fluid yet distinct (Bolden, Petrov, & Gosling, 2009; Davidson et al., 2015). In contrast to the industrial era definition wherein leaders are synonymous with managers, Rost (1991) sought to distinguish their roles in a useful and practical way. Northouse (2019), like Rost and Bolman and Gallos (2011), focused on the process of leadership and management as opposed to individuals' personality, skills, and behavioral characteristics. Rost also attempted both to distinguish the strengths of each role without denigrating either one and recognizing the two are distinct from each other. Northouse (2019) contends there is notable overlap between these two constructs, especially because both include influencing others, interacting with others, and "effective goal management" (p. 12). While Northouse sees more similarities than differences between leaders and managers, Northouse does emphasize that organizations without either managers or leaders will suffer:

> If an organization has strong management without leadership, the outcome can be stifling and bureaucratic. Conversely, if an organization has strong leadership without management, the outcome can be meaningless or misdirected change for change's sake. (pp. 12-13)

Both Rost and Northouse agree that while management and leadership are distinctive, they are also very complimentary. Both are important and unique – to varying extents – in organizations, such as IEPs.

Rost (1991), Bolman and Gallos (2011), and Northouse (2019) have similar definitions of leadership. Rost defines it as "an influence relationship among leaders and followers who intend real changes that reflect their mutual purposes" (p. 102). Similarly, Northouse describes it as "a process whereby an individual influences a group of individuals to achieve a common goal" (p. 5). Adding in the importance of personal development, Bolman and Gallos (2011) defined leadership as "a social process that involves relationships of influence, learning, and exchange" (p. 10). Rost emphasizes how this influence relationship is "multidirectional" (p. 105), meaning the leader and follower roles are interchangeable. This influence relationship excludes coercive behavior, which Northouse notes "often involves the use of threats, punishments, and negative reward schedules" (p. 11), which also means leaders and followers may choose to begin or end the relationship at any time. Followers also have an important role in this "leadership relationship" (Rost, 1991, p. 109), and the leaders accomplish the influence relationship by working, creating bonds, and even exchanging places with active followers in their organization to accomplish their shared purpose. This happens, Rost (1991) believes, by intending real "substantive and transforming" (p. 102) changes even if those changes are not actually accomplished.

Rost (1991) claims that while there could be as few as one subordinate with one manager, there should be more than one follower with a leader, and "there typically is more than one leader" (p. 111). In defining leadership as having more than one follower, Rost eliminates dyadic relationships, such as those found in marriage, friendship, or between a student and instructor. This is because the shared purpose of the leadership relationship usually intends changes which affect more than two people. In contrast, it is possible for some organizations to be run by only two people: one manager and one subordinate.

In contrast to leadership, Rost (1991) argues, “management is an authority relationship between at least one manager and one subordinate who coordinate their activities to produce and sell particular goods and/or services” (p. 145). This is accomplished by individuals in a position of authority-based power, working in relationships with subordinates, who are also in this management relationship. Together, they need to coordinate their activities to achieve their mutual goals. Because managers and subordinates are in a codified, contractual relationship and have a specific role within the organizational system of an organization, Rost believes they are easily identifiable.

As for the role of authority, Rost (1991) proposes, “leadership is the use of influence and management is the use of authority” (p. 131). However, Northouse’s (2019) less restrictive description of management includes the claim that “when managers are involved in influencing a group to meet its goals, they are involved in leadership” (p. 14). Whereas leaders use persuasive influence to motivate an organization toward a goal, the managers are the drivers who make it possible for the organization to move. Within Rost's (1991) model of leadership, where the followers can become the leaders, they can at any time be free to disagree or even choose to not follow the leader. However, a manager leads by authority; within management relationships, the subordinates play a supportive role to their managers in an authoritative structure.

Rost (1991) claims that in contrast to the primarily vertical nature of management relationships, where managers direct their authority down to their subordinates, leaders and followers are in “vertical, horizontal, diagonal, and circular” (p. 105) relationships which allow flexibility in their roles. Just as leaders and followers can swap roles depending on the context, managers and subordinates can each play both roles at the same time, but only in relationships with different people, which is not true of leaders and followers, who can play both roles in the same relationship. Leaders, in Rost's ideal world, have a fair, interactive relationship with their followers, which is built on the constant process of developing shared purposes. In contrast, a management relationship is not built on a shared purpose but instead focuses on coordinated activities, though this relationship does allow for the independent goals of the participants, as long as the final goal is the production and sales of goods and/or services (Rost, 1991).

Regarding the participants' contributions in management and leadership relationships, Rost (1991) claims managers and subordinates are in "inherently unequal" (p. 147) relationships. Similarly, leaders and followers are also in "inherently unequal [relationships] because the influence patterns are unequal" (p. 112). This is because leaders are willing to use their power to increase their influence. Furthermore, Rost is careful to note how both good managers and good leaders are essential for an organization's success and how the evil manager and good leader dichotomy is erroneous. In fact, a management relationship can exist in an organization independent of any leadership relationships, and the reverse is also true. As Northouse (2019) emphasizes, "To be effective, organizations need to nourish both competent management and skilled leadership" (p. 13). Furthermore, Rost (1991) observes that people love effective managers as much as they love effective leaders. People crave good management and appreciate organized and mature managers.

Rost (1991) emphasizes that the new school of leadership must consider what organizations need in the future instead of being focused on how they did it historically.

It must also be interdisciplinary in nature and focus on what leaders and followers do in their organizations, as opposed to what people think they do.

Change Agents, Leaders, and Managers in IEPs

IEP instructors work as leaders and followers, managers and subordinates, as well as change agents, which is most evident during organizational change. While many IEPs are governed by higher education institutions, they remain self-supported and "are housed in a variety of organizational settings: some in academic units…, others in continuing education or other non-academic units (e.g., student affairs or international education offices)" (Hamrick, 2015, p. 322). IEPs' internal structure also varies widely (Thompson, 2013), and IEP instructors may share leadership and management responsibility of the institute, with or without close supervision from the director (Bolden et al., 2009). In fact, Soppelsa (2015) contends, "[IEP] faculty may control a school, program, or department through committee structure and may be responsible for virtually all decisions" (p. 139). However, IEP faculty often have a low status within the host university, due in part to their classification as staff or non-tenure track faculty (Stoller, 1992; Thompson, 2013).

Organizational change can be minor or significant and tends to occur either slowly through intentional change process or culture change or quickly due to a significant intervention leading to revolutionary change (Burke, 2014). It may be focused on individuals, small groups, or the whole organization (Burke, 2014). In these change efforts, individuals urge their leaders and followers toward decisions leading to intentional changes and common goals (Rost, 1991; Northouse, 2019). These individuals are change agents and may operate from outside or inside the organization to encourage change (Tichy, 1974). Lippitt, Watson, and Westley (1958) postulate that change agents are individuals who strive to “make a deliberate effort to improve the system” (as cited in Ottaway, 1983, p. 362), and IEP instructors, when innovating for or leading – or preventing – program changes (Stoller, 1992) are taking the role of change agents.

Organizations can be changed through the work of both external and internal change agents (Tichy, 1974). Examples of external change agents in IEPs include independent recruiters (Hamrick, 2015) or representatives at partner universities in other countries because they sometimes request completely new programs in response to their students’ needs. Jones (1969) contends that an “agent of change is a professional that is equipped with the necessary skills and knowledge to improve the organizational performance of the client system” (p. 192). In contrast, a *change catalyst* is an agent – or agency – involved in the change process but is not “in a position to exercise extensive direct power” (p. 192). IEP instructors, as internally-located change agents, can use their knowledge of the institute to identify weaknesses at the individual, group, or organizational level. As potential leaders, they can influence the program and other instructors toward program changes to nullify these weaknesses.

Ottaway (1983) contends there are three kinds of change agents: change generators, change implementers, and change adopters. Examples of Ottaway’s change generators are the individuals who recognize the need for change and initiate the process or those who “are the first line of confrontation between the change agents and the change resisters” (p. 382). Although change agents can have a variety of roles (Tichy, 1974), when operating internally to influence their colleagues to achieve real changes for their mutual purposes, instructors can be change generators (Ottaway, 1983) in a leadership relationship (Rost, 1991; Northouse, 2019) or management relationship

(Northouse, 2019). Ottaway (1983) purports that change implementers support the change process by executing the tasks, which aligns well with Rost's (1991) role of managers. Change adopters (Ottaway, 1983) "normalize the change…, but do not consciously contribute to the change process" (p. 385), which is also something Rost's (1991) managers do as they maintain the system through an authority relationship with subordinates. As managers, IEP instructors can also be change agents when they implement and adopt the changes into the IEP's system (Ottaway, 1983).

IEP faculty often play the role of both managers and leaders, as well as change agents. Davidson, Tesh, and Hartmann (2015) explains that IEPs' full-time instructors often complete "management tasks (e.g., program information management, program communication, and program analysis)" (p. 204) in addition to their instructional responsibilities. As managers, their power is based on their director-assigned authority to coordinate the activities of their colleagues in specifically assigned areas. However, many of the instructors play the role of leader on an infrequent basis. Stoller (1992) asserts that IEP instructors influence their colleagues beyond the authority granted to them by their position within the university and the IEP. For example, Davidson et al. (2015) also contend IEP instructors lead in essential areas of their programs, such as "curriculum development, program promotion, and student activities" (p. 204).

Within IEPs, Stoller (1992) reveals, changes usually originate with IEP instructors even though IEP directors usually make the final decisions. In Stoller's (1992) survey of 43 IEPs, respondents identified IEP instructors as the variable "contributing most to the innovative character of the IEP" (p. 173). In fact, Stoller's research suggested 89.4% of the 76 respondents felt change began with IEP instructors. Second to instructors were administrators, such as directors, whose "supportive attitude toward innovation and their willingness to explore innovative alternatives with [IEP] faculty" were essential to respondents (p. 176). Because IEP instructors play the role of both managers and leaders, it is necessary to understand their distinctive roles.

IEP faculty, especially senior instructors, are often managers with a limited range of assigned domains of management, such as curriculum, assessment, textbooks, orientation and placement, final exam scheduling, campus liaison, and educational technology (Davidson et al., 2015; Stoller, 1992). This means their management role is only relevant when their specialty domains are required by the institute, as opposed to IEP directors who are always in a management position. When serving as managers, there is at least one subordinate but usually several (Hamrick, 2015), and they "coordinate their activities to produce and sell… services" (Rost, p. 145), such as language instruction. The instructors play the role of managers working with other instructors or the role of subordinates while other instructors are the managers (Davidson et al., 2015). The manager and subordinates work on assigned projects designed to maintain the organization's quality.

While in these management roles, instructors may not be referred to by the title *managers*, but their authority rests in the power given to them by the directors to ensure the quality of the institute's programs (Stoller, 1992). The other instructors, while playing the role of subordinates, do not have a choice in whether they are a part of the projects. However, as Bergquist (1992) explains, there is often a collegial culture even in management situations. According to Bolman and Gallos (2011) and McGrath et al. (2016), some leaders accept their responsibilities; they believe the organization needs it, and they are willing to help, which may be the case in IEPs. Rowe (2015) emphasizes how "typical language program personnel are committed to helping others" (p. 105). Indeed, Bolman and Gallos (2011) suggest leaders – in any field – might not want the duty but feel it is the best choice considering the need. However, the choice of duties may not be wholly due to a sense of duty because the manager gets to make decisions which affect everyone, so if another was in that role, then control would be lost (Bolman & Deal, 2008).

Rost (1991) proposes influence has a diagonal and circular nature in leadership relationships. IEP faculty are also often in the position of leaders, who do not base their power on authority but on influence. This is evident when instructors play both leader and follower roles, and it can be influenced by other instructors while they are in the leader position. However, in contrast to a management relationship, true leaders do not use coercive behavior in an effort to influence others (Rost, 1991; Northouse, 2019), and followers follow the leader on a voluntary basis (Rost, 1991). There are times when IEP instructors spend their influence to achieve faculty-level, group-level, or institute-level goals (Soppelsa, 2015). At these times, instructors use persuasive influence to motivate the IEP and its employees toward a goal while depending on other instructors and the administration to drive the changes.

Obstacles to Change

Change, Burke (2014) maintains, generally occurs in two ways on three levels: revolutionary, transformational change and incremental, evolutionary, continuous change, transpiring at the individual, group, and total system levels. However, Burke (2014) also contends, "most efforts by executives, managers, and administrators to significantly change the organizations they lead do not work" (p. 9). This is because "deep organizational change" (p. 9) is very challenging, especially when not everyone is convinced change is necessary. Planning for change, Burke (2014) notes, is another challenge which requires experienced, knowledgeable individuals, such as change agents, to navigate the non-linear change process.

Despite the challenges of planning for and implementing change, organizations must adapt to their changing environments to survive (Burke, 2014). IEPs are especially vulnerable because their environment is sensitive to a wide variety of factors, including local and international political disputes and economic fluctuations (ICEF Monitor, 2017, Dec. 13). In recent years, fewer international students are studying English at IEPs (Institute of International Education, 2016, 2017). ICEF Monitor (2018, Jun. 6) warns, "starting from the recent-year high in 2015, IEP enrolments in the US have fallen off by 35% over the last two years" (para. 4). They also point out that 60% of U.S. IEPs report declining enrollment in spring of 2018. The most commonly reported reason for this downward trend is the political climate.

However, as Chance and Björk (2006) warn, it is dangerous to assume a simple cause and effect relationship, which is closely related to what Argyris and Schön (1978) refer to as *single-loop learning*. In those contexts, "the error detected and corrected permits the organization to carry on its present policies or achieve its present objectives" (p. 2). In contrast, *double-loop learning* requires the leaders understand the problem more deeply by challenging the organization's assumptions and values. It "occurs when error is detected and corrected in ways that involve the modification of an organization's underlying norms, policies and objectives" (Argyris & Schön, 1978, p. 2), which indicates organizational change based on double-loop learning is more difficult than single-loop learning. Considering the frequently changing and uncertain environment of IEP enrollment, OLA adoption may require double-loop learning. Argyris and Schön (1996) identify two types of changes which mirror single and double-loop learning: type I and type II changes. Type I changes are superficial, based on existing assumptions, and focused on fixing immediate problems; however, type II changes involve a revision of assumptions and the need to implement new strategies for correcting errors.

To accomplish type II organizational change, employees and their leadership need to recognize that everyone's behavior is governed by their *theories-in-use* rather than their *espoused theories* (Argyris & Schön, 1996). Espoused theories are what individuals say when asked about their own behavior while theories-in-use explain how people actually behave. Bolman and Deal (2008) agree that there is often a difference in how people think they will behave and how they actually do behave. Argyris and Schön's (1996) two theories of action explain why people often describe their actions differently than how others describe them. It also means individuals cannot always be relied on to predict their own behavior accurately, which is extremely significant for organizations, organizational change, and surveys of employees' perceptions of their behavior.

Furthermore, Chance and Björk (2006) recommend organizations consider how their multiple interdependent units can work together for mutual benefit and survival. Because IEPs "may teeter on the brink of insolvency from time to time" (Soppelsa, 2015, p. 151), Rowe (2015) suggests it would be prudent for IEP leaders to understand their interdependency with their host institutes, which is an "often misunderstood" relationship (p. 99). IEPs' survival depends on their ability to respond quickly and agilely to the changing environment. Offering supplemental online language acquisition (OLA) courses in English is one possible solution to this enrollment problem, though multiple ventures would likely be necessary to bolster enrollment. Thus, it would be prudent for IEP leaders and change agents to be familiar with how OLA has diffused among IEPs in the United States and be able to identify obstacles to change, as well as possible strategies to overcome them.

Foster and Kaplan (2001) identify “cultural lock-in” as the inability of an organization to change its culture “even in the face of clear market threats” (p. 16), which IEPs appear to be experiencing currently. Mercado (2015) underscores the need for IEPs to be more student-oriented in order to be competitive in this world where “the importance of English has grown exponentially, and countless new organizations are offering language teaching services” (p. 117). Foster and Kaplan (2001) warns that after organizations reach the domination stage in their industry, they become either highly responsive and agile or culturally locked-in. The more successful an organization is, the more locked-in their cultures can become (Foster & Kaplan, 2001). Thus, when organizations experience “market discontinuities” which “present management with a maelstrom of disorder” (p. 62), innovation is necessary because their former way of doing business may no longer be enough. If, instead of innovation, organizations respond with fear and defensiveness, then cultural lock-in occurs (Foster & Kaplan, 2001).

Foster and Kaplan (2001) claim organizations can avoid cultural lock-in by seeking revolutionary, transformational change rather than just incremental improvements. They claim organizations need to be as responsive as capital markets. They further contend organizations need to rise above their natural defensive reaction and take risks on new ventures, even if it means "cannibalizing" (p. 62) their primary business. They should be investigating new services and terminating unproductive ones.

Burke (2014) explains that some obstacles to change are based on organizational-level resistance, such as an "insufficient sense of urgency" (p. 130). This means employees are not convinced a change is necessary. Another obstacle is the attitude which implies now is the wrong time to make changes, or "there are far too many other things" (p. 130) going on now. In these situations, employees stress how busy they are now, which is often true in IEPs. IEP directors are unique from their university peers due to their wide variety of duties, which are often performed by multiple individuals in other departments (Christison & Stoller, 2015; Hamrick, 2015). In these cases, a potentially risky venture, like OLA, may present motivation challenges.

Related to this organizational-level resistance is the obstacle of time, which is a type of individual-level resistance (Burke, 2014) and resource scarcity (Bolman & Deal, 2008). Brinkhurst, Rose, Maurice, and Ackerman (2011) claim that one challenge to changes within institutes of higher education is "lack of time and/or authority, and feeling disempowered as agents of change within a complex institution" (p. 345). Even when classes are small due to low enrollment, because IEPs are level-based programs, all levels are usually offered, so classes must continue. This means the workload for faculty is only slightly less when there are fewer students because they still must prepare for and teach the same number of hours and complete the required administrative tasks for each class. While IEP instructors may be interested in being change agents, "investments of scarce time are needed simply to participate in initiatives, let alone to lead them" (p. 345). Some instructors get release time from courses to pursue tasks important for the whole institute.

However, as Bolman and Deal (2008) note in reference to leadership in general, "there is rarely enough [organizational resources] to give everyone everything they want" (p. 206; Lasswell, 1958), which means few get the luxury of release time. One possible response to this obstacle is if such change projects were "explicitly supported by job descriptions" (Brinkhurst, et al., 2011, p. 345), but that also requires financial resources.

A notable organizational change theory is from Lewin (1947), who noticed how "a change toward a higher level of group performance is frequently short lived" (p. 34). In response, Lewin identifies three phases which organizations need to progress through for change at the group level: unfreeze, movement, and refreeze. The purpose of the first phase is to create employee motivation for change, and one way to begin that phase is to "demonstrate a need for change by… showing that the customer base is eroding and…providing information about radical change in the organization's external environment that threatens the survival of the enterprise" (Burke, 2014, p. 176). In this way, leaders are also appealing to their lower order, hygiene motivators (Herzberg, 1966; Maslow, 1943). When employees realize they could lose their jobs due to the state of their IEPs' environment, they may be more motivated. However, leaders must be careful in describing this situation to employees lest it be viewed as threatening, which is a Theory X (McGregor, 1960) approach to leadership and eventually leads to more obstacles. In contrast, McGregor's (1960) Theory Y presents empowering and motivating employees as the best way to get them involved in the change process as leaders and change agents.

The second phase is about changing mental models of the organization and its role in the environment (Lewin, 1947). This means changing how instructors view their responsibilities to the organization and their IEPs' environment (Foster & Kaplan, 2001). The third phase involves refreezing the system by integrating the new changes, which may be more successful if the changes are reinforced with something like a reward system (Burke, 2014). This could apply to instructors in the form of being assigned non-standard work hours or receiving financial incentives for creating online courses. Transformational change theory (Burns, 1978) also recommends rewarding employees for making changes, which could take the form of new technology or new roles (Burke, 2014). Lawler and Worley (2006) purport the right reward system "improves organizational effectiveness and facilitates change" (p. 236), which is necessary to promote performance and change in an agile, adaptable organization.

The theory of *ideological resistance* (Burke, 2014) suggests some people resist because they think the idea is not a good choice, though they may be confused about what is being recommended, or they may understand exactly and still object. Others are ambivalent about change (Burke, 2014). As Wanberg and Banas (2000) point out, people with "self-esteem, optimism, and perceived control" tend to have "higher levels of change acceptance" (p. 132). To increase employees' openness to change, organizations need to control how information about the change is communicated and encourage "participation in the change decision process" (p. 132). For IEPs planning for OLA courses, instructors may object because they think any form of online education is a bad choice for the IEP's future. Burke (2014) recommends countering this obstacle with persuasive data.

Burke (2014) and Bolman and Deal (2008) claim people resist change because they are worried about losing something of value, such as their power, status, and recognition in the organization. In the case of new technology, those with few technological skills may be concerned about diminished power and status (French & Raven, 1959). In response, Burke (2014) recommends countering with negotiation, as Cyert and March (1959) also suggested, along with arguing for the benefits of long-term gain versus short-term loss. Ottaway (1983) may recommend contacting persuasive change agents within the organization to influence the opinions of their coworkers.

In preparing for and responding to inevitable change within IEPs (Stoller, 2015), IEPs may benefit from leaders and managers deliberately considering organizational change planning, process, obstacles, and implementation.

Theoretical Framework: Diffusion of Innovations

This section provides an overview of the diffusion of innovation (DOI) theory at the individual and organizational levels, as well as how it applies to OLA in IEPs. Rogers' (2003) DOI theory describes the process which begins when an innovation becomes available until the time it is widely adopted, if it reaches that point. DOI considers the communication of the innovation, diffusion and adoption obstacles, and the characteristics of the adopters and the innovations to learn how to increase – or decrease – its adoption. DOI is prominent in many disciplines and especially those related to technology. With thousands of researchers using diffusion theory in a variety of disciplines, Rogers' (2003) work is seminal in diffusion research.

History of Diffusion of Innovations Theory

Although DOI theory was first employed in research in separate disciplines in the 1940s, by the 1960s, it was found to be a cross-disciplinary theory which charted innovations as each followed an S-shaped curve as it diffused over time (Rogers, 2003).

Rogers first wrote about DOI theory in 1962 but acknowledges the earlier works of two prominent diffusion thinkers, Gabriel Tarde and Georg Simmel, as well as independent groups of diffusionists in Europe and the United States. The more general idea of diffusion and thoughts on why innovations diffused were first codified by Tarde, who was a lawyer and judge in France in 1903. Tarde wondered "why, given one hundred different innovations conceived at the same time… ten will spread abroad while ninety will be forgotten" (Tarde, 1903, p. 140). Rogers' observations led to the realization that innovations diffuse along an S-shaped curve and adoption increases when those with social power adopt it; however, Rogers' did not confirm the theory in empirical studies.

Around 1908 in Germany, Georg Simmel, who was the first university professor to be referred to as a sociologist, wrote about the role of strangers in the network systems through which innovations diffuse. Simmel's concept of the stranger led other researchers to write about several modern ideas of DOI theory, such as the characteristics of the innovator. Around this same time, two groups of European anthropologists adopted the theory of diffusion to describe why social change occurs only through diffusion, as opposed to inventions occurring in different locations around the same time. While this diffusionist theory has since been proven inaccurate, their writing on diffusion drew the attention of other anthropologists and social scientists in the United States.

Rogers (2003) attributes the modern view of DOI theory to nine research traditions: anthropology, early sociology, rural sociology, education, public health and medical sociology, communication, marketing and management, geography, and general sociology. From each of these traditions, Rogers has estimated their percentage of diffusion research publications and summarized the characteristics of their research.

However, Rogers admits the number is arbitrary but was chosen because these accounted for an estimated 86% of all research publications on diffusion. The top three contributors – and the only ones to rise above 10% – were rural sociology, marketing and management, and communication which have contributed 51% (i.e., 20%, 16%, and 15%, respectively) of all diffusion research publications (Rogers, 2003).

Rogers (2003) reveals that the first empirical DOI study was from the rural sociology research tradition and performed by Ryan and Gross in 1943 as they investigated the diffusion of hybrid seed corn. Rogers emphasizes the important role of their research within the development of DOI research: “more than any other study, [it] influenced the methodology, theoretical framework, and interpretations of later students in the rural sociology tradition, and in other research traditions” (p. 55). At the time of the study, hybrid seed corn was a relatively recent innovation with many advantages and was growing in popularity; however, there were farmers who continued to ignore it, even when all their neighbors were successful with it. This led Ryan and Gross in 1950 to research questions they had on the variables associated with its diffusion, such as the rate of adoption, the perceived characteristics of its adoption and how they affected the growth rate, and the communication channels used by adopters.

Diffusion of Innovations Model

Waters (2009) emphasizes that innovation “has become a defining characteristic of English language education… over the last twenty years or so” (p. 421). Thus, Rogers’s (1962) diffusion of innovation theory is a valuable framework for investigating the process of OLA adoption in IEPs. Rogers (2003) insists diffusion is “the process by which (1) an *innovation* (2) is *communicated* through certain *channels* (3) *over time* (4) among the members of a *social system*" (p. 11).

The first of the four parts of this definition of diffusion begins with the *innovation.* Rogers (2003) defines it as an "idea, practice, or object that is perceived as new" (p. 13). Next, communication and communication channels, which are integral to Rogers' (2003) definition of diffusion, refer to how innovations are transferred through people, usually via personal or digital media channels. Digital media is helpful for increasing awareness about an innovation, but personal channels of communication are best for influencing others to adopt or reject an innovation. The role of peers cannot be underestimated because "most individuals evaluate an innovation not on the basis of scientific research by experts but through the subjective evaluations of near peers who have adopted the innovation" (p. 36). Because some individuals and agencies have more influence over the rate of adoption, internal and external change agents are in a unique position to affect the diffusion of innovations. Of course, as Rogers notes, ideas are exchanged most easily between people with the most social similarities. However, this also limits a diffusion process to a single network; thus, some differences must exist for the diffusion process to occur. In contrast, too many differences are a barrier to diffusion.

In the definition of diffusion, Rogers (2003) recognizes the important role time plays in the diffusion process. It is used to measure how much time occurs from when an individual learns of an innovation and decides to adopt or reject it, as well as how long it takes an innovation to diffuse to wide adoption. It is also used to define a period of time, so the rate of adoption can be measured. Last, Rogers' reference to the *members of a social system* in the diffusion definition refers to the "social and communication structure of a system [which] facilitates or impedes the diffusion of innovations in the system" (p. 37). The level of integration which individuals have with their social system strongly affects what kind of adopter they will be. Zaltman and Lin (1971) distinguish between two types of social interactions: those which preserve its stability and those which alter it for the purposes of change, the latter of which refers to the work of change agents.

Innovation-decision process. Rogers (2003) purports, there are "five main steps in the innovation-decision process: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation" (p. 20). In the knowledge-seeking stage, potential adopters want to know all the advantages and disadvantages of adoption. They want to understand as much about the innovation as possible, and in particular, how it works.

The role of persuasion is about more than the potential users' attitudes toward the innovation; it is also about the feelings which individuals have about the innovation, and how these feelings are influenced by the media and peer organizations. "Social reinforcement from others (colleagues, peers, etc.)", Sahin (2006) observes, "affects the individual's opinions and beliefs about the innovation" (p. 16). Sahin proposes that high feelings of uncertainty lead to lower rates of adoption. Zaltman and Lin (1971) concur with this belief about uncertainty, and they emphasize how the "relevance of perceived risk will vary across social sectors" (p. 661). This means some groups, such as physicians, have more risks when adopting innovations (e.g., medical innovations) than others, such as those adopting fashion innovations (Zaltman & Lin, 1971).

There are four types of innovation-decisions: decisions made by independent individuals, by consensus, and by authority individuals or groups, and by combinations of the aforementioned methods. Although the decision stage occurs when users decide to adopt or reject the innovation, they may also choose to reject the innovation at any point in the innovation-decision process (Rogers, 2003). In fact, is also possible for the decision stage to precede the persuasion stage if the decision belongs to a group instead of just an individual. In the decision stage, there are two types of rejection: active and passive. When innovations are actively rejected, the possibility of adoption is considered and then rejected, or adoption is discontinued. In contrast, when innovations are passively rejected, adoption is never really considered.

Even though implementation involves applying the innovation within the target context, Rogers (2003) notes there is still uncertainty at this stage, which is problematic. Sahin (2006) maintains that during the implementation stage, "the implementer may need technical assistance from change agents and others to reduce the degree of uncertainty about the consequences" (p. 17). It is during the implementation stage when re-invention occurs the most (Rogers, 2003). The last stage, Rogers explains, is the confirmation stage, which occurs when users search for support for their decision from members of their social system. It is worth noting users often avoid feedback which is contrary to their adoption decision, especially after they have already implemented it. Rogers claims this is because humans prefer to avoid "a state of internal disequilibrium or dissonance" (p. 189), which occurs when people make decisions in conflict with the opinions of their social network.

Other variables related to diffusion include the existence of *technology clusters*, which refer to how adopting one idea can "trigger the adoption of others" (Rogers, 2003, p. 249), may encourage adoption. Another important idea within the diffusion of innovation framework is *re-invention*, which explains how innovations are modified by users as they progress through the stages of adoption. The speed of the adoption of an innovation increases the more re-invention occurs.

Adopter categories. Rogers' (2003) five adopter categories are based on the results of research plotted according to adoption frequency and cumulative adoptions. The adoption frequency curve is a normally distributed, bell-shaped curve, with each adopter category consisting of "individuals with a similar degree of innovativeness" (p. 267). Rogers (2003) claims, "innovativeness indicates overt behavioral change, [which is] the ultimate goal of most diffusion programs, rather than just cognitive or attitudinal change. Innovativeness is the bottom-line behavior in the diffusion process" (p. 268).

In contrast, for successfully adopted innovations, when the cumulative number of adopters is plotted, this results in an S-shaped curve, with the cumulative adoptions beginning slowly and eventually increasing sharply once a critical mass of adopters has convinced non-adopters to adopt. At the top end of the S-curve, the rise is small because there are fewer non-users to whom the innovation can diffuse (Rogers, 2003). The adopter categories, as exhibited in the S-curve and bell curve, are located on a continuum, and are relative to each other, mutually exclusive, and exhaustive. They can be exhaustive because the discontinued innovations are not represented. The five types of adopters are "(1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards" (p. 22). However, it is important to note the adopter categories are grouped into oversimplified ideal descriptions, yet the characteristics of each group remain distinctive.

The adopter categories follow a bell-shaped distribution, as seen in Figure 2.1 (Rogers, 2003).

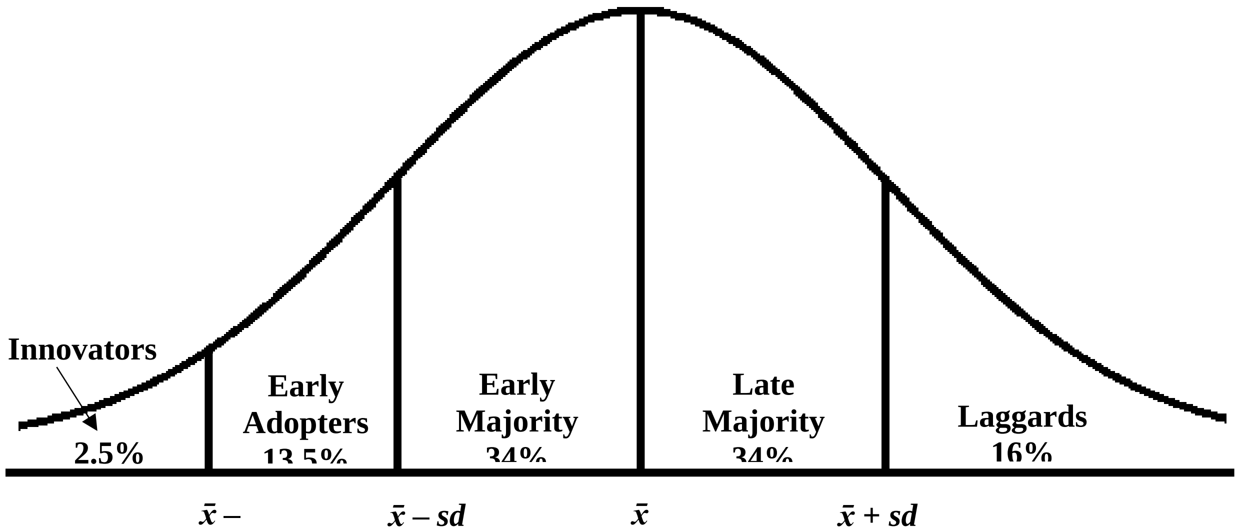

Figure 2.1. Adopter categories (Rogers, 2003, p. 281).

The first adopter category is *innovators* which account for the first 2.5% of individuals or organizations who adopt a new innovation (Rogers, 2003). They tend to be the most adventurous, with the financial resources to handle potential losses, the ability to understand the technical details of recently released innovations, and the ability "to cope with a high degree of uncertainty about an innovation" (p. 282). Regarding the uncertainty factor, Frambach and Schillewaert (2002) maintain, "by reducing the risks associated with early adoption of an innovation, … the adoption of an innovation can be stimulated" (p. 166). Innovators do not tend to be tightly connected to their local social system, which explains why they are often alone in their adoption.

In contrast, *early adopters* make up 13.5% of the adopters and tend to be "a more integrated part of the local social system than are innovators" (Rogers, 2003, p. 283), which gives them more influence. *Potential adopters* often watch early adopters for guidance, and by adopting an innovation, an early adopter increases the credibility of the innovation. For this reason, change agents are most likely to approach early adopters for assistance in diffusing an innovation.

Rogers (2003) maintains that *early majority* and *late majority* categories are each comprised of 34% of the adopters, making them the two largest categories, with the divide between them being the mean time of adoption. The early majority includes those who "adopt new ideas just before the average member of a system" (p. 283). Because early majority adopters spend more time in the innovation-decision process than innovators and early adopters, they rarely lead or hold positions of influence in respect to the innovations. Although late majority adopters tend to be wary and distrustful of innovations, they are not isolated from peers who have already adopted. Thus, they are also likely to receive a considerable amount of pressure from peers to adopt. Due to "relatively scarce resources" (p. 284), late majority adopters wait until most of the uncertainty about an innovation has disappeared before adopting. In contrast, the last category, the laggards, which comprises 16% of the adopters, is extremely isolated and thus subject to less peer pressure than the late majority. Laggards are very resistant to new ideas and suspicious of those who promote them. Because laggards have the most limited resources, they must be as certain as possible an innovation will not fail before adopting it. They lack the resources to take risks.

Rogers emphasizes that the effective diffusion of innovations occurs when different strategies are used for different adopter categories. Although modeling an innovation is the most effective diffusion process, understanding the adoption process is vital for changes agents so they know where to target their efforts (Rogers, 2003). The traditional perspective has been that if change agents focus on early adopters, they will be most successful. However, the internet and social media may be altering the way change agents approach potential adopters because “later adopters can now be reached with highly targeted, individualized messages about an innovation, delivered via the Internet” (p. 296).

Rogers’ Original Perceived Characteristics of Innovation

Rogers (2003) proposes there are five innovation characteristics. Individuals’ perceptions of these characteristics are supposed to “predict the rate of adoption of innovations” (p. 219). Rogers chose not to focus on the characteristics of the innovators in order to learn about “predicting the reactions of people to an innovation” (p. 219) instead of predicting who will be innovators. Specifically, Rogers (2003) is interested in how people’s perceptions can be altered. These five innovation variables, Rogers (2003) claims, account for 49% to 87% of the variance in the rate of adoption. Although each characteristic is “somewhat interrelated empirically with the other four,... they are conceptually distinct” (p. 223). These five characteristics should be understood in the context of the other adoption variables: the innovation-decision process, communication channels, individuals’ social system, and change agents’ efforts to promote – or discourage – the innovation (Rogers, 2003). Rogers’ (2003) definitions of the five innovation characteristics are as follows:

- Relative advantage: “the degree to which an innovation is perceived as better than the idea it supersedes” (p. 15). This includes economic and status-based advantages.

- Compatibility: “the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters” (p. 15).
- Complexity: “the degree to which an innovation is perceived as difficult to understand and use” (p. 16).
- Trialability: “the degree to which an innovation may be experimented with on a limited basis” (p. 16).
- Observability: “the degree to which the results of an innovation are visible to others” (p. 16).

Relative advantage. Rogers (2003) believes relative advantage is “one of the strongest predictors of an innovation’s rate of adoption” (p. 233). Rogers describes relative advantage as “the degree to which an innovation is perceived as being better than the idea it supersedes” (p. 229). Zaltman and Lin (1971) define relative advantage slightly differently as “those things the innovation does that other alternatives do not do” (p. 663). Economic benefits are one aspect of relative advantage. For some innovations, the initial cost can be a strike against it. Status is another relevant aspect of relative advantage (Rogers, 2003). Innovations convey social prestige, and status has a strong effect on innovators, early adopters, and early majority adopters. However, it can be difficult to study status because, as Rogers (2003) notes, adopters might be hesitant to admit it is the reason for the adoption choice. Rogers emphasizes the importance of the speed by which the innovation produces the expected advantages.

Compatibility. Rogers (2003) asserts that certainty is strongly connected to compatibility, meaning the less certain potential adopters are about an innovation, the less likely they are to perceive it as being compatible with themselves, their organization, or previously adopted innovations. As Zaltman and Lin (1971) note, items are perceived as being less compatible if they “require changes or adjustments on the part of other elements in the social situation” (p. 663).

Additionally, as Rogers (2003) notes, compatibility is connected to prior experiences, which means “a negative experience with one innovation can damn the adoption of future innovations” (p. 245). Similarly, innovations must be considered in relation to how much its need is felt (Rogers, 2003), with the greater felt needs leading to a faster adoption rate. *Acceptability research* can be conducted on past research to make generalizations about the future. The goal, Rogers (2003) emphasizes, is to position an innovation as needed and acceptable.

Complexity. Rogers (2003) defines complexity as the “degree to which an innovation is perceived as relatively difficult to understand and use” (p. 257). Rogers admits there is insufficient evidence linking complexity to the rate of adoption yet still believes less complexity increases the adoption rate. Zaltman and Lin (1971) emphasize two levels of complexity: complex ideas and a complex implementation process.

Trialability. Trialability, Rogers (2003) explains, is “the degree to which an innovation may be experimented with on a limited basis” (p. 258). Essentially, the more opportunities potential adopters get to experiment and practice with an innovation, the more likely they are to adopt it because this personalization process diminishes their perceptions of its uncertainty. Zaltman and Lin (1971) also advocate for being able to make a small commitment to the innovation to increase the chances of adoption. Rogers (2003) proposes earlier adopters tend to value trialability more than later adopters because later adopters have the benefit of hearing about and observing their peers with the innovation.

Observability. Rogers (2003) defines observability as the "degree to which the results of an innovation are visible to others" (p. 258). Rogers found this idea to be complex and described it as having two parts with one focused on how the results demonstrate an innovation's visibility and communicability, and with the other focusing on just the visibility of the innovation. Rogers claims innovations which are more easily observed are more likely to be adopted, but the observation process may refer to noticing the results of their use or actually visually seeing the innovation. This means technological innovations comprised primarily of software can be challenging to observe.

Organizational Innovation

Rogers (2003) acknowledges, "most research on the attributes of innovations and their rate of adoption utilized individuals as the units of analysis, but this need not be the case" (p. 225). An innovation's diffusion at the organizational level tends to follow a "process that is similar to the way that an innovation diffuses among the individuals in a community or some other system" (p. 407). Rogers believes organizations could be the unit of analysis in DOI research but only if the research focused on multiple-decision makers, as opposed to one individual at the top of the organization. Rogers (2003) reveals, "these early studies of organizational innovativeness were oversimplifications in that the data were obtained from a single individual (usually the top executive in the organization)" (p. 407). Rogers (2003) reveals that organization-level innovations which focus on just a few leaders often lack validity: "there was no way to determine how adequately these data truly represented the entire organization's behavior with regard to an innovation" (p. 409). This study intends to avoid those issues by including all the directors and faculty of an IEP, the latter of whom research has suggested are often the source of innovation in IEPs (Stoller, 1992) and may also play the roles of both leaders and managers (Bolden et al., 2009; Davidson et al., 2015).

Additionally, an organizational focus is necessary because of the nature of IEPs' organizational policies and instructional system which prevents instructors from unilaterally adopting OLA instruction apart from the organization. This is because tuition is set at the institutional level and would likely be different for students studying remotely from their own countries instead of traveling to the United States for immersion courses. Thus, it is essential to learn the perceptions of both IEP directors and faculty to understand the adoption process of OLA within U.S. IEPs. Frambach and Schillewaert (2002) refer to this type of leadership group as a DMU and note the importance of their role in organizational adoption: "The perceptions of an innovation by members of an organization's decision-making unit (DMU) affect their evaluation of and propensity to adopt a new product" (p. 164).

Frambach and Schillewaert (2002) identify two types of organizational adoption decisions: those made by the organization and those made by individuals in the organization. This research study considered the first of Frambach and Schillewaert's types of organizational innovation by focusing on how the innovation benefits the organization. Frambach and Schillewaert also identified six PCI which were focused solely on organizations: relative/economic advantage, compatibility, complexity, trialability, observability, and uncertainty. Except for the characteristic *uncertainty,* all of them can be found in those noted by Rogers (2003) and Moore and Benbasat (1991). For these reasons, it is important to consider how the role of organizations differs from that of individuals in DOI theory.

Organizational innovation-decision process. As previously noted, Rogers (2003) identifies five stages of the decision-making process: knowledge, persuasion, decision, implementation, and confirmation (see Figure 2.2). In response to the needs of organizations, Rogers builds on the individuals' decision-making process with two phases of innovation which overlap primarily with the individual's decision and implementation stages.

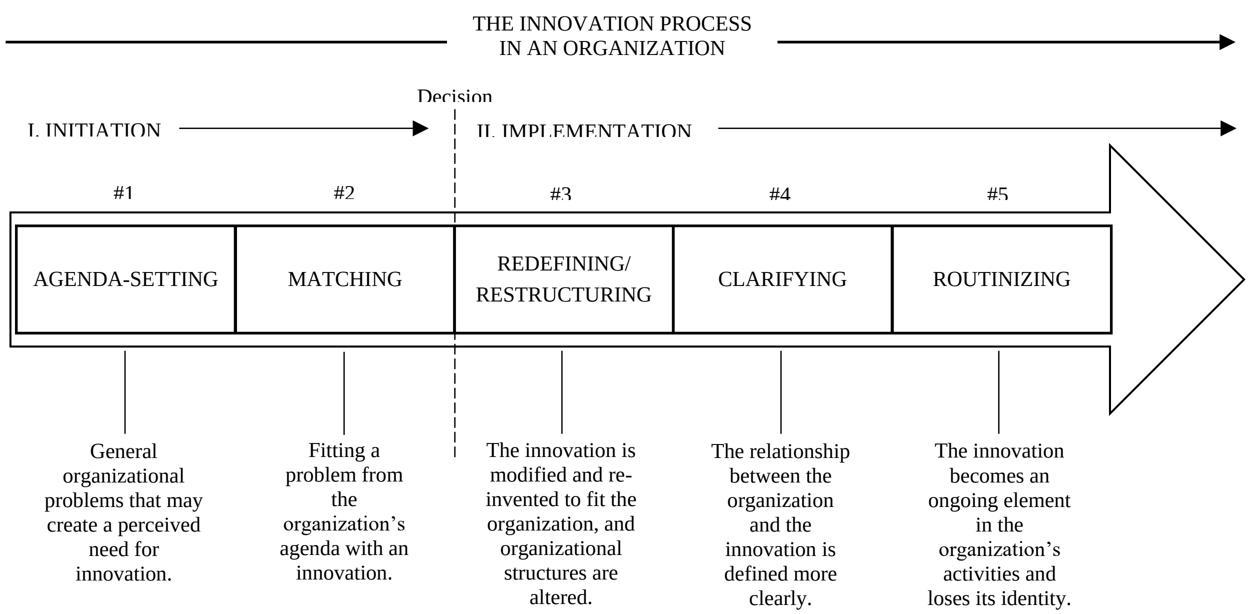

Figure 2.2. Organizational innovation-decision process (Rogers, 2003, p. 421).

The two phases are initiation and implementation with the decision to adopt occurring between them. Initiation includes agenda-setting and matching, in which organizations identify needs by looking at gaps in performance, prioritize those needs, and search for solutions in the organization's external environment.

During the initiation phase, organizations gather information and strategize for an innovation's potential adoption, which is similar to the first two stages in the decision-making process in which change agents or agencies build knowledge and persuade others. In this initiation phase, Rogers (2003) acknowledges how the identification of an innovative solution often precedes the problem, which is an idea Kingdon (2003) advocates in reference to how politicians and change agents wait for the opening of a "policy window… for advocates of proposals to push their pet solutions…" (p. 165). Rogers (2003) notes how once an innovation is matched to a problem, the organization's stakeholders can "determine the feasibility of the innovation in solving the organization's problem" (p. 423). A mismatch leads to rejection of the innovation, but a successful match leads to the decision to adopt it.

Following the initiation phase, Rogers (2003) identifies implementation as the next step, which is a stage Zaltman and Lin (1971) believe is more important than the adoption decision. Rogers (2003) claims the first step in the implementation phase is re-inventing the innovation for each organization's specific needs. Leonard-Barton (1988) emphasizes that one benefit of innovation reinvention is the more the innovation is customized for one particular organization's needs, the less organizational change has to occur. As the innovation is implemented, sometimes "the structure of the organization may be changed to accommodate the innovation" (Rogers, 2003, p. 424), such as when a new department is needed to manage and train individuals to use the innovation. Leonard-Barton (1988) refers to this as "*organizational scope* [which] is determined by the number of organizational subunits that must alter their output or input operations to accommodate in innovation" (p. 612) because different users often need an innovation for different purposes. Scope is more relevant than the number of people affected because it takes into consideration how an innovation may improve one subunit's work but harm another's.

Following the redefinition of an innovation, Rogers (2003) explains, the organization's employees need an opportunity to trial it and clarify its meaning for their own purposes. Leonard-Barton (1988) contends that when innovations can be trialed in segments, this increases the success of the implementation stage because it means one subunit can adopt part of the innovation without requiring another subunit to adopt it. Rogers (2003) notes how innovation champions often play a key role in the initiation phase because they are required to carefully frame the innovation to avoid rejection – or implementation obstruction – for personal reasons. Rogers (2003) emphasizes how dangerous and complex this stage can be, especially if it occurs too quickly or without planning.

Leonard-Barton (1988) emphasizes the distinction between organizations' initial decision to adopt and the later "*innovation response,* [which is] the attitudinal and behavioral stance taken within an organization by targeted users of an innovation" (p. 604). This means the response to an innovation by leaders not involved in the adoption decision, as well as the employees who use the innovation, affects how well the innovation is routinized, which occurs in Rogers (1962) last stage of implementation. When innovation implementation is mandatory, employees who resist the innovation but choose to remain employed may be required to use the innovation but may also obstruct the implementation process (Leonard-Barton, 1988). Leonard-Barton claims that innovation responses to adoption decisions within organizations are affected by two major factors. First, individuals within the organization evaluate the innovation's characteristics "more according to the individual's job performance criteria than relative to personal values or skills" (p. 604). The second major factor is based on how managers introduce the innovation to the target users, which supports Rogers (1962) emphasis on how an innovation is framed as being necessary for a successful implementation.

Leonard-Barton and Deschamps (1988) underscore how the managers' role is very important in the implementation phase. Their research (1988) suggests "the diffusion of an innovation within an organization perhaps could be viewed as a two-step managerial process" (p. 1252). The first step is for managers to focus on introducing and supporting the infrastructure of the innovation, and the second step is focused on "motivating the later adopters" (p. 1262). The idea behind this is "employees whose characteristics incline them to adopt an innovation will do so without management support or urging if it is simply made available" (p. 1252). In contrast, employees lacking these early adopter characteristics often delay until a manager requires their participation.

Rogers' (2003) last stage of the innovation's implementation phase is the *routinization* point "when an innovation has become incorporated into the regular activities of the organization and has lost its separate identity" (p. 428-9). This is similar to the final stage of Rogers' (2003) decision-making process called confirmation. However, for organizations, Rogers emphasizes the importance of sustainability – or institutionalization – of innovations. Methods to encourage the sustainability of an innovation during this stage include the involvement of an innovation champion. Additionally, the extent to which the innovation has been re-invented affects how much the employees "regard it as their own, and are more likely to continue it over time, even when the initial special resources are withdrawn or diminish" (p. 429). Despite these choices, an innovation may be discontinued at any point in the routinization process.

Additionally, Rogers (2003) maintains knowledgeable and formally trained individuals within an organization often appreciate the "value of innovations, but [their expertise] may make it difficult to achieve consensus about implementing them" (p. 412). However, they may also have difficulty reaching agreement on whether to implement it. Because bureaucratic organizations emphasize the importance of rules and policies, their opportunities to innovate are be limited; however, once they agree on an innovation, this organizational focus on rules is an advantage because it can encourage the implementation of an innovation. Rogers (2003) asserts "larger organizations are more innovative" (p. 409) but suspects size is a "surrogate measure of several dimensions" (p. 411), such as the aforementioned resource availability and the expertise of the employees. Frambach and Schillewaert (2002) agree that although size has been correlated with greater innovativeness, smaller organizations are often more flexible and innovative. They purport, "these apparently contrary relations and results may be largely attributable to the correlation of organization size with other variables, such as structure, strategy, and culture" (p. 165).

In addition, Rogers (2003) implies change agents have a greater role to play in organizational innovation decisions. An internal change agent, or "innovation champion" as Rogers (2003) refers to them, "contributes to the success of an innovation in an organization" (p. 414) and is especially necessary for less visible innovations. Rogers claims these change agents have diverse levels of formal power, but most have strong people skills. Rogers (2003) notes how internal organization characteristics often have opposing effects on innovation in the initiation and implementation phases of the adoption process. For example, organizations with decentralized power and highly specialized employee skill sets, but which lack a strict emphasis on rule-following are more likely to initiate innovations (Rogers, 2003). In contrast, those same organizations would be challenged to implement the same innovation. This is because characteristics like centralized power discourage innovation but once it is initiated, they promote implementation because of their type of power structure.

PCI Instrument

Rogers' (1962) five perceived attributes of innovation are based on "a survey of several thousand innovations studies" (Moore & Benbasat, 1991, p. 193); however, Rogers admits "one possible problem with measuring the five attributes of innovations is that they may not always be the five most important perceived characteristics for a particular set of respondents" (p. 225), which is the case for this study. While Rogers discourages the use of "existing scale items already developed by other investigators" and also encourages researchers to reach for the higher goal of creating "new scale items for each set of innovations to be adopted" (p. 225), Rogers also recommends the use of Moore and Benbasat's (1991) well-developed scales if they are modified for general use. Similarly, Moore and Benbasat (1991) believe "any scales developed should also be generally applicable to a wide variety of innovations, especially other types of information technologies" (p. 194). For this reason, their final 38-item scale omitted items applicable only to personal workstations, which was the focus of their study. In a later edition, Rogers (2003), who did not write items to measure the five attributes, argues for the use of Moore and Benbasat's items by other researchers: "With proper adaption, these fifteen [short form] scale items can be applied to any particular innovation" (p. 224).

Moore and Benbasat (1991) began their research in response to their review of the diffusion literature which "indicated that most existing instruments designed to tap these [diffusion] characteristics lacked reliability and validity" (p. 194). Moore and Benbasat (1991) built on Rogers' (1962) research into five perceived attributes of innovations (i.e., relative advantage, compatibility, complexity, trialability, and observability). They also considered Tornatzky and Klein's (1982) meta-analysis of diffusion research, which identified ten attributes frequently occurring in the literature, including "…cost,… communicability,… divisibility,… profitability,… social approval" (p. 33) in addition to Rogers' (1962) original five characteristics.

From this research, Moore and Benbasat (1991) decided on eight characteristics. They eliminated cost and profitability because these focused on organizations, which was not the goal of their study. Zaltman and Lin (1971) consider cost and profitability – especially initial and continuing financial costs – to be of great relevance for understanding how innovations diffuse. Zaltman and Lin (1971) believe that high continuing costs decrease adoption rates, but high initial financial costs often increase adoption because sometimes, "the more expensive an innovation is, the higher its perceived quality" (p. 659). This applies directly to IEP programs in several ways: Witbeck and Healey (2015) contend the expenses of starting online programs include "acquisition of technology resources, teacher training, provision of technical support, and marketing costs" (p. 298). Frambach and Schillewaert (2002) claim that relative advantage for an organization is focused primarily on economic advantages, which means financial advantages would be included within that construct.

The greatest distinction between Rogers' (2003) perceived attributes of *innovations* and Moore and Benbasat's (1991) perceived attributes of *innovating* is found in the words, *innovations* and *innovating*, although in fact, most of Moore and Benbasat's literature only refers to *innovations* despite their attempted distinction. Rogers (2003) defines the attributes as "perceptions of the innovation itself, and not on perceptions of actually using the innovation" (p. 196). In contrast, Moore and Benbasat (1991) contend the difference is found in attitudes (i.e., perceptions) versus behavior, meaning the perceptions "of using the innovation… are key to whether the innovation diffuses" (p. 196). For this reason, Moore and Benbasat revised all of Rogers' attributes to focus on the degree to which "using the innovation is perceived as being better than using its precursor" (p. 196).

To develop the instrument, Moore and Benbasat's (1991) first reviewed the diffusion literature for items previously designed to measure perceptions of these attributes, and then they created some of their own. Then, to assess the constructs' validity, the resulting 94 items were "subjected to four rounds of sorting by [different sets of four] judges to establish which items should be in the various scales" (p. 192). Items placed into the same category on a consistent basis were "considered to demonstrate convergent validity with the related construct, and discriminant validity with the others" (p. 200). By the last step in the scale development, they had also discovered the attribute observability "seemed to be tapping two distinctly different constructs" (p. 210), so they replaced it with *visibility* and *result demonstrability* instead. This left a total of 75 items for the eight attributes typically associated with Moore and Benbasat (1991): voluntariness, image, relative advantage, compatibility, ease of use, result demonstrability, trialability, and visibility. The last step was to test the instrument in two steps prior to deploying it: first with a pilot group of 20 and then with 75 individuals close to the target population. Finally, 800 questionnaires were administered, which garnered a response rate of 68%.

By the end, Moore and Benbasat (1991) concluded, “the best predictors for distinguishing between the [adopter] categories are Relative Advantage, Result Demonstrability, and Visibility” (p. 210). Moore and Benbasat’s (1991) final product included 38 scale items to measure the eight attributes, plus a 25-item, short form of this scale.

Survey modifications. While Moore and Benbasat’s (1991) questionnaire on the eight PCI is used as the foundation for the data collection instrument, changes in focus at the characteristic and item levels are necessary to ensure they align with an organizational DOI focus. Although Moore and Benbasat’s questionnaire was designed for general technological innovation use, it was focused solely on how individuals may benefit from the innovation. However, within IEPs, research suggests (Bolden, Petrov, & Gosling, 2009; Davidson, Tesh, & Hartmann, 2015; Stoller, 1992) faculty also have the role of managers and leaders who innovate for the future of the IEP. Thus, this study’s instrument needs to focus on an organizational-level adoption, but the directors’ and faculty’s perceptions of the innovation could predict its adoption.

An example of how the wording needs to focus more on organizations as opposed to individual instructors can be seen here: one of the relative advantage items is “Using a

PWS improves the quality of the work I do" (Moore & Benbasat, 1991, p. 216). PWS, which stands for personal workstations, were an innovation which could be seen on some workers' desks but not others; this phrase changes to *online ESL classes* for this study.

OLA is a phrase chosen to succinctly account for the focus of this study, but *ESL classes* is more common within the field, so *online* was added to it because it is known variation within higher education contexts. Because the goal of this survey focuses on how OLA benefits the organization and not the individual instructor, this question becomes "Offering online ESL classes improves the quality of my IEP." For this reason, most of the items in this research study's instrument were customized to account for how the innovation OLA may benefit the organization.

Another way OLA is unique from Moore and Benbasat's (1991) survey of the innovation of personal workstations is found in how OLA can be adopted, which is through the approval of the IEPs' leadership. Individuals cannot unilaterally adopt it for their classes. This means they cannot *trial* it until after the adoption decision has been made. Participants can respond to all of the other PCI if their IEP has or has not adopted OLA, but the way *trialability* is described in Moore and Benbasat's (1991) instrument, participants must have access to the technology to try it out and become familiar with it. Consider one item from Moore and Benbasat's instrument: "Before deciding whether to use any PWS applications, I was able to properly try them out" (p. 216). OLA is really a method which employs a variety of technologies, some of which are already available. While some of the technologies related to OLA may be trialed, the decision to use OLA for IEP classes must first be adopted by the leadership before the technology is used in this manner. For that reason, the perceived characteristic *trialability* has been removed.

However, faculty can choose to unilaterally adopt technologies related to OLA for use in their classrooms. Rogers (2003) refers to these related technologies as *technology clusters* and claims they can “trigger the adoption of [other technologies]” (Rogers, 2003, p. 249). Examples of related technology from the literature include faculty’s experience with online learning as a student or through professional development, video conferencing, online learning management systems, recorded video feedback, online grading or online gradebooks, digital ESL textbooks, other online activities, and video recording all or parts of their classes. Witbeck and Healey (2015) believe the use of such related technologies also serve as a type of instructor training for IEPs interested in offering OLA in the future. Thus, this training could affect how faculty perceive the adoption of OLA. Because adopting technology clusters can increase adoption, trying them out (i.e., *trialability*) moves individuals closer to the adoption decision. However, because the degree of use of these technologies is beyond the scope of this study, and because the *I use [this technology]* statements do not match those of the other PCI, questions related to the use of these related technologies are limited to a dichotomous option of yes or no (or choosing all that apply from a list, in this case). Thus, questions regarding the use of these related technologies were included in the instrument but were separated from the PCI statements.

Frambach and Schillewaert’s (2002) review of the literature implies only six characteristics need to be the focus of research for organizations. All but one of these exist within Moore and Benbasat’s (1991) PCI survey. Because *visibility* and *result demonstrability* were found to be two of the three greatest predictors of adoption in

Moore and Benbasat's research, their recommendation to split *observability* was integrated into this study's survey instrument.

Additionally, Moore and Benbasat's (1991) questionnaire omitted the characteristics *cost* and *profitability* because these focused on organizations. However, research (e.g., Frambach & Schillewaert, 2002; Zaltman & Lin, 1971) indicates *cost* and *profitability* to be highly relevant in understanding how innovations diffuse within organizations. Thus, these characteristics are relevant in this study which seeks to learn about an organizational-level innovation, so they were added using Frambach and Schillewaert's suggestion of including them under *relative advantage,* which has a stronger focus on economic issues than Moore and Benbasat's (1991) items and is now referred to as *economic advantage*.

This survey created items targeting participants' perceptions of how OLA could affect their organization according to the following six characteristics: *economic advantage*, *compatibility*, *complexity*, *visibility*, *result demonstrability*, and *uncertainty*. These are based on the original research of Tornatzky and Klein (1982) and Rogers (2003), the interpretations and recommendations on organizational DOI by Frambach and Schillewaert (2002) and Zaltman and Lin (1971), as well as Moore and Benbasat's (1991) contribution of a validated survey tool and a focus on *using* an innovation.

Economic advantage. Rogers (2003) contends that relative advantage is "the degree to which an innovation is perceived as being better than the idea it supersedes" (p. 229), and in an organization, the bottom line is often financial. Because this characteristic focuses on the economic advantages and omits Rogers' original inclusion of *status* and *image*-based advantages, it is referred to as *economic advantage* in this study instead of

Frambach and Schillewaert's (2002) descriptor "relative or economic advantage" (p. 166). For IEPs, *economic advantage* translates to increasing student enrollment or decreasing existing costs, both of which increase the IEPs' profitability. Even statements about the IEP's quality are related to fiscal advantages. Initial and on-going costs are also considered, as Zaltman and Lin (1971) and Tornatzky and Klein (1982) recommend. As Rogers (2003) notes, the initial cost can deter adoption. The *economic advantage* characteristic is positively related to the probability of organizational innovation adoption (Frambach & Schillewaert, 2002).

Compatibility. This is "the degree to which an innovation is perceived as being consistent with the existing values… and needs of potential adopters" (Rogers, 2003, p. 15), with the potential adopters being the organizations. *Compatibility* is positively related to the probability of organizational innovation adoption (Frambach & Schillewaert, 2002). How compatible an innovation is with an organization also takes into account how much the need for the innovation is felt, with the greater felt needs leading to a faster adoption rate (Rogers, 2003).

Rogers (2003) purports certainty is strongly connected to *compatibility*, meaning the less certain potential adopters are about an innovation, the less likely they are to perceive it as being compatible with their organization. This means *compatibility* may be influenced by the separate characteristic *uncertainty* even though that one focuses more on avoiding risks. The Rasch analysis of the pilot survey reviewed these characteristics carefully for the possibility they represent the same dimension.

Complexity. This is "the degree to which an innovation is perceived as difficult to understand and use" (Rogers, 2003, p. 16). Zaltman and Lin (1971) emphasize two levels of complexity: complex ideas and a complex implementation process, both of which are considered in this study. IEP directors and faculty need to consider their personal knowledge of the ESL instruction process to respond to these questions. *Complexity* is negatively related to the probability of organizational innovation adoption (Frambach & Schillewaert, 2002).

Visibility. Like Rogers' (2003) *observability* characteristic, this is "the degree to which the results of an innovation are visible to others" (p. 16). Because faculty are unlikely to be able to observe OLA in their institute until it has been adopted by leadership, the statements related to *visibility* focus primarily on other instances of OLA or online learning, such as those which occur in other parts of the university or college, in videos describing OLA, or in written or oral descriptions by others who have used OLA. However, some statements include the possibility of observing OLA in action within their IEPs. *Visibility* is positively related to the probability of organizational innovation adoption (Frambach & Schillewaert, 2002).

Result demonstrability. Rogers (2003) finds *observability* to be quite complex. Rogers originally described it as having two parts with one focused on how the results demonstrate an innovation's visibility and communicability, and with the other focusing on just the visibility of the innovation. Rogers had determined that computer hardware was more visible than software, which describes only its physical *visibility*. However, the results of hardware and software use are equally visible. It is also important for those whose IEP has not adopted OLA and who have no personal experience with it to be able to report their understanding of its benefits or disadvantages to others. Thus, in this study, *result demonstrability* refers to the ability of an innovation's user to be able to communicate the results of either their experience or their understanding of how it works to others. This is positively related to the probability of organizational innovation adoption (Frambach & Schillewaert, 2002).

Uncertainty. Generally, the characteristic *uncertainty* refers to the risks associated with the adoption of an innovation. Rogers (2003) purports that early adopters are willing to take greater risks and accept more uncertainty than later adopters. Newness is inherent in the definition of diffusion, so all innovations include some level of uncertainty, which "implies a lack of predictability, of structure, of information" (Rogers, 2003, p. 6). The *uncertainty* characteristic is negatively related to the probability of organizational innovation adoption (Frambach & Schillewaert, 2002). It is possible that *uncertainty* is not a separate dimension from *compatibility*, as Rogers noted, but it is included in the pilot instrument.

OLA Diffusion in IEPs

OLA is a relatively recent innovation, but IEPs have been experimenting with aspects of it for many years; nonetheless, there is little evidence of its diffusion. Whereas online education at higher education institutes in general had already diffused to 30% of students in the United States by the fall of 2016 (Seaman et al., 2018), there is no data describing how much OLA has diffused to IEPs in the United States, though there are a few examples of OLA adopters of (e.g., Rice University and Sacred Heart University). This study uses DOI as a theoretical lens to examine the adoption status of OLA by both IEP directors and instructors to understand how they perceive the characteristics of the innovation, which may shed light on its current adoption status. Much of the DOI research related to online education focuses on its use in higher education, but this research focuses specifically on IEP institutes governed by higher education institutes.

Whether an organization's change is incremental or revolutionary (Burke, 2014), charting the path of innovative change is beneficial. Thus, where innovations play a role in the change process, Rogers' (2003) DOI model is relevant because it contributes an understanding of how innovations have or have not diffused across time, social groups, and organizations. Adding OLA courses and programs to IEPs' current program selection potentially represents a substantial form of organizational change for IEPs. Such changes substantiate the importance of Rogers' (2003) emphasis on the value of diffusion research in offering "a particularly useful means of gaining an understanding of change…" (p. 104) because understanding change is central to IEP success. As Hamrick (2015) notes, "to adapt, IEPs must be nimble and their leaders must be prepared to deal with these changing realities" (p. 327).

Based on the successes of IEP competitors, it is feasible the addition of OLA courses to IEPs with existing F2F programs could increase enrollment if it increases access to new students. OLA would not need to supplant the traditional model of F2F instruction. Zaltman and Lin (1971) define relative advantage as "those things the innovation does that other alternatives do not do" (p. 663), which highlights how OLA may allow IEPs to reach students who are not yet committed to traveling to the United States to study. If OLA were a successful venture, it could lead to increased profits solely from the online tuition, but more importantly, it could recruit students to the more profitable IEP immersion programs in the United States; however, Chance and Björk (2006) caution against assuming a simple cause and effect relationship. Nonetheless, as

Mercado (2015) claims, OLA could give IEPs an edge over competitors who have been slow to adopt online practices. Specifically, Stoller (2015) maintains innovations should be encouraged in IEPs because “it facilitates program renewal, enhances teachers’ careers, minimizes burnout, improves instruction, and allows programs to be responsive to change” (p. 37), which is crucial for IEPs to remain solvent in this competitive environment.

Stoller (2015) asserts that IEP instructors have a role in changing how people perceive innovations by becoming “agents of change rather than recipients of change” (p. 44). Because IEP instructors contribute “most to the innovative character of the IEP” (Stoller, 1992, p. 173), most innovations are adopted due to the influence of IEP faculty. Because IEPs’ technological trajectory may include the adoption of OLA, Rogers’ (2003) DOI theory can reveal pertinent information to change agents and stakeholders. Guided by DOI theory and an understanding of how OLA has diffused within U.S. IEPs, change agents may be better equipped to strategize where to target their efforts and how to affect the adoption rate of online education in IEPs. Additionally, as Frambach and Schillewaert (2002) note, those who create and design innovations and the organizations that market them can benefit from gathering “insight into adoption processes, its inhibitors and stimulators [because it] helps suppliers of innovations to market their new products more effectively” (p. 163).

Change agents and stakeholders also benefit from understanding who wields the most influence over OLA decisions, how adoption develops, how innovation-decisions are made, how the characteristics of adopters relate to adoption expectations, and how people typically react to innovations. As Witbeck and Healey (2015) note, “many language program administrators see the possibilities for developing their own programs in this area [of online education]" (p. 297). Rogers and Wolff (2000) also believe OLA is advantageous because it allows "for self-directed and individually paced learning, greater time for reflection, and more emphasis on skills mastery, but it may also present language instructors with new and difficult challenges" (p. 46). Understanding the adoption or rejection of innovations can help designers, potential users, change agents, and other stakeholders make sense of older innovations and strategize for the implementation of recent innovations, like OLA.

To understand the DOI process in IEPs, it is important to consider how decisions are made. Rogers (2003) identifies four types of decision making (i.e., decisions made by independent individuals, consensus, and authority individuals or groups, and combinations of the aforementioned methods). Adopting OLA in IEPs is not a decision made by independent instructors because the decision must be represented and consistent in multiple areas of the IEP (e.g., the policies, tuition, and syllabi). OLA adoption is an organizational decision, but instructors can affect its adoption.

Stoller (2015) maintains that for an innovation to be successful, all stakeholders need to be involved in all the diffusion phases; in particular, IEP instructors should be "granted some control during the continuation stage" (p. 45). Many IEPs stress "a sharing of authority for decision making" in which the directors "retain responsibility and authority for the final say" but let "faculty participate in making decisions and initiating change" (Soppelsa, 2015, p. 139). Rowe (2015) concurs: IEP instructors "tend to function best as a team, collaborating on tasks and projects" (p. 105). Soppelsa (2015) observes that IEP directors often prefer a collective decision-making system: "in most settings, however, [IEP] faculty members participate in decision making without having absolute authority; their decisions are subject to review and authorization" (p. 139). In this scenario, IEPs operate so that all the members of the social system adopt or do not adopt an innovation together, with the final innovation-decision being made with the input of the instructors and with the final approval of the director.

OLA adoption may also be affected by faculty's interpersonal communications (Rogers, 2003), such as in membership forums and at regional and national annual conferences where IEP leaders and instructors share information and influence each other's views. External accreditation through CEA also supports the diffusion of ideas and innovations by forcibly aligning organizational policies with a standard which is shared by other IEPs.

Technology clusters and *re-invention* may also explain OLA adoption. Technology clusters may encourage adoption from IEP's host institutes to the IEPs themselves. Other innovations clustered with OLA include the increasing use of online textbooks in IEPs (Rose, 2015) and online platforms which are used not only for assigning and submitting IEP students' assignments but also used for online courses by universities. Re-invention explains how innovations are modified by users as they progress through the stages of adoption (Rogers, 2003). Since IEPs likely need to customize the OLA program or course policies and curriculum for their needs, this re-invention process can contribute to its rate of adoption. To facilitate adoption, Leonard-Barton and Deschamps (1988) recommend the assistant director introduce and support the new system as well as the early adopting instructors who volunteer to teach the courses. Then, they propose the manager make training mandatory for the remaining, later adopters.

Rogers' (1962) diffusion of innovation theory could play a guiding role in the development of OLA programs. For this reason, it is useful for IEPs to understand how OLA has diffused throughout IEPs historically, how the diffusion occurs, and how change agents can influence the adoption rate. DOI theory can help IEPs chart the path of change for innovations such as OLA.

Limitations of applying DOI to OLA. Although applying Rogers' (2003) diffusion model to understand the historical, current, and potential status of OLA adoption may help IEP faculty, directors, change agents, and other stakeholders capitalize on the benefits of OLA, depending on adoption and diffusion research is not without risks.

Rogers' (2003) emphasizes that the five perceived characteristics of innovation are not completely independent of each other. Zaltman and Lin (1971) postulate this lack of empirical evidence regarding the unidimensionality of the innovation characteristics is a concern. They "assume that, there exists a limited set of innovation dimensions, independent of one another, which specify the universe of innovations", but they also admit there is still a need for research into the "hypothetically independent dimensions of innovations" (p. 669). This means it is important to identify the latent variables among the perceived characteristics of innovation, so the research results are meaningful.

A second concern Zaltman and Lin have is that the different innovations may "require differential weights to be assigned to various dimensions of the innovations in order to make the prediction significant" (p. 669). However, such accurate weighting can be difficult to discover. Additionally, once applied, the weighting method makes the adoption prediction results more subject to dispute. It also limits the comparability of the results to the results from other uses of the instrument. In response to this challenge, this study proposes to utilize Rasch (1960) methodology to identify multiple dimensions among the innovation characteristics and overcome the need to weight the innovation dimensions.

Because the diffusion of OLA throughout IEPs in the United States actually requires adoption by individuals not located in the United States, it is more complicated than studying an innovation where the stakeholders are all in one country. This complication manifests itself in two prominent ways: unequal access to technological innovations (Rose, 2015) and the unknown factors of multicultural adoption of OLA. Rogers (2003) admits “the social structure in developing nations is a powerful determinant of individuals’ access to technological innovations” (p. 133). Although Rogers’ adopter categories are based primarily on the innovation’s characteristics, Rogers does take note of the economic resources of each adopter groups. In past research studies, the “individuals’ socioeconomic status is highly related to their degree of change agent contact” (p. 159). This means those with the most influence and wealth interact the most with change agents. Rose (2015) emphasizes that technology, such as high-speed internet, which is easily accessible in some countries can be challenging in others, which also affects OLA’s diffusion in those countries with limited access.

Additionally, the success of OLA in IEPs is dependent on its appeal to its potential clients, who are not living in the United States. Frambach and Schillewaert (2002) maintain there is insufficient research on diffusion of innovations in international settings but from what exists, they claim diffusion patterns “differ significantly by country” because there are “significant cultural effects” (p. 173). OLA not only represents technological change for organizations and instructors, but it also represents a change for students who reside in countries where the current status of online educational practices may not be at the same point it is in the countries who are hosting the courses (Rose, 2015). Additionally, although online courses may be acceptable for some university courses, it is also possible OLA may not be held in high esteem in some cultures, which would hurt its diffusion (Zaltman & Lin, 1971). Thus, multicultural adoption factors may distort how the diffusion framework applies to OLA.

Rogers (2003) also acknowledges several failures of diffusion research. One example is the tendency of diffusion research to focus on how the highest-ranking member of an organization explained the implementation or rejection of an innovation, even if this individual had not been directly involved in the adoption process. These studies suffered because, as Rogers (2003) describes it, “that individual’s personal and social characteristics may prove to have little relationship to the school’s innovativeness” (p. 278). In contrast, the focus of this study is the perceptions of the IEPs’ directors and its instructors. Stoller (2015) explains that IEP directors “can significantly affect the impact, quality, and sustainability of innovations” (p. 40), and Stoller (1992) describes instructors as the backbone of innovation in IEPs. This means those typically responsible for IEP innovations – both the directors and the full-time instructors –represent the organization in the proposed study.

Another example is the “pro-innovation bias” (Rogers, 2003, p. 106), which is common in diffusion research in general, and OLA adoption research does not appear to be an exception. The pro-innovation viewpoint leads to a situation where much of the interest in an innovation is written by those who want to see the innovation succeed. Since the rejection of an innovation is more difficult to discover than its adoption (Rogers, 2003), there is likely to be less research into its rejection. Frambach and Schillewaert (2002) contends that non-adoption may occur due to active or passive rejection, or because potential adopters have not completed the stages of adoption. This is important because the lack of research into OLA adoption could indicate the current status of OLA's adoption could have already peaked, or the rejection status could be so low as to be inconsequential. If the former were true, it is possible the current technological version of OLA is never be widely adopted, and continued efforts to diffuse it are wasted.

However, without knowing that information, the re-invention process, which encourages adoption (Rogers, 2003), can be hindered and "overlooked" (p. 107). Rogers (2003) proposes that such a pro-innovation bias can be overcome by researching innovations which have not been fully diffused, which allows rejected innovations to be more easily remembered and reported. It can be challenging for individuals to recall the precise time of an innovation, the communication channels used to convey information about the innovation, or how an individual felt about its adoption. Overcoming those memory obstacles is the same method as overcoming pro-innovation bias: selecting innovations which are earlier in the diffusion process (Rogers, 2003).

Rasch Measurement Model

In 1960, Georg Rasch wrote *Probabilistic models for some intelligence and attainment tests* (Bond & Fox, 2015). Rasch wanted to be able to chart the progression of item difficulty alongside responders' skills in a way which showed the items each person has the greatest and lowest probabilities of solving. The Rasch model is a type of latent trait analysis which achieves stochastic conjoint additivity measurement (Perline, Wright, & Wainer, 1979). *Stochastic* refers to the random probability of the distribution, *conjoint* refers to the "measurement of persons and items on the same scale", and *additivity* describes the "equal-interval property of the scale" (Granger, 2008, para. 2). The Rasch model orders items according to their difficulty and persons according to their ability. Bond and Fox (2015) explains, "the Rasch principle is that interval-level measurement can be derived when the levels of some attribute increase along with increases in the values of two other attributes" (p. 12). In the traditional, true score, or classical test models, Likert scale data are ordinal but are often analyzed as interval (Granger, 2008; Jamieson, 2004). However, with the Rasch model, the "purely ordinal relationships between the levels of probabilities are indicative of an interval-level quantitative measurement structure" (Bond & Fox, 2015, p. 12).

Rasch Models

The three Rasch models, the dichotomous rating scale model (Rasch, 1960), the polytomous rating scale model (Andrich, 1978), and the partial credit model (Masters, 1982), require a focus on only one dimension per analysis with category responses presented in a hierarchy on one continuum, with each item indirectly measuring this dimension (Bond & Fox, 2015) in order to produce meaningful measurement results. The Rasch models also assume the independence of items (Bond & Fox, 2015). This means the solution or response to one item cannot depend on the solution or response to another item. Lastly, if a measure is reused in similar conditions, neither the person nor the item estimates should vary, within a range of error (Bond & Fox, 2015). Reusability of a measurement tools is one reason why it is important for the data to fit the model and not the reverse.

The rating scale model (RSM), in which the Likert-type scales are a prime example, assumes the use of ordinal responses and subjective data (Bond & Fox, 2015). In contrast, the classical test approach assumes the responses are interval, meaning “the relative value of each response category across all items is treated as being the same, and the unit increases across the rating scale are given equal value” (Bond & Fox, 2015, p. 113). Since ordinal responses are simply opinions of the participants, they should not be analyzed as interval responses. It is not only that there is a lack of interval nature in a given question, but because questions are not equal in degree, the category responses cannot be added together as equals. For example, it is possible category 2 from one statement might be more properly aligned with the amount of *x* present in the category 4 from another statement. Thus, running a statistical analysis as if all the responses in one category were equal to each other would likely lead to erroneous results (Bond & Fox, 2015).

Linacre (2005) proffers that the polytomous RSM and PCM models are mathematically equivalent. The mathematical model for the dichotomous RSM (Rasch, 1960) is $Ln\ [P_{ni} / (1 - P_{ni})] = B_n - D_i$, and the model for the polytomous RSM (Andrich, 1978) is $Ln\ [P_{nix}/P_{ni(x-1)}] = B_n - D_i - F_x$. In a slight contrast, the model for the PCM (Masters, 1982) is $Ln\ [P_{nix}/P_{ni(x-1)}] = B_n - D_i - F_{ix}$. In each of these models, the basic dichotomous model’s variables are shared: the probability *P* of person *n* endorsing item *i* is the logistic function of the difference between a person’s ability (or attitude) *B* and the difficulty *D* of item *i*. However, in the polytomous model, threshold *F* and category *x* are added because it is necessary to consider the likelihood of a person choosing a category, which refers to the threshold *F* between categories *x*-1 and *x* on any item because the category options and threshold structure between categories are the same for all items. Thus, $P_{ni(x-1)}$ refers to the probability of a person endorsing category *x*-1 on any item. In the PCM model, item *i* is added to the threshold *F* variable to note the independent role of each item's threshold (Grondin & Blais, 2010).

Bond and Fox (2015) asserts that a confirmatory and predictive model, such as the Rasch model, demands the data fit the model and not the reverse. Thus, if the purpose of the model is to infer the results of new data, then the new data may not easily fall into the complex partial credit model (PCM) pattern created by items which defined their own rating structure. Wright (1998a) warns that in order for "items or subsets to be given their own scales, there needs to be strong evidence, statistically and substantively, that these particularized scales lead to different measures with different implications" (para. 6). Without such evidence, there may be some benefits to changing the model, but there are larger risks, such as limited inferencing ability. A foundational maxim of the Rasch model is for the data to fit the model and not the reverse. This means the goal is not to manipulate the model to achieve the smallest amount of unexplained variance but to investigate the idiosyncrasies in the data to learn how the measure failed so as to improve it for future use (Bond & Fox, 2015). As Linacre (2000) notes, the data need to fit the model, but "if the fit is poor, then the data are deficient" (para. 11).

Unlike the classical test approach, which, Bond and Fox (2015) purport, assumes the degree of distance among the category thresholds to be equal, the RSM "detects the threshold structure of the Likert scale in the data set and then estimates a single set of response category threshold values that apply to all of the item stems in the scale" (p. 116). These threshold estimates allow for the item difficulty estimates, which are part of a model's fit statistics (see question 5b). In contrast, the PCM allows the thresholds between category choices to vary for each item (Bond & Fox, 2015) because it is designed for items which have independent rating scale structures.

In contrast, the RSM is designed to be used with a set of items which share the same rating scale structure, although the "grouped RSM" (Linacre, 2018, Jun. 1, para. 2) allows for a combination of both models, depending on how it is applied. In the RSM, a scale is defined in relation to the other item scales in that dimension, but in the PCM, Wright (2000) underscores, the item's scale is allowed "to define its own partial credit scale [which] introduces (number of categories - 2) extra parameters into the estimation" (para. 2). Usually, extra parameters mean the data fit the model better and reduce misfit (Wright, 2000), but in reality, fewer rating scale parameters result in better stability estimates (Linacre, 2000). Specifically, PCM's inferencing ability suffers more than the RSM from too few observations (less than 10) in each category because each PCM item defines its own scale, but RSM items depend on observations from other items with the same category.

Rasch Fit Statistics

Fit statistics are a key part of Rasch analysis, and person and item fit play a major role in understanding how the data fit the model. Two primary components of person and item fit are person and item separation and the reliability of those separation indexes (Bond & Fox, 2015). Person separation classifies people according to their item performance, from low to high (Linacre, 2019). When person separation is low, which is < 2, the instrument may not be able to distinguish the low and high performers (Linacre, 2019). Item separation classifies the items into a hierarchy of difficulty. When item separation is low, which is < 3, the sample is likely too small. Linacre (2019) notes that person reliability does not depend on sample size, and item reliability is independent of test length, while both are mostly unaffected by model fit.

Linacre (2019) purports that the reliability of the separation indexes shows whether the persons or items would have similar scores if reproduced. However, the reliability is uninfluenced by the data quality. Low person reliability is < 0.8 while low item reliability is < 0.9. If a measurement instrument or test is administered a second time, then the expected retest reliability value is found in the person reliability of the first use (Linacre, 2019). As a point of comparison, in the classical test approach, there is only a test reliability index, known as Cronbach's Alpha, which is comparable to the Rasch person reliability, though it overestimates reliability while the Rasch model underestimates it (Linacre, 2019). However, Linacre (2019) argues, the classical approach lacks anything resembling an item reliability index. When both of these statistics are computed by Winsteps (Linacre, 2018b), it assumes the sample is the population, so when it is not, the reliability and separation numbers are slightly higher than those reported, which is relevant when person reliability is compared to Cronbach's Alpha (Linacre, 2019).

In addition to person and item separation and reliability, another substantial part of person and item fit is infit and outfit statistics, which are measured by mean standardized squares (MnSq) or *z* standardized scores (z scores), which is the Winsteps version of the *t*-statistic. *Z* standardized scores are strongly dependent on sample size and best suited to determining if the "data fit the Rasch model (perfectly)" (Linacre, 2019, p. 635). In contrast, mean squares are focused on a productive fit and are independent of the sample size "when the noise in the data is spread evenly across the population" (Linacre, 2014, Jun. 29, para. 4). Additionally, Linacre (2019) proposes "that mean-squares be used in preference to *t*-statistics… [because] the standard *t*-tests are testing the wrong hypothesis," which is that "the data fit the model (perfectly)" rather than "the data fit the model (usefully)" (p. 635). Furthermore, Linacre opposes the use of *t*-statistics for sample sizes over 300 because the *t*-statistic will be "over-powered" (p. 635). Linacre (2019) explains that outfit refers to outlier fit, is based on the chi-square statistic, and is very sensitive to unexpected category endorsements of relatively easy or hard items. In contrast, infit refers to inlier fit, is based on the weighted chi-square statistic, and is very sensitive to unexpected category endorsement patterns for items or persons.

Bond and Fox (2015) contend the Rasch model is not meant to be a perfect fit or an erratic, unexpected fit but to fall between the two in a more realistic position. Linacre and Wright (1994) insist that for a rating scale or survey, the most acceptable range of infit and outfit mean square values is 0.6 to 1.4, with 1 being the best possible value. Bond and Fox (2015) emphasize that if the value is too low (i.e., < 0.6), it is said to overfit the model and be too perfect. Often, this is because items lack local independence, meaning one solution or response depends on another, or there is redundancy in the items. In contrast, if the value is too high (i.e., > 1.4), it is said to underfit the model and have too much variability. When this occurs, "item and person performances… are not sufficiently predictable to make useful Rasch measures" (Bond & Fox, 2015, p. 271).

Bond and Fox (2015) claim that underfit is a greater concern because it suggests there are problems with the model which could be due to poor item design, special knowledge, or guessing, all of which degrade the measures (Bond & Fox, 2015). If the instrument is used again, then it is important to investigate underfitting items. In contrast, overfitting items may "have no practical implications at all" though the values can lead to "smaller standard errors and inflated separation/reliability" (p. 271). If persons fit the model too perfectly (i.e., they chose *strongly agree* or *strongly disagree* for every question), then they have extreme measurement scores, which means it is unclear by how much more they agree with the value of the statements, compared with the other persons. Thus, Winsteps software (Linacre, 2018b) omits their estimated measures from fit analyses (Linacre, 2019).

Person misfit is of less concern than item misfit because another administration of the instrument could include a larger variety of persons who may endorse the statements differently, which makes this more of a targeting issue (Bond & Fox, 2015). Thus, item misfit is more serious if the measurement tool is used again. Sample sets naturally vary in how persons fit the model, but item misfit must be investigated (Bond & Fox, 2015) because the effects of their misfit continue with each administration of the instrument.

Wright item map. Linacre (2019) explains that a Wright item map is a conceptual visualization of the person separation which classifies people according to their performance on the items. The item separation ranks the items into a hierarchy of difficulty measures. For each of these fit statistics, a mean is produced and represented by the *M* occurring on both sides of the central vertical line, one for the person mean and another for the item mean. Those persons at the top have the highest measurement scores, and those items at the top have the greatest difficulty, meaning the observations of the highest ordered category response (i.e., category 5 or *strongly agree*) should be the rarest. Thus, those persons at the bottom scored the lowest, and the items at the bottom should be the easiest practices with which persons agreed.

The benefits of a Wright map are apparent in the optimization process of modifying a pilot instrument for use as the final instrument version. This is because Wright maps can be used to identify measurement gaps and redundant items which indicate “items measuring at the same level of ability” (Mueller & Bradley, 2009, p. 13; Granger, 2008). The measurement gap can also be seen in the number of logits between the person and item means (Bond & Fox, 2015).

Logits. Item difficulty and person ability measures are calculated in logits which is a natural log-odds “unit of additive measurement which is well-defined within the context of a single homogeneous test” (Linacre, 2019, p. 624). Linacre and Wright (1989) postulate:

> One logit is the distance along the line of the variable that increases the odds of observing the event specified in the measurement model by a factor of 2.718.., the value of “e”, the base of “natural” or Napierian logarithms used for the calculation of “log-” odds. All logits are the same length with respect to this change in the odds of observing the indicative event. (Para. 7).

The formula is as follows: Log_e [(Probability of Success)/(Probability of Failure)] (Wright, 1993). For a person’s ability, the logit measure can be used to describe their chances of success on the items within that assessment (Wright & Stone, 1979). A person’s logit measure is calculated by subtracting the item difficulty measurement from the person ability measurement; this logit measure can be used to calculate the probability odds of that person endorsing either the positive value of a dichotomous scale or the next highest adjacent category in a Likert scale (Linacre, 2019).

Linacre (2019) observes that having items located across from persons shows their ability is adequately measured. For example, the items across from each person have a 50% probability of being observed at the highest category of that item. This probability changes for items below and above a person, with items one logit below a person having an approximately 73% chance of being endorsed and two logits indicating an approximately 88% chance of endorsement, and items one logit above a person having an approximately 27% chance of being endorsed and two logits above having an approximately 12% chance of endorsement. All of these probabilities must be estimates because they are based on measurements with standard errors which could influence the odds of endorsement.

Rasch-Andrich thresholds. Linacre (2019) asserts the Rasch-Andrich thresholds identify the difficulty in stepping from one response category to another. The scores should increase as the categories progress from the lowest (i.e., *strongly disagree*) to the highest. This ordered progression of the categories indicates the increasing levels of the latent variable. Because the Rasch-Andrich thresholds are the person minus item measures found at the intersections of adjacent categories on probability curves, they are sometimes viewed in that format; when one category is underutilized, its probability curve appears flatter. Linacre (2019) explains that the probability curves show the category scale is likely to work for a future sample.

Polytomous RSM category thresholds are useful for discriminating category independence:

> The polytomous Rasch model for multiple categories is built out of successive applications of Rasch's dichotomous model, applied conditionally to successive pairs of adjacent categories. Thus the magnitudes of the conditionally-defined step parameters can take any order, and their interpretation is also conditional on the consideration of categories two at a time. (Masters, 1992, p. 191)

Validity and unidimensionality. The Rasch measurement model requires unidimensionality of the measure, and this is necessary for Rasch analysis to be meaningful (Linacre, 2011). However, Keeves (1997) notes that "unidimensionality is a matter of degree not just a matter of kind" (as cited in Bond & Fox, 2015, p. 157). This implies that the line between multidimensional and unidimensional is not always clear. Stahl (1991) warns that dimensions can nearly always be subdivided multiple times. For example, many measures purporting to have one dimension also measure secondary dimensions, such as reading skills. However, complete unidimensionality is not necessary as long as the psychological processes, Bejar (1983) emphasizes, "function in unison – that is, performance on each item is affected by the same process and in the same form – unidimensionality will hold" (as cited in Bond & Fox, 2015, p. 157). In fact, perfect unidimensionality is neither possible (Linacre, 1995b) nor is it necessary for the Rasch model (Linacre, 1998).

Linacre (1998) stresses that determining unidimensionality is context-driven. For example, a politician may consider *reading* to be one dimension, but an education specialist would separate it into multiple dimensions based on its application.

Multidimensionality is only a problem when “response patterns” indicate “two or more dimensions so disparate that it is no longer clear what latent dimension the Rasch dimension operationalizes” (Linacre, 1998, p. 3). Thus, unidimensionality is based on the explicit intent of the researcher (Stahl, 1991) and on the context (Linacre, 1998, 2012), which allows for a unidimensional latent variable to have “subordinate latent variables” (Bond & Fox, 2015, p. 158), which do not interfere with the model’s fit and interpretation.

Regarding the analysis of multiple domains which function as one dimension, Linacre (2018, June 1) reveals, the data can also be analyzed together in one control file but separated either into PCM groups or into different groups which have their own rating scale structure. The latter is called the Grouped Rating Scale Model, which can be either a “mixed model” (para. 2) variant of the PCM and the RSM or two RSM groups.

Therefore, it is important to identify possible secondary dimensions and then to decide if “they are of sufficient interest to warrant the construction of separate measures” (Linacre, 1998, p. 5). Linacre (1995a) postulates there are three priority fit indicators. The first identifies the most obvious misfit, which is a negative point-biserial correlation because it could indicate “miskeyed items or items with ambiguous or negatively worded stems” (para. 9). Second, Linacre (1995a) recommends searching for misfit based on outfit or infit. Linacre’s (1995a) third recommendation is to consider whether local item independence is deficient, which is “manifested by large correlations between standardized residuals” (para. 9). This is because “the only multidimensionality of real measurement concern is manifested by unmodeled behavior in the data” (Linacre, 1998, p. 5).

Dimensionality. The Rasch model's dimensionality report describes the "primary components factor analysis of the Rasch residuals" (Bond & Fox, 2015, p. 163). This can be used to search for a second dimension through the identification of factor loadings in the dimensionality tables and map. In Rasch measurement, the data must fit the model (Bond & Fox, 2015). Thus, if a "random dispersion of residuals" is found after the Rasch model is applied to the data, then "the claim is that the solution accounts for just one dimension" (p. 283). In contrast, if there is a pattern among the observation residuals, and the factor loadings are present (residuals > 0.40) in the residuals' analysis, then a second dimension or unexpected subset may be present (Bond & Fox, 2015). However, not all dimensions require separation (Linacre, 1998). It depends on whether removing or grouping the relevant items improves the fit statistics. Linacre (1995a) also proposes that finding the reasons for large correlations between standardized residuals is sometimes challenging and requires a careful review of item content. Linacre also warns that "remedying defects is also more difficult" with regards to residuals (para. 9).

If there are patterns of non-random residuals, it is still important for the item content to align logically with the items for it to be considered as a possible subset or second dimension (Bond & Fox, 2015). As Sick (2011) maintains, identifying multiple constructs is "the responsibility of the instrument designer, who groups items into subscales in advance based on experience or theory" (p. 15). With knowledge of the development of the instrument, patterns and natural groupings of the practice statements may be found.

Differential item functioning. Differential item functioning (DIF) "indicates that one group of respondents is scoring better than another group of respondents on an item (after adjusting for the overall scores of the respondents)" (Linacre, 2019, p. 559). DIF statistics are influenced by the size of both the DIF effect and the classification groups, but they are "largely uninfluenced" by model fit (para. 11). However, for scales with four categories, a sample size of at least 200 is adequate to detect DIF (Scott et al., 2009), but "for dichotomous items, the sample size of each group needs to be around 1,000" (Linacre, 2019, p. 560). When DIF Contrasts are greater than the absolute value of 0.64, then DIF is considered to be moderate to large in those items and when the absolute value is at least 0.43, the DIF is considered to be slight to moderate. Linacre (2018) highlights how a DIF contrast of 0.64 "means the two groups differ by 0.64 logits, which, in education, is more than 6 months development in many areas" (personal communication, Oct. 10, 2018). However, if the Rasch-Welch probability value (p-value) is greater than 0.05, then the observed DIF is assumed to have occurred by chance. Thus, p-values lower than 0.05 indicate further investigation is needed to identify the potential bias in these two groups. Linacre (2019) warns that Rasch statistics are not able to distinguish whether one group is performing at its usual ability while the other group is doing better or worse than usual, or whether the item has its usual difficulty for one group but is more difficult or easier for the other.

Rasch model limitations. Accurately identifying subsets and second dimensions can be challenging for a researcher with limited experience. Bond and Fox (2015) propose that even if a researcher has "empirical evidence for the existence of a separate subscale," the researcher must decide if "this is large enough and meaningful enough to measure separately…" (p. 290). While Goldstein and Blinkhorn (1982) claim true unidimensionality is challenging to attain and there are actually few truly unidimensional models, they seem to misunderstand how the RSM approaches unidimensionality. Multiple domains working in tandem can be unidimensional, depending on the context and purpose of the research.

Regarding DOI theory, Rogers (2003) postulates the five innovation characteristics are "somewhat interrelated empirically" with each other, but "are conceptually distinct" (p. 223). The concern is in overlooking dimensions which need to be further divided. For example, Rogers' (2003) first characteristic is *relative advantage*, which considers whether an innovation offers a relative advantage to the user. This characteristic appears conceptually distinct from the other four, and so it may be a separate dimension. However, a closer reading of the characteristic reveals *economic benefits* and *status* are identified as important aspects of relative advantage (Rogers, 2003). Further review may also suggest status should be divided again into *image* and *social prestige* (Rogers, 2003; Moore & Benbasat, 1991). This example highlights how unexpected dimensions could be hidden within the data.

Similarly, Frambach and Schillewaert (2002) include *uncertainty* as a separate dimension, but it is also part of the definition for *compatibility*, which implies it may not be adequately distinct from it. Nonetheless, this weakness is limited in scope because one advantage of the Rasch model is to discover these dimensions within the data, which is also part of the role of the pilot instrument.

Summary

This chapter provided an extensive review of the literature in the areas of IEP programs, OLA, and IEP leadership as seen through several seminal leadership works and theories. This literature review provided a basis for understanding the adoption status of OLA in U.S. IEPs and IEP leadership's perceptions of OLA for their IEPs and themselves as leaders in its diffusion in U.S. IEPs. This chapter ended with a description of the conceptual and methodological frameworks for this study: the diffusion of innovation and the Rasch model.

The next chapter describes the methodology for the study, including the research design, setting and context, sample and data sources, instruments and procedures, data collection, data analysis, and the role of the researcher.

CHAPTER 3: RESEARCH METHODS

The purpose of this study was to investigate the adoption status of online language acquisition (OLA) in intensive English programs (IEPs), IEP leadership's perceptions of OLA for their IEPs, and their perceptions of themselves as leaders in the diffusion process. This study employed a quantitative deductive inquiry to investigate the IEP directors' and faculty's perceptions of six OLA innovation characteristics using the diffusion of innovations (DOI) theory as the conceptual framework and Rasch as the methodological framework. Specifically, the Rasch measurement model was employed to ascertain the instrument's reliability and validity, analyze its quality, analyze the dimensionality, and describe the results.

Research Questions

This chapter offered a methodological approach to address three research questions:

1. To what extent has OLA been adopted at university and college-governed, IEPs in the United States?
2. How do IEP directors and faculty perceive the adoption of OLA in their IEPs?
3. To what extent do IEP directors and faculty perceive themselves to be leaders in the diffusion of OLA?

This chapter includes the research design, context, sample, instruments and procedures, data collection process, data analysis, and the role of the researcher.

Research Design

This study employed a cross-sectional survey using an online modified diffusion of innovation survey instrument. Cross-sectional studies are based on two assumptions: a "survey is given at one point in time and only once to a particular sample of respondents" (Nardi, 2014, p. 127). This study met both of these assumptions by surveying only respondents employed as full-time or part-time directors or faculty at accredited, U.S. university and college-governed IEPs once during a one-month time frame in early 2019. Additionally, Nardi (2014) believes surveys are especially useful for investigating unobservable behaviors and "describing characteristics of a large population" (p. 72), which describes this population with as many as 2,741 IEP directors and faculty. The objective was to study IEP directors and faculty throughout the United States to learn whether they had adopted OLA, what they thought about it, and whether they were involved in leading its adoption. The complete population of IEPs meeting the criterion were contacted either directly or indirectly.

Validity Threats

Several validity threats were considered in this research design. Because individuals may fail to complete the instrument, mortality could be a threat. Having enough participants and minimizing the length of the instrument during the piloting process could offset the effects of mortality. Also, the Rasch measurement model estimates missing values. The locations in which participants complete the survey cannot be controlled, and this could threaten the validity of the results. Participant characteristics could affect the validity of the results because this research design requires the participants to have knowledge of their IEPs' OLA adoption status. Individuals lacking that knowledge or making inaccurate assumptions could skew the results.

Context of the Study

The study took place among the 249 IEPs who met the following three criteria: accredited; non-proprietary, university or college-governed IEPs; and located in the United States. While there were more than 600 U.S. IEPs (Rose, 2015), the majority of those included specialized subject, independent proprietary, chain, and franchised institutes. This study focused on those IEPs which were governed by universities or colleges and were in the United States. University or college governance was necessary because 1) being a part of a university or college meant they had access to many or all of the resources necessary for OLA adoption, which could have influenced OLA's adoption; and 2) the focus of this study was on leadership within higher education institutes. EnglishUSA's Member Directory (n.d.) and the member list from UCIEP ("All UCIEP Members", n.d.) reveals there were 249 university or college-governed IEPs in the United States that met these requirements at the time the sample was sent the survey instrument.

Research Sample

The IEPs chosen for this survey were found using search tools created by EnglishUSA and UCIEP. These two organizations were the only two recommended to international students by EducationUSA ("English Language…," n.d.), which is the name of the U.S. Department of State's (2018) website for international students interested in studying English in the United States. These two organizations were also recommended by the Institute of International Education (IIE) because their "membership will guarantee that programs are at least preoccupied with academic standards" (De Angelis, n.d., para. 15).

Design and Limitations

A population design was used to minimize sampling errors, thus increasing the relevance of the research findings for those meeting the criterion. The population was approached in two ways: directly and indirectly. Contact information for the 249 executive directors of the 249 IEPs was publicly available, and each was emailed (N=249) a direct request to participate in the survey. When possible, faculty were also emailed directly (n=1,226) to request their participation in the survey. The participation of the faculty employed in 115 IEPs was indirectly requested because the faculty's email addresses were not publicly available. Their executive directors were asked to forward the survey request to the faculty at those 115 IEPs. It is possible however none of the other faculty received the request, or all faculty at an IEP received the request and declined to participate. A total of 35 faculty, representing 14 unique IEPs, completed the survey after receiving the forwarded request from their IEP director (*Qualtrics^XM* created a special trackable link for forwarding).

Response Frame

All 249 executive directors and 2,492 faculty in the 249 accredited, higher education-governed IEPs were invited to participate in the study, and 76 directors and 245 faculty, as well as 7 individuals who did not specify their position, from 121 IEPs opted to do so. The 249 IEPs were selected because they included the complete population of IEPs meeting three criteria: accredited, governed by higher education institutes, and located within the United States.

For all 249 executive directors and 1,226 faculty from 134 of the 249 institutes in the complete population of IEPs, publicly available contact information was available.

For the remaining 115 IEPs, the executive directors were contacted to request their aid in sending the surveys to their full and part-time faculty.

Rights of Participants

The study received Institutional Review Board (IRB) approval through the University of Kentucky. The online survey instrument required participants to digitally sign an informed consent form before proceeding to the survey. The consent form described the study and the participants' role. Participants' names were not collected or linked to survey responses. Data records were password protected on the researcher's computer, and when shared with committee members, they were stored on the University of Kentucky's Office 365's OneDrive, which was also password protected. Data will be stored for 10 years, according to IRB standards for research study documents.

Instrument and General Procedures

The primary instrument for this study was an online organization-focused, perceived characteristics of innovation (PCI) survey which was based on Moore and Benbasat's (1991) DOI instrument. Permission was gained from Izak Benbasat (personal communication, Oct. 10, 2018) to use and modify their DOI survey instrument. Drawing on DOI as the conceptual framework for the instrument and the Rasch measurement model for the instrument's design and analysis, this research study employed a cross-sectional, quantitative online survey. The survey was designed to solicit both director and faculty perceptions. In the survey, there were 32 PCI statements and 10 primary institutional and individual demographic questions that expanded to 16 based on skip logic (i.e., age; employment position, status, and total years employed; and IEP name, characteristics, and OLA adoption status). The latter were included to better understand the relationship between the sample and adoption status, innovation characteristics, OLA leadership status, and technology comfort levels.

Scale Choice

The 32 PCI statements were followed by an even, four-point scale of response options. The scale consisted of the following categories: 1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, and 4 = *strongly agree*. Lopez (1996) strongly discourages the use of categories such as *no opinion* because these are "prime candidates for misplacement in the category hierarchy" and "such category labels provoke irrelevant and evasive responses" (para. 4). In research on rating scales in survey research, Bradley, Peabody, Akers, and Knutson (2015) found "the inclusion of a neutral middle category distorts the data to the point where it is not possible to construct meaningful measures" (p. 8). Nunnally (1967) also recommends removing the neutral category even if respondents had never considered or formed an opinion on the topic. Thus, lacking a middle option, participants were encouraged to consider the topic and choose *agree* or *disagree*, with two levels of granularity for each. If they chose to skip a question to which they had no response, then, Lopez (1996) purports, this was still better than including the neutral response because such response options were already the equivalent of a missing response.

From a Rasch measurement model perspective, "how the variable is divided into categories affects the measurement qualities of a test" (Linacre, 2002, p. 5). In contrast to the classical approach which favors longer scales in an attempt of imitating interval data (Carifio & Perla, 2007), the Rasch model converted the results into interval data, which meant it could focus on the performance of each category. Stone and Wright (1994) maintain that fewer scale categories should be used if a good reason for using more was lacking: “rating scale categories… must also be clearly differentiated in the behavior of the respondents, otherwise more categories do not mean more information” (para. 1). Too many category options often confuse respondents and lead to “more noise than information” (Lopez, 1996, para. 5).

Because participants do not always notice the granularity in a longer scale (Lopez, 1996), and also for valid Rasch analysis, it was important for each category to be endorsed at least 10 times (Linacre, 2019). If participants do not discriminate distinctly between the nuances of agreement or disagreement, then one of the categories may not be endorsed adequately for an effective Rasch analysis. For these reasons, a four-point scale was chosen.

Missing Values

With the Winsteps software (Linacre, 2018b), the Rasch model estimates the missing values using “the marginal raw scores and counts of the non-missing observations” (Linacre, 2019, p. 636). Granger (2008) proffers that in the Rasch model’s linear measures of item difficult and person ability, “item values are calibrated and person abilities are measured on a shared continuum that accounts for the latent trait. Should an item rating be missing, the model estimates the person's probable rating without imputing the missing data” (para. 8). Linacre (2019) underscores how missing data remain relevant because they decrease the amount of data available for analysis, but they are also not a concern in the Rasch model. In the Winsteps manual, Linacre (2019) explains how “generally, missing data are missing essentially at random (by design or accident) or in some way that will have minimal impact on the estimated measures…" (p. 635). Thus, missing data were not a concern.

Reliability and Validity

The instrument's reliability and validity were demonstrated through a Rasch analysis of the pilot survey instrument (see Appendices A & C). To address content validity threats, the survey design and constructs of the instrument were built on innovation characteristics and items designed by Rogers (2003), Moore and Benbasat (1991), Frambach and Schillewaert (2002), Zaltman and Lin (1971), and Tornatzky and Kline (1982). Moore and Benbasat's PCI survey items were the model for those used in this study's survey.

To accurately analyze the reliability of the instrument using the Rasch measurement model, it was necessary to decide whether the rating scale model (RSM) or partial credit model (PCM) was a better model for the pilot instrument's data set. Linacre (2000) recommends comparing the "construct and predictive ability" (para. 9) of the two models, especially the item and person measures of difficulty. Linacre (2000) emphasizes that a lack of meaningful difference between the item difficulties found when RSM and PCM are used indicates the simpler RSM should be used. Additionally, because all the PCI items shared an identical scale and because categories with less than 10 observations suffered more with PCM than RSM, PCM was not used. RSM items also depended on observations from other items with the same category, which was helpful because all of the PCI items lacked 10 observations of one or more categories. However, this was not considered a significant problem because each scale was expected to garner more observations for the final instrument.

The final survey instrument (see Appendix B) had strong person and item separation and reliability statistics and more closely aligned the difficulties of the person and item means once 20 items were identified for removal (see the complete Rasch pilot optimization process in Appendix C). Ideally, the difference between the mean persons' skills and the mean items' difficulty will be close to zero, but it was -0.24 logits (see Table 3.1). However, the mean difference was expected to change with a larger sample.

Table 3.1

Model Fit

	Persons			Items	
	Mean Measure	Separation	Reliability	Separation	Reliability
Final Survey Instrument	-0.24	2.83	0.89	3.55	0.93

The person and item separation and reliability values were higher than needed (see Table 3.1). At least 2.00 was enough for person separation, which indicated whether the instrument distinguished low and high performers. At least 2.50 was sufficient for item separation, which suggested the instrument distinguished between low and high difficulty items. Person reliability should be at least 0.8 or higher and item reliability is best if it is at least 0.9 or higher. Person and item reliability indicated whether these participants or items would have similar scores when reproduced. Additionally, for the final version of the instrument, none of the items had low or near zero point biserial correlations, and the remaining 32 items explained 45% of the raw variance, which was up 6.4% over the original version. The Rasch-Andrich Threshold values (i.e., step difficulties or step calibrations) showed the difficulty in observing a category (Linacre, 2019). There was a positive progression as the category value increased, which meant there was no disordering of these estimates.

A Wright Map allowed a visual demonstration of how the item and person performance related to each other. Due to its ability to identify too difficult or too easy to endorse items as well as redundant items, the Wright Map was used extensively in the pilot instrument analysis (see Appendix C for the complete analysis). There were two assessment gaps which could not be filled with the existing items. However, there were a total of four items within approximately 0.2 logits of difficulty directly above and below each of these gaps, so the total negative effects of measuring the unifying dimension of OLA adoption were minimized.

Instrument Development and Modifications

A pilot survey was created, field-tested and collected using *Qualtrics^{XM}*, and analyzed using the Rasch measurement model (see Appendix C for the complete instrument analysis and optimization process). Based on the pilot survey, the following changes were made to the final version. First, 20 fewer PCI questions were included due to the removal of underperforming and redundant items. The original instrument had intentionally redundant items with the expectation that the Rasch analysis would identify the most appropriate items for the instrument. Additionally, the remaining PCI questions were organized randomly rather than in groups by their PCI characteristic's name. Using survey skip logic, participants who indicated OLA had taken place at their IEP, were asked to respond to six contingency questions which described their IEP and its OLA experience. Finally, the question regarding the identity of participants' IEPs was moved to the beginning of the survey in the final version. To attract more responses, an incentive in the form of a drawing for one of five $20 Starbucks gift cards was offered to those participating in the study.

Data Collection

The survey was administered once using the researcher's University of Kentucky *Qualtrics*^{XM} account, which was sufficient for reaching individuals using a large-scale online survey. Standard survey distribution procedures were used for the survey. Survey completion requests were emailed to 1,475 IEP instructors and directors; 115 directors were also sent a request to send the linked survey on to their instructors (see introduction letters in Appendices A & B). The email introduction included a description of the study, a link to the formal consent form, and a link to the survey, which was hosted by *Qualtrics*^{XM} (see Appendices A & B). The survey requests were emailed on March 19, 2019 and collected on April 19, 2019, four weeks and four days after it was sent. For IEPs with half-semester sessions, this was the middle of a typical eight-week session and was the ideal time to send the survey because it avoided the stresses of placement, orientation, and final exams; for IEPs with semester-long sessions, it was prior to midterms and not expected to be inordinately busy. Follow-up reminder emails were also sent twice at 1.5-week intervals. The survey was closed on April 19, 2019.

Data Analysis

Preparations for Analysis

All the data were gathered using *Qualtrics*^{XM} and analyzed with the Rasch measurement model using Winsteps software. Data analysis began by converting the collected data into a spreadsheet format. The data were exported from *Qualtrics*^{XM} using numerical codes in a Microsoft Excel spreadsheet format. Each PCI statement was followed by four options: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. These were converted into numbers one through four. Within Excel, items with negatively worded statements, such as 06EEA, were reverse coded so that the higher numbers indicated greater favorability toward OLA adoption.

The data in Excel were converted to a comma-separated csv file, which was opened in Microsoft Notepad in order to easily remove the commas. Item responses were then copied from the Notepad file and pasted into the WordPad text control file for use with Winsteps, version 4.4.4 (see the control file in Appendix D). The item labels were created and transposed within Excel into a vertical format, which was converted for use in the Winsteps control file. The item labels were a combination of the item numbers (i.e., 1-32) and PCI types (e.g., EEA and VIS). The non-PCI item labels used the new numbers, all of which began with the letter "S" for survey. The letter was added to distinguish them from the PCI item numbers.

Data Analysis with the Rasch Measurement Model

The survey instrument was analyzed using the Rasch measurement model. Data analysis began by cleaning the data, which for Rasch measurement involves analyzing the instrument's items and respondents. By focusing on person and item fit, Rasch fit statistics explained how the data fit the model, and included a review of misfitting data in more detail to determine if removal was necessary. The analysis of the survey instrument included the following types of analyses: category frequencies, fit statistics and Wright maps of the model variations, individual item and person fit statistics for misfitting items and persons, a dimensionality analysis, Rasch-Andrich threshold analysis, and category probability curves. Following the data cleaning process, a thorough review of the item and person results followed. Wright maps, item measures, item subgroup means and measures, person subgroup means and measures, and the differential item functioning were analyzed to determine how the participants perceived the six PCI and items within each. The data collected were used to develop the results and discussion in the following chapters.

Limitations and Delimitations of the Study

Role of Researcher

The researcher actively participated in the researching, writing, survey administration, and data collection and analysis of the study. In particular, the survey deployment, data collection, and data analysis were the sole responsibility of the researcher. This study was designed, with the guidance of committee members, to meet scholarly rigor. Any researcher bias was unintentional but was also mitigated by committee review.

Limitations

The external and internal validity threats experienced in this study were for the most part common to DOI studies. There were 249 IEPs which fit the requirements of the study; however, it was possible there were more than 249 directors. Larger IEPs have multiple directors. It was also possible the director listed on the EnglishUSA membership list was not the executive director, which may have affected whether the survey request was forwarded. Although it was the goal of this research to include full-time and part-time faculty, the fluctuation of adjunct faculty numbers could have affected the number of individuals participating in the study. Similarly, the number of faculty who were forwarded the survey request from their director was unknown. This meant the faculty portion of the population could only be estimated.

Another limitation was due to the source of data: self-reported information, which was limited by the participants' awareness of themselves, was influenced by a variety of factors, and then expressed through their perceptions. The survey results were based on how people perceived their own behavior and feelings on the subject, and as Nardi (2017) points out, "selective memory, selective perception, and a willingness to be candid all play a role in the validity and reliability of the data collected" (p. 86). This threat was mitigated by avoiding misleading wording in the survey questions. Lastly, while a population design minimized sampling errors, some error may have occurred due to IEPs which were erroneously added to or dropped from the population.

A third limitation was due to the size of the institute, which, Rogers (2003) claims, affects their willingness to pursue innovativeness. IEPs' enrollment is often limited by the size of their host universities or colleges as well as the variety of majors which international students typically find of interest (e.g., engineering, business, etc.). Thus, the innovativeness of IEPs at small colleges may have been affected by their smaller enrollments.

Delimitations

Because the survey was performed at one specific moment in time, it did not represent the full scope of the OLA adoption-decision process. Similarly, Rogers (2003) warns that those responding to adoption research questions do not always remember why they rejected an innovation, which limited the relevance of those respondents.

Summary

The third chapter described the methodology for the study, including the research design, setting and context, sample and data sources, instruments and procedures, data collection, data analysis, and the role of the researcher. Chapter three included the role of the researcher, as well as limitations and delimitations of the research. The next chapter presented the findings in regard to the three research questions.

CHAPTER 4: RESULTS

Despite the increase in online education both in institutes of higher education in the United States (Seaman et al., 2018) and by intensive English program (IEP) competitors, to date nationwide research studies on the adoption status of online language acquisition (OLA) courses by university or college-governed IEP programs have been nonexistent. This study was designed to help fill this gap by exploring the status and extent of OLA diffusion, how the IEPs' directors and faculty perceived OLA, and whether they perceived themselves to be the leaders in its diffusion.

Using Rogers' (1962) diffusion of innovations (DOI) theory as the methodological framework and the Rasch model (Rasch, 1960) as a framework for instrument design and analysis, this study employed a cross-sectional survey using an online modified DOI survey built around six perceived characteristics of innovation (PCI). Three research questions guided this study.

1. To what extent has online language acquisition (OLA) been adopted at university and college-governed, intensive English programs (IEPs) in the United States?
2. How do IEP directors and faculty perceive the adoption of OLA in their IEPs?
3. To what extent do IEP directors and faculty perceive themselves to be leaders in the diffusion of OLA?

This chapter was organized by a description of the participants and their IEPs which was followed by the results according to the research questions.

Rasch Measurement Model Analysis

An essential requirement of Rasch measurement is unidimensionality. There were two groups of items on the survey: those which were intended to support the latent variable (i.e., dimension) of OLA adoption and the descriptive data on the participants and their IEP organizations. The latter group was included in the Rasch analysis as variable groups for the differential item functioning (DIF) analysis. The remaining items within the first group were divided according to their response scale. In a single Rasch analysis, Winsteps can analyze separate groups of items – both those sharing the same scale using the rating scale model (RSM) and those with different scales using the partial scale model (PCM) – with the ISGROUPS command in the control file. The Rasch analysis in Winsteps used three groups of mixed RSM and PCM.

The RSM was chosen over the PCM for two of the scale groups (e.g., the PCI survey and technology cluster items) because within each of these groups, the items were intended to share the same rating scale. There was a lack of meaningful difference between the item difficulties found when both RSM and PCM were employed for both, which Linacre (2000) contends is a reason to use the simpler RSM model. Additionally, because there were seven items in the PCI survey which had less than 10 observations in one category each (see Table 4.1), the RSM was a better choice as it depended on observations from other items with the same category (Linacre, 2000). However, in the group with two items focused on new technological confidence and OLA leadership, the four-step rating scales are not identical, so the PCM was the best choice (Taleb, 2012).

Thus, the 49 items in the survey can be divided into five groups (see Table 4.1) based on their shared scales, the choice of RSM versus PCM, and the intended dimension the items support.

Table 4.1

Survey Item Groups

Parts of Survey	Item Numbers	Winsteps Item No.'s	Scales	RSM or PCM	Intended Dimension
PCI Survey	S5 (1-32)	1-32	Likert: SD, D, A, SA	RSM	OLA Adoption Potential
OLA Leadership & Tech Confidence	S6 & S7	33-34	2 similar Likert Scales	PCM	OLA Adoption Potential
10 Tech Clusters	S8 & S9	35-44	Dichotomous: N, Y	RSM	OLA Adoption Potential
Individual & Organizational Demographics	S2-S4; S10; S10a-S10f; S11-S13	N/A	Mixed	N/A	Descriptive Data

Frequencies and Demographics

Category frequencies. Only the 44 survey items – stemming from items S5-S9 (see Table 4.1) – which were on the latent variable of *OLA adoption potential* were analyzed with the Rasch analysis. The dichotomous individual and organizational (i.e., the IEP) demographic variables within the survey were used in the DIF analysis. From those 44 survey items, there were 13,884 observations by 328 participants with 548 missing observations. There were no participants with extreme scores, meaning no one responded with all of one category.

Table 4.2

Categories and Frequencies of Items in Rasch Analysis

Item Group Descriptions	Missing Items	Categories				
		0	1	2	3	4
			Strongly Disagree	Disagree	Agree	Strongly Agree
PCI Survey (S5; items 1-32)	392, 4%		1306, 13%	3599, 36%	4204, 42%	995, 10%
			None	Low	Moderate	High
OLA Leadership (S6; item 33)	13, 4%		147, 47%	72, 23%	57, 18%	39, 12%
			Almost None	Low	Moderate	High
Tech Confidence (S7; item 34)	14, 4%		0, 0%	23, 7%	124, 39%	167, 53%
		No	Yes			
10 Tech Clusters (S8-S9; item 35-44)	129, 4%	1143, 36%	2008, 64%			

Missing data and item frequencies. In a Rasch analysis, while missing data are relevant because they decrease the amount of data available for analysis, they are also not a concern (Linacre, 2019). Granger (2008) maintains, if an “item rating [is] missing, the model estimates the person's probable rating without imputing the missing data” (para. 8). This was completed using the other items with the same scale (i.e., the RSM). The Rasch model estimates missing values using “the marginal raw scores and counts of the non-missing observations” (Linacre, 2019, p. 636). In the Winsteps manual, Linacre (2019) explains how “generally, missing data are missing essentially at random (by design or accident) or in some way that will have minimal impact on the estimated measures…" (p. 635). However, as seen in Table 4.2, none of the *Almost No Confidence* category of question S7 on participants' confidence in using new technology were observed, which suggested it would have been better suited to a three-category rating scale, perhaps one in which the *low* and *almost none* categories were combined.

Except for the responses to the conditional questions (i.e., see items S10a-S10f in Figure 4.1), which were dependent on a positive response to question S10 asking whether the participants' IEP had any experience with OLA in the last five years, responses' percentages for each question were high. As seen in Figure 4.1, excluding items S10a-S10f, the response counts ranged from 91% (n=299) to 100% (n=328). Questions S4 and S8 were the only items to receive responses by all participants, which is represented by the dotted horizontal line in Figure 4.1.

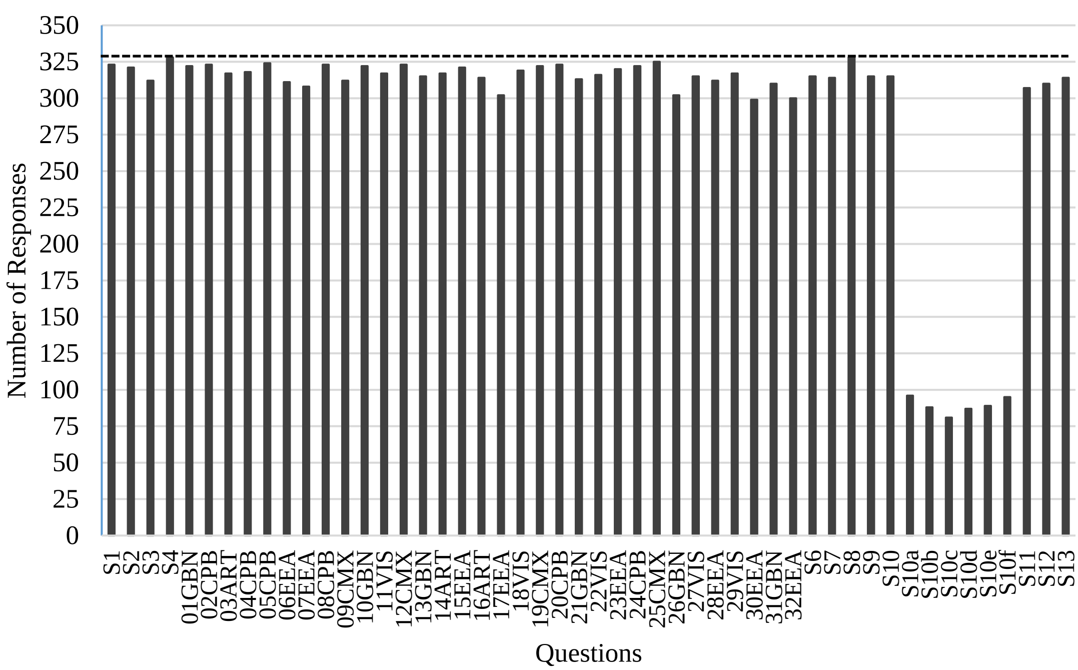

Figure 4.1. Total responses per question (n=328).

Positions, employment status and experience, and age. Of all the participants (N=328), 97.9% (n=321) responded to the first content question, S2: "Are your IEP duties primarily those of a director or teacher?" The highest percentage (76.3%; n=245) of respondents reported their duties were primarily those of an instructor, in contrast to the 23.7% (n=76) who reported their duties were primarily those of a director. Overall, respondents primarily worked full-time (n=232; 76.1%) versus part-time (n=73; 23.9%). This was true across both directors (91.0%; n=61) and faculty (71.8%; n=171). Also, the highest percentage of respondents (i.e., a total of 56.5%) had 7-9 years (19.8%; n=61), 10-12 years (19.2%; n=59), and 22 or more years (17.5%; n=54) of experience (see Table 4.3). The largest percentage of faculty had 7-9 years (21.0%; n=50) of IEP experience, in contrast to the largest percentage of directors who had 10-12 years (25.7%; n=18) of experience. Additionally, the highest percentage (19.3%; n=58) responded to item S11 regarding age to indicate they were between 36 and 40 years old. This was also true for faculty with 20.7% (n=48) responding they were 36-40 years old, but the highest percentage of directors (24.6%; n=17) reporting they were 41-45 years old.

No respondents chose the 18-21 age range, where there was an input error. This option should have been 18-20, so it did not overlap with the next option, 21-25. There were few faculty reporting an age under 26 or over 70 and few or no directors reporting an age under 31 and over 65 (see Table 4.3).

Table 4.3

Employment Status and Experience, Age, and Mean Measure of Respondent Groups by Position

	Mean Measure (logits) of Category Total	By Position (n=321)		
Item S2: Position (n=321)		Directors	Faculty	Total
	Directors 0.20 (SE 0.13) Faculty 0.09 (SE 0.06)	76 (23.7%)	245 (76.3%)	321
Item S12: Employment Status (n=310)				
Part-time (n=75)	0.13 (SE 0.11)	6 (2.0%)	67 (22.0%)	73 (23.9%)
Full-time (n=235)	0.10 (SE 0.07)	61 (20.0%)	171 (56.1%)	232 (76.1%)
Totals		*67*	*238*	*305*
Item S13: Employment Experience (n=314)				
< 1 yr. (n=9)	0.28 (SE 0.50)	1 (0.3%)	7 (2.3%)	8 (2.6%)
1-3 yrs. (n=25)	0.00 (SE 0.19)	3 (1.0%)	22 (7.1%)	25 (8.1%)
4-6 yrs. (n=42)	0.35 (SE 0.14)	5 (1.6%)	37 (12.0%)	42 (13.6%)
7-9 yrs. (n=61)	0.14 (SE 0.13)	11 (3.6%)	50 (16.2%)	61 (19.8%)
10-12 yrs. (n=60)	0.28 (SE 0.13)	18 (5.8%)	41 (13.3%)	59 (19.2%)
13-15 yrs. (n=32)	-0.04 (SE 0.20)	9 (2.9%)	22 (7.1%)	31 (10.1%)
16-18 yrs. (n=11)	-0.57 (SE 0.28)	3 (1.0%)	6 (1.9%)	9 (2.9%)
19-21 yrs. (n=19)	-0.18 (SE 0.20)	6 (1.9%)	13 (4.2%)	19 (6.2%)
22+ yrs. (n=55)	0.03 (SE 0.10)	14 (4.5%)	40 (13.0%)	54 (17.5%)
Totals		*70*	*238*	*308*
Item S11: Age (n=307)				
18-21 yrs. (n=0)	N/A	0 (0.0%)	0 (0.0%)	0 (0%)
21-25 yrs. (n=2)	-0.55 (SE 0.37)	0 (0.0%)	2 (0.7%)	2 (0.7%)
26-30 yrs. (n=25)	0.15 (SE 0.20)	0 (0.0%)	25 (8.3%)	25 (8.3%)
31-35 yrs. (n=40)	0.12 (SE 0.15)	8 (2.7%)	32 (10.6%)	40 (13.3%)
36-40 yrs. (n=58)	0.27 (SE 0.13)	10 (3.3%)	48 (15.9%)	58 (19.3%)
41-45 yrs. (n=45)	0.13 (SE 0.18)	17 (5.6%)	28 (5.6%)	45 (15%)

Table 4.3 (continued)

46-50 yrs. (n=38)	0.12 (SE 0.18)	15 (5.0%)	23 (7.6%)	38 (12.6%)
51-55 yrs. (n=29)	-0.12 (SE 0.17)	7 (2.3%)	21 (7.0%)	28 (9.3%)
56-60 yrs. (n=29)	0.15 (SE 0.16)	6 (2.0%)	21 (7.0%)	27 (9.0%)
61-65 yrs. (n=27)	0.12 (SE 0.16)	5 (1.7%)	20 (6.6%)	25 (8.3%)
66-70 yrs. (n=12)	0.01 (SE 0.21)	0 (0.0%)	11 (3.7%)	11 (3.7%)
71+ yrs. (n=2)	-0.73 (SE 0.25)	1 (0.3%)	1 (0.3%)	2 (0.7%)
Totals		*69*	*232*	*301*

The mean measures in Table 4.3 present how well each respondent group performed on the survey instrument discussed under research question two. The instrument items ranged in difficulty from 3.18 (SE 0.24) to -2.74 (SE 0.22). This means the higher the respondent group's mean measure, the more likely those participants were to have adopted OLA. For example, those with 4-6 years of IEP experience (mean 0.35 logits; SE 0.14) scored the highest of those shown in Table 4.4.

Research Question One

The first research question – To what extent has online language acquisition (OLA) been adopted at university and college-governed, intensive English programs (IEPs) in the United States? – attempted to identify where the IEPs can be found along the OLA adoption continuum. The responses to questions S3, S4, S10, and S10a informed the results of this research question. Additionally, the responses to S10a through S10f provided further details on how IEPs who have recent OLA adoption experience were integrating it into their IEPs. Questions S3, S4, and S10, as well as the six conditional questions (i.e., S10a-S10f) were listed in Table 4.4.

Table 4.4

Survey Questions Informing the Analysis of Research Question One

Question	Item Wording
S3.	What is the name of your IEP?
S4.	What is the name of the university or college which hosts/governs your IEP? Find by choosing the state. If your host university or college was not in the previous list, please write it here.
S10.	Has your IEP had an online ESL class of any kind in the last five years?
	Options: No, Yes
[Questions conditional on a positive response to S10.]	
S10a.	Are online ESL classes of any kind currently offered in your IEP?
	Options: No, Yes
S10b.	Which student proficiency levels are/were offered with your online ESL class(es)?
	Multiple select options: Beginner, Intermediate, and Advanced
S10c.	Which skills are/were taught using online ESL? *Multiple select options: Reading, Writing, Listening, Speaking, and Grammar*
S10d.	Which part(s) of your IEP offer or have offered online ESL?
	Multiple select options: Regular EAP Program, Short-Term EAP Program, and Other Programs. If you chose "other programs" in the last question, please list them here.
S10e.	Approximately how many teachers total have taught or are teaching online ESL class(es) at your IEP?
S10f.	How often have students begun with your online ESL class(es) while in their home country before joining the face-to-face classes at your IEP?
	Options: Almost Never Happens, Sometimes Happens, Often Happens, Almost, Always Happens, and Unknown

Of the 249 IEPs contacted for the research study, the 328 participants represented 121 IEPs. Figure 4.2 presents the adoption status of all the university and college-governed U.S. IEPs (N=249) who had faculty or directors participate in the research. From the sample of IEPs (n=121) who had at least one participating respondent, 40.5%

(n=49) had experimented with OLA in the last five years, and 24.8% (n=30) offered it *currently*, which referred to a time period between January and May of 2019. If the results were generalized to the population of 249 IEPs, this meant nearly 101 U.S. IEPs governed by colleges or universities could have experimented with OLA in the last five years, and 62 could be offering it *currently*. If the generalizability of the results were ignored since 51.4% (n=128) of IEPs did not respond to the survey, at least 19.7% (n=49) of all U.S. IEPs had experimented with OLA in the last five years, and at least 12% (n=30) offered it *currently*.

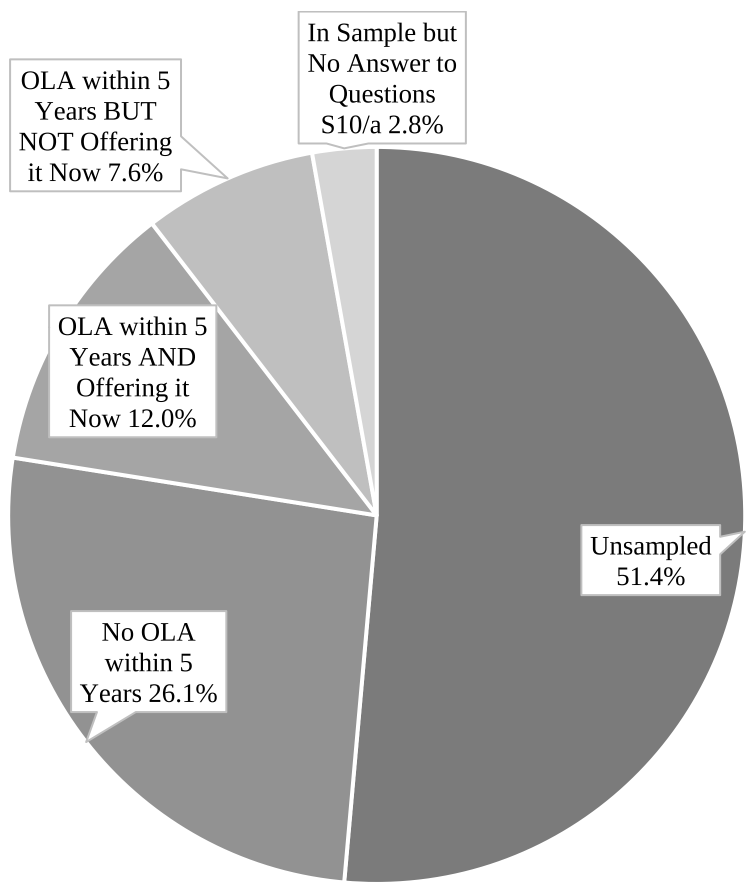

Figure 4.2. Percentage of IEPs having adopted OLA in the past 5 years or currently offering it.

Limits

Because the question about current OLA adoption (i.e., question S10a) was one of the questions dependent on a positive response to the question about OLA adoption within the last five years (i.e., question S10), all those who chose *yes* for S10a also chose *yes* for S10. Thus, if at least one survey participant reported their IEP had experimented with OLA in the last five years or was currently offering at least one OLA course, then that IEP was classified as having had a recent experience with OLA adoption. It should be noted that not all the directors and faculty were aware of whether their IEP had been experimenting with or was *currently* offering OLA (questions S10 and S10a), which is a limitation of the study. Of the 328 participants from the 121 IEPs, only in 15 of those IEPs (i.e., 12.4%) did all the participants – at least two – from one IEP agree that OLA had been experimented with in the last five years. In contrast, participants from 60 IEPs (i.e., 49.6%) agreed that it had not been experimented with during that time frame. This inconsistency meant that in some of the IEPs reported as non-adopting according to the results, it was possible they had adoption experience, but the person who responded to the survey did not know this. Thus, these results were limited by the institute-level knowledge of the participants.

IEP Adoption by State

The population of 249 accredited university or college-governed IEPs in this study had a presence in the District of Columbia (D.C.) and 45 states, which excluded five states: Alaska, North Dakota, Rhode Island, South Dakota, and Wyoming. Of the 45 states and D.C., participants from 39 states and D.C. responded, which excluded the following six states: Arkansas, Maine, New Hampshire, New Jersey, New Mexico, and Oklahoma.

The results reveal that 29 states had IEPs which had experimented with OLA in the last five years (see the states in the five shades of green in Figure 4.3; the darker the shade, the more IEPs in that state have adopted OLA). Based on the responses from 315 participants, 97 of whom answered question S10 positively, there were at least 49 IEPs which had experimented with OLA in the last five years, which was 40% of the 121 IEPs who responded and 20% of the population of 249 accredited, university or college-governed U.S. IEPs.

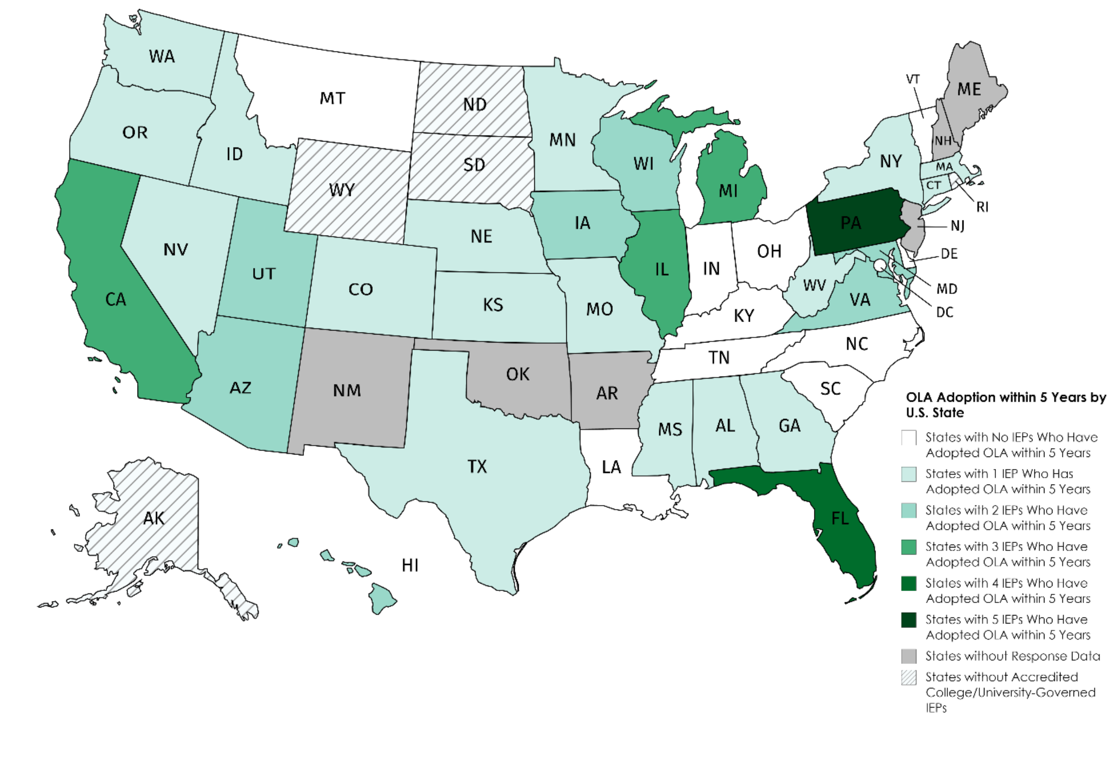

Figure 4.3. Recent experience with OLA adoption, by U.S. state.

IEP Adoption by Participants' Position

Of the 328 participants, 309 responded to both questions S2 and S10 related to the participants' IEP position and whether their IEP had adopted OLA in the last five years. Figure 4.4 presents how participants' position – as directors or faculty – was related to their IEPs' recent experience with OLA adoption.

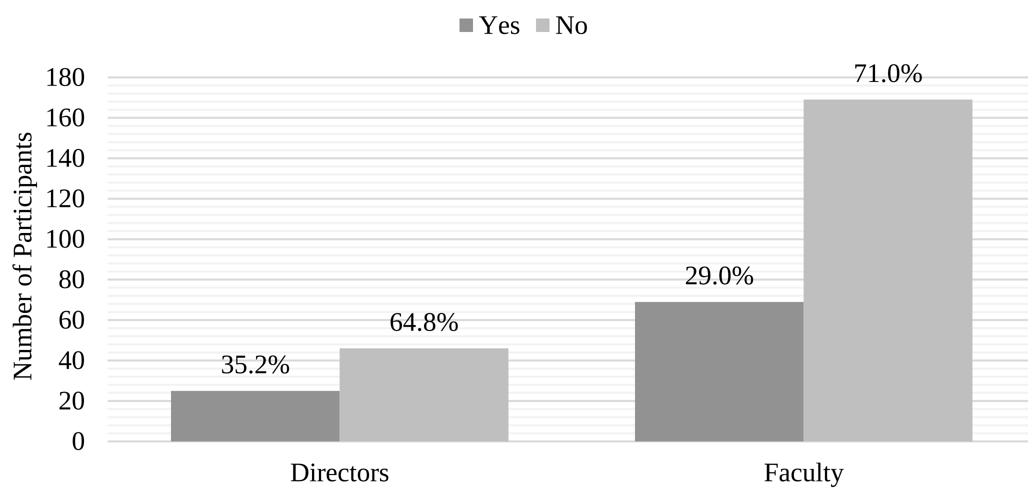

Figure 4.4. Cross-tabulation of IEP adoption and participants' position.

IEP Adoption by Participants' Employment Status

Of the 328 participants, 309 responded to both questions S12 and S10 related to the participants' employment status and whether their IEP had adopted OLA in the last five years. Figure 4.5 presents how participants' employment status – as full-time or part-time – is related to their IEPs' recent experience with OLA adoption.

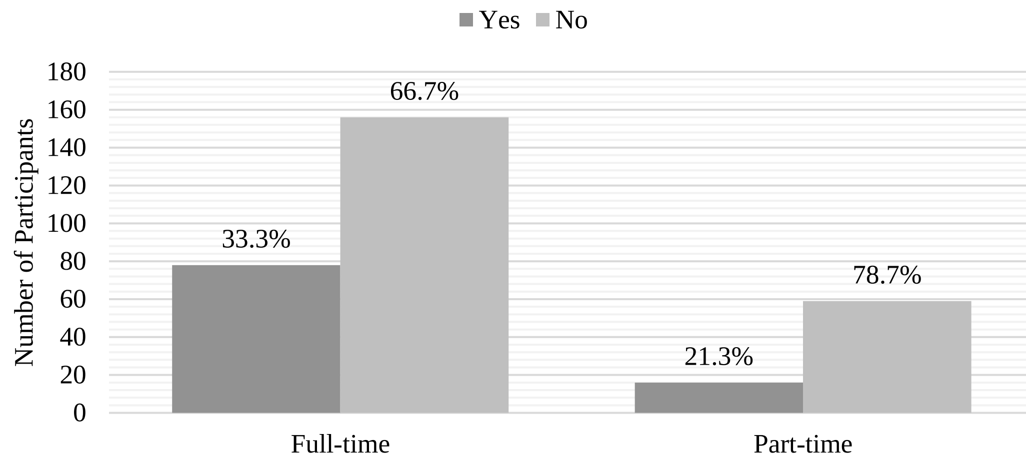

Figure 4.5. Cross-tabulation of IEP adoption and participants' employment status.

IEP Adoption by Participants' Age Range

Of the 328 participants, 306 responded to both questions S11 and S10 related to the participants' age range and whether their IEP had adopted OLA in the last five years. Figure 4.6 presents how participants' age ranges – primarily in five-year increments – was related to their IEPs' recent experience with OLA adoption.

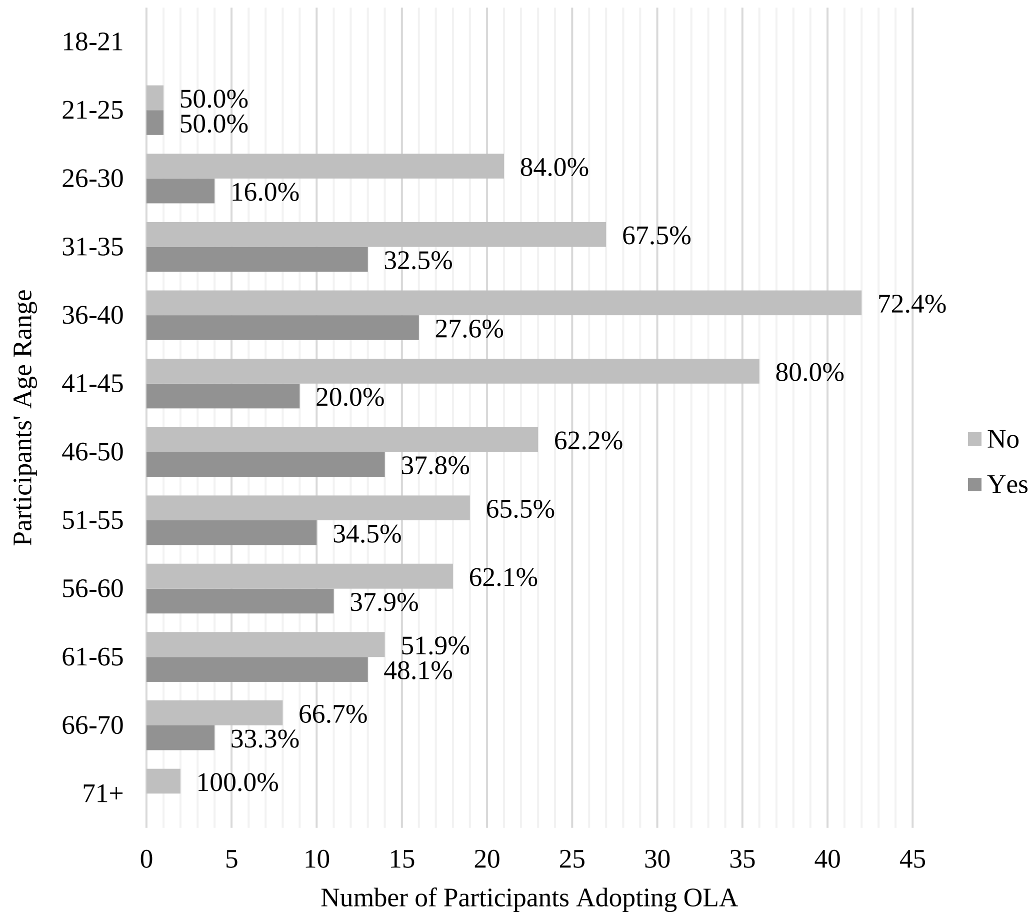

Figure 4.6. Cross-tabulation of IEP adoption and participants' age range.

IEP Adoption by Participants' Years of Employment in U.S. IEPs

Of the 328 participants, 313 responded to both questions S13 and S10 related to the number of years participants' have been employed full or part-time in any U.S. IEP and whether their IEP had adopted OLA in the last five years. Figure 4.7 presents how participants' years of experience in IEPs – primarily in three-year increments – is related to their IEPs' recent experience with OLA adoption.

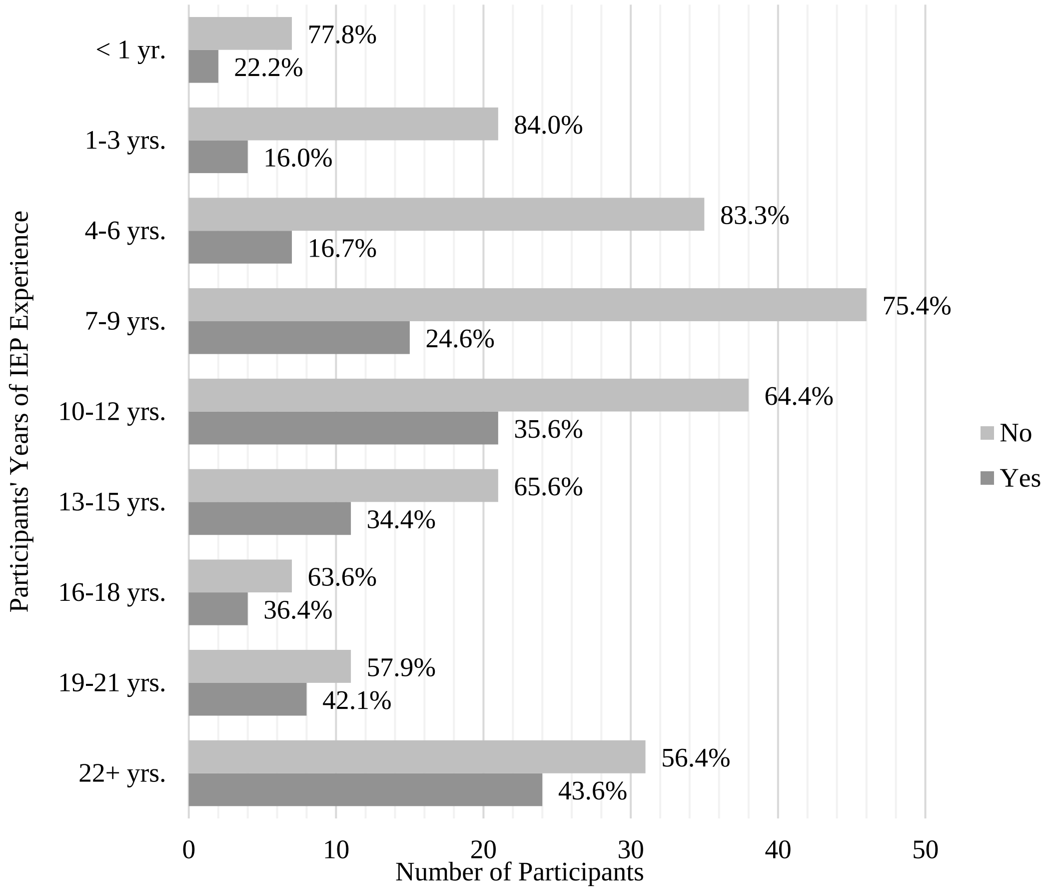

Figure 4.7. Cross-tabulation of IEP adoption and participants' years of IEP employment experience.

Characteristics of IEPs with OLA Adoption Experience

Responses to questions S10a through S10f provided further details on how IEPs who had recent OLA adoption experience were integrating it into their IEPs (see Table 4.4).

Number of faculty teaching OLA courses at IEPs. Of the 97 participants from the 49 IEPs in the sample who reported their IEP had experimented with OLA in the last five years, 88 answered question S10e regarding the number of faculty in their IEP who had taught OLA courses. As seen in Figure 4.8, the highest percentage (i.e., 56.9%;

n=50) of participants reported their IEP had between one and three faculty teaching OLA courses.

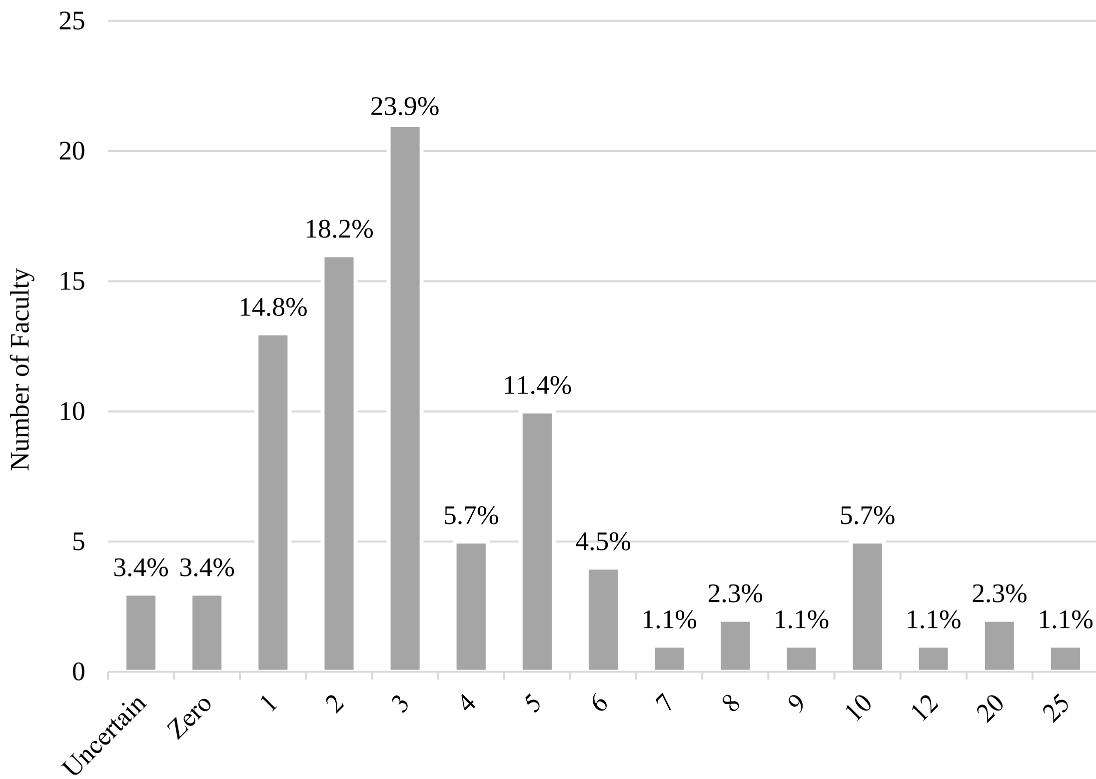

Figure 4.8. Number of faculty teaching OLA courses in IEPs who have adopted OLA in the last 5 years.

OLA course proficiency levels available within adopting IEPs. Of the 97 participants from the 49 IEPs in the sample who reported their IEP had experimented with OLA in the last five years, 88 answered question S10b regarding the proficiency levels offered in their OLA courses. Figure 4.9 presents the proficiency levels offered in exclusivity. Additionally, allowing for overlap, 35.2% of the participants (n=31) whose IEPs had recent experience with OLA reported their IEPs offered beginner levels, 67.0% (n=59) offered intermediate levels, and 73.9% (n=65) offered advanced levels.

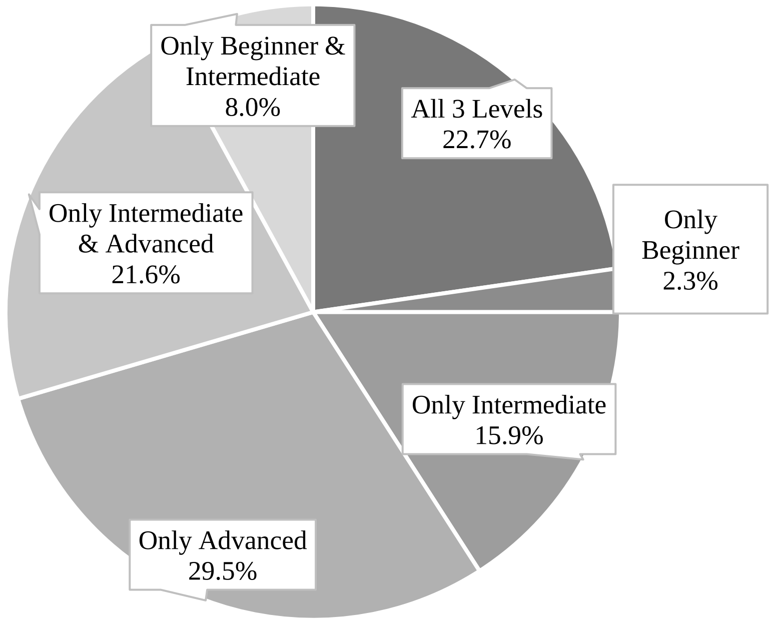

Figure 4.9. OLA proficiency levels.

Language skills taught using OLA within adopting IEPs. Of the 97 participants from the 49 IEPs in the sample who reported their IEP had experimented with OLA in the last five years, 81 answered question S10c regarding the five skills or subjects typically taught in IEP programs: reading, writing, listening, speaking, and grammar. Figure 4.10 presents the number of participants, from the 81 who answered question S10c, who reported their IEP taught OLA according to the skills available. One course could have incorporated one to five skills. See the pie chart in Figure 4.10 for the results according to those reporting their IEP had recent experience with OLA adoption.

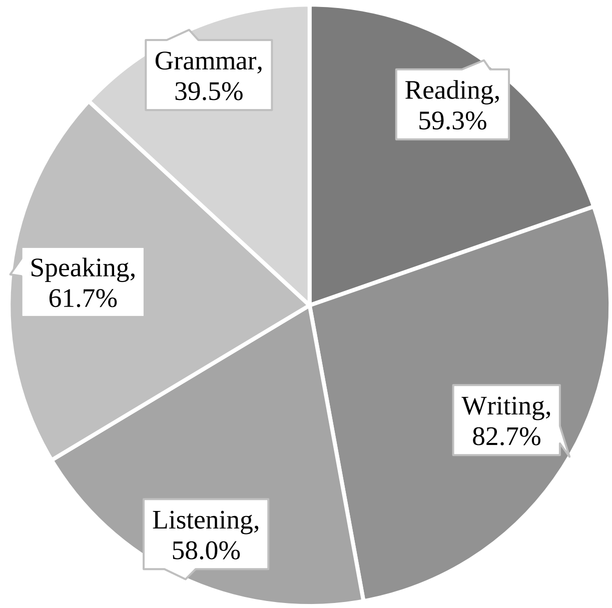

Figure 4.10. OLA skills taught in IEPs with OLA experience, by skill, overlapping.

The highest percentage of participants (i.e., 40%; see Figure 4.11) reported their IEPs taught all the primary language skills (i.e., writing, reading, listening, and speaking). Grammar was commonly taught integrated into all skills, so it was excluded from Figure 4.11 unless the participants reported it was the only subject taught.

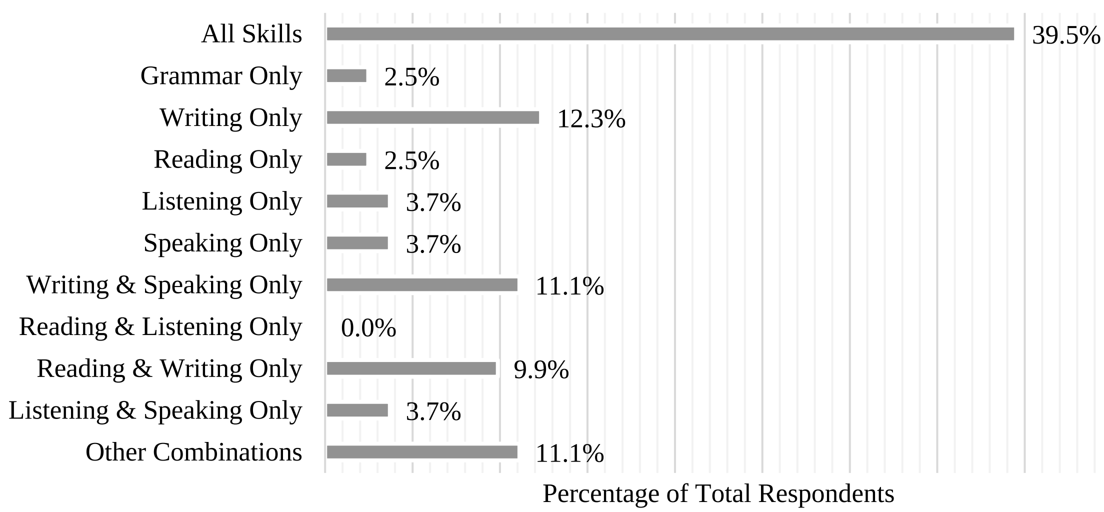

Figure 4.11. OLA skills taught in IEPs who have adopted OLA, by skill foci.

OLA for Recruitment Purposes

One use of OLA was to advertise an IEP to international students abroad for the purposes of recruitment. This was relevant to the first research question because it described how OLA had been adopted at some institutes, and because recruitment can lead to enrollment, which was often tied to IEPs' financial viability (Soppelsa, 2015), its use was relevant to the topic of OLA adoption. Of the 97 participants from the 49 IEPs in the sample who reported their IEP had experimented with OLA in the last five years, 94 answered question S10f asking how often international students had begun with their IEPs' OLA courses while in their home country before joining the face-to-face classes at their IEP. While all the questions regarding the descriptions of the IEPs' OLA program and courses were dependent on the knowledge of the participants, question S10f required knowledge of the IEPs' recruitment strategies and successes. Few participants reported their IEP had successfully used OLA for recruitment (see Figure 4.12). Regarding the one participant who reported their IEP almost always had success with OLA for recruitment, they described their OLA experience as being a completely independent online ESL program which was separate from their regular ESL program.

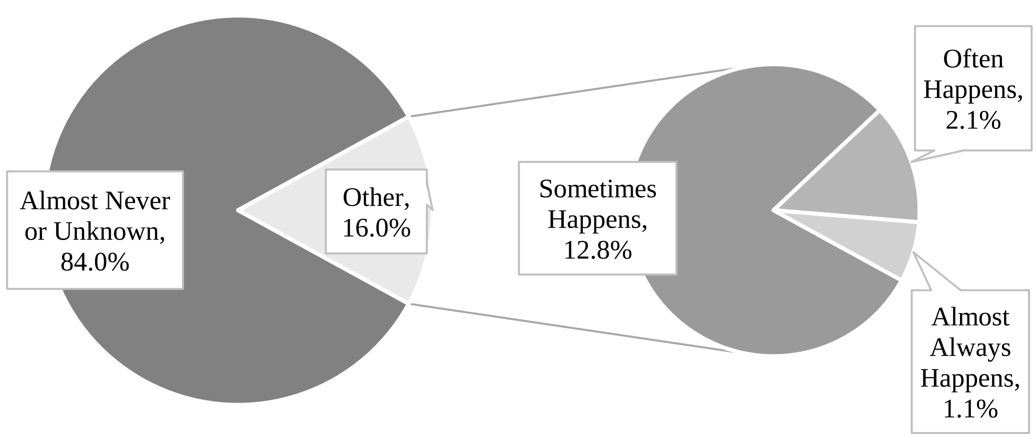

Figure 4.12. OLA for recruitment purposes.

Research Question Two

The second research question – How do IEP directors and faculty perceive the adoption of OLA in their IEPs? – focused on six organizational characteristics of innovations: compatibility (CPB), enrollment and economic advantages (EEA), general benefit (GBN), complexity (CMX), articulated results (ART), and visibility (VIS; Rogers, 1962; Moore & Benbasat, 1991; Frambach & Schillewaert, 2002; Tornatzky & Klein, 1982). To understand the adoption decision process of directors and faculty, it was important to learn how both directors and faculty perceived each of these six innovation attributes regarding their organization's innovativeness in the area of OLA.

The responses to questions S5, S7, S8, and S9 informed the results of this research question. Question S5 is the 32-item PCI Likert survey (see Appendix B within the final survey). Questions S7, S8, and S9 were also listed in Table 4.5.

Table 4.5

Survey Questions Informing the Analysis of Research Question Two

Question	Item Wording
S5.	Regarding your intensive English program (IEP), indicate how strongly you agree or disagree with the following statements by choosing the response that best represents your opinion. *[32 statements in six categories follow this question; see Appendix B for the full list.]*
S7.	Indicate your degree of confidence in learning to use new technological innovations. *Options: Almost No Confidence, Low Level of Confidence, Moderate Level of Confidence, and High Level of Confidence*
S8.	Which of the following do you have experience with? *Multiple selection options: Online learning as a student, Online learning through my employer and/or in professional development, Video conferencing technology, Online learning management systems to make or collect assignments, Digital ESL textbooks, Online grading or online gradebooks, Online activities (other than digital textbooks) with my ESL students, Recorded video feedback to students, and Video recording of all or part of my ESL classes*
S9.	Does your IEP record live classes on video and offer those for students to view online? *Options: No, Yes*

Rasch Analysis of Faculty and Director Perceptions of OLA

For meaningful measurement with the Rasch model, the data must have a random probability of distribution (i.e., stochasticism) and be unidimensional (i.e., each item indirectly measures the dimension of OLA adoption), and the items must be independent (i.e., not depending on the responses from other items). The 32 PCI survey items (i.e., item S5), the OLA leadership item (i.e., item S6), the new technological confidence item (i.e., item S7), and the 10 items in the technology cluster (i.e., items S8-S9) meet all three of these requirements and will be included in the Rasch analysis. A stronger response (e.g., *strongly agree*, *high*, or *yes*) in all of these items theoretically pointed to a stronger degree of agreement with the same latent variable. In the Winsteps analysis, these items are numbered 1-44, respectively. In contrast, the items asking for demographic data on the participants and their IEP institutes were excluded from the Rasch analysis, except as potential variables to be included in the DIF analysis. Using Winsteps version 4.4.1 software, a grouped, mixed RSM and PCM model was applied to the persons and items to test the overall fit of the data to the model.

Dimensionality analysis. Linacre (2018a) contends the Rasch dimensionality analysis identifies non-random patterns of residuals and can be used to determine whether a second dimension exists. The six perceived characteristics of innovation (e.g., compatibility, enrollment and economic advantage, general benefit, complexity, articulated results, and visibility) were theoretically separate subsets of the dimension of OLA adoption potential. In addition, there were four other questions totaling 12 items which were also theoretically on the latent variable of OLA adoption: OLA leadership, new technology confidence, and the 10 technology cluster items. Items in the technology cluster may indicate a participants' willingness to adopt another related technology (Rogers, 2003), such as OLA. Indeed, many of the technologies are necessary for OLA to occur (e.g., video conferencing, online gradebooks, digital textbooks, and other online activities). Similarly, participants' confidence in learning to use new technology was expected to be higher for those who could endorse more of the technology cluster items as well as those who did not consider complexity to be a hindrance to adopting OLA.

Linacre (2018a) postulates five broad steps to determine if a second dimension exists among the residuals using the Winsteps dimensionality analysis.

Step one. *Confirm lack of displacement between the observed and expected variance*. This was the case with the data in the analysis. The raw variance explained by the measures differed the most by 0.6%, which includes the raw variance explained by persons and items. Thus, no displacement was found.

Step two. *Confirm the unexplained variance in the first contrast was not accidental*. Linacre (2018a) argues the second dimension must have the strength of two to three items to be large enough to affect the measurement and discount the possibility of coincidental correlations. The eigenvalue of the first contrast was 5.17, which was 6.6% of the total unexplained variance, and this suggested a possible second dimension. The eigenvalues of the remaining contrasts were inconsequential.

Step three. *Determine if patterns of residuals are present in the items loading high and low in the first contrast*. Using the data in Winsteps' table 23.2, a pattern of residuals was identified among those items loading high in the first contrast but none in the remaining contrasts. Of the 19 items loading high in the first contrast, eight focus on the benefits of OLA for an IEP. This includes all six items of the PCI *general benefit* (GBN) and two more items (e.g., 03ART and 17EEA), the first of which mentions benefits and the second of which describes one specific benefit. Four others among the remaining 11 which loaded high are related to specific benefits of OLA (see Table 4.6).

There was one possible pattern among the 25 items loading low in the first contrast: all but two of the non-PCI items were grouped close together with factor loadings ranging from -0.37 to -0.24. This includes items S6 and S7 asking about participants' involvement in OLA leadership and confidence in learning new technology as well as eight of the ten technology cluster items, excluding only S8.7 and S9 about using other, non-gradebook, online activities and recording classes for online use. It is worth noting that all the non-PCI items have a different scale than the other items, and all the technology cluster items are on a dichotomous scale. There was no other discernable pattern in those items loading low. The benefit-focused items load high and the non-PCI items loading low could be indicative of two separate dimensions among the 44 items in the first contrast, but further confirmation was required.

Table 4.6

Items Loading High in the First Contrast of the Rasch Principal Components Analysis

Loading	Item Code	PCI Statements
0.64	21GBN	Offering online ESL classes enhances the effectiveness of my IEP.
0.60	13GBN	Offering online ESL classes improves the quality of my IEP.
0.59	31GBN	Overall, I find offering online ESL classes to be advantageous for my IEP.
0.56	26GBN	Offering online ESL classes improves the performance of my IEP.
0.48	03ART	I would have no difficulty telling others about the potential benefits of offering online ESL classes.
0.48	10GBN	I feel confident in the advantages of offering online ESL classes at my IEP.
0.46	17EEA	Offering online ESL classes gives my IEP a competitive advantage over other IEPs.
0.43	01GBN	I feel certain that international students will benefit from online ESL classes offered by my IEP.

Step four. *Determine if there was a negative correlation between items in contrast one and three*. Winsteps' table 23.0 also identifies the correlations between contrasts one and three using two statistics: the Pearson and disattenuated correlations.

Linacre (2018a) stresses that the disattenuated correlation is a more helpful indicator because it estimates a correlation similar to the Pearson but without measurement error. A Pearson correlation or disattenuated correlation of >0.7 shows the items are measuring the same thing whereas a correlation of <0.3 shows multiple dimensions are very likely (Linacre, 2018a). A correlation from 0.4 to 0.6 is more ambiguous but still less likely to point to multiple dimensions. The Pearson correlation for the data in the first contrast was 0.55, and the disattenuated correlation was 0.67, which strongly suggested only one dimension was being measured. The other contrasts' disattenuated correlations were also not below 0.3.

Step five. *Confirm dimensionality analysis using Winsteps' simulated data*. Linacre (2018a) proposes repeating the prior steps using simulated data to confirm the existence of multiple dimensions. For perspective, the simulated data fit the model slightly better than the authentic data, which suggests the potential second dimensions were due to the specific participants in this sample rather than the measurement tool.

The simulated dimensionality analysis indicated no displacement between the observed and expected raw explained and unexplained variance. Unlike with the authentic data, the eigenvalues of the unexplained variance in the simulated data were 1.82, implying differences in the first contrast are more likely coincidental. In a review of the factor loadings, the contrasts between the high and low were more balanced and had no discernable patterns, like those present in the authentic data. The benefit-focused and non-PCI items loaded more evenly. Lastly, the Pearson and disattenuated correlations were 0.72 and 0.86, respectively, which implies a single dimension was being measured.

Results of Rasch dimensionality analysis. The dimensionality analysis indicates the existence of a strong strand of benefit-focused items, which includes all of the PCI *general benefit*. A review of the other contrasts did not reveal any additional strands, which suggests the other five PCI represented the single dimension more strongly than they did the individual strands of the dimension. Additionally, because the non-PCI items had moderately positive correlation statistics above 0.3, and their variance increased with the simulated data, the strength of the non-PCI items in the high/low loadings contrast was most likely due to the use of a different scale for those items, and thus did not represent a second dimension. Overall, the dispersion of residuals was adequately random to suggest the 44-item measurement tool measured a single dimension. Thus, the 44 items which were on the latent variable of *OLA adoption potential* were analyzed together.

Point-biserial correlations. Point-biserial correlations were analyzed to determine polarity of the items. Linacre (2019) maintains that a negative point-biserial number would have meant the item was not on the latent variable because of input errors or reverse scoring. None of the items had negative point-biserial correlations.

Item and person separation and reliability. Two primary components of person and item fit are separation and the reliability of those separation indexes (Bond & Fox, 2015). Person separation classifies people according to their item performance (Linacre, 2019), with scores > 2 indicative of a tool adequately distinguishing performers, which was the case with this instrument (see Table 4.7). This instrument's item separation score of 10.1 suggests it was able to classify the items into a hierarchy of difficulty (a minimum value of 3 was necessary for sufficient item distinction), and the sample size was not too small. In contrast to separation, reliability values show whether the persons (if > 0.8) or items (if > 0.9) may have similar scores if reproduced (Linacre, 2019). As seen in Table 4.7, this instrument's person and item reliability scores were more than enough. Additionally, when computing the item and person reliability indexes, Winsteps assumes the sample is the population, so when it is not, the reliability and separation numbers were slightly higher than those reported (Linacre, 2019). Thus, a re-administration of this tool is likely to have a similar person reliability value.

Similar to person reliability is Cronbach's Alpha, which Winsteps also computed for those more familiar with that test reliability statistic. However, Linacre (2019) notes that Cronbach's Alpha overestimates reliability while the Rasch model underestimates it. The Cronbach's Alpha (KR-20) was 0.96 (SEM 3.69), which was within the range of normal but could also suggest the presence of redundant items (Tavakol & Dennick, 2011). The Wright map and item measures, as later in this chapter, confirm the existence of items measuring the latent variable at similar levels of difficulty.

Table 4.7

Model Fit, part 1

	Persons			Items	
	Mean Measure	Separation	Reliability	Separation	Reliability
Model Fit (44 items)	0.11	3.16	0.91	10.10	0.99

Fit statistics. In addition to person and item separation and reliability, another substantial part of person and item fit is infit and outfit statistics, which were measured by mean standardized squares (MNSQ). Mean squares are focused on a productive fit and are independent of the sample size if the data noise is spread evenly across the sample (Linacre, 2014), as the dimensionality analysis has shown. As seen in Table 4.8, the overall mean person and item infit scores were very close to 1, which points to a good fit. Linacre (2019) observes that low infit mean squares would have suggested dependency in the data, and high values would have identified noise in the data. Additionally, the overall mean person and item outfit scores were slightly greater than 1, which also implies a good fit. As with infit, low outfit mean squares also would have suggested dependency in the data, but high outfit values would have suggested the presence of unexpected outliers in the data. Thus, the mean data lacked dependency, excessive noise, and the presence of unexpected outliers.

Table 4.8

Model Fit, part 2

	Infit MNSQ (SEM)	Outfit MNSQ (SEM)
Persons	0.99 (0.03)	1.06 (0.03)
Items	1.01 (0.04)	1.07 (0.05)

Note. SEM = standard error of the mean measure of items or persons (Linacre, 2019).

However, Winsteps also computes individual person and item infit means squares to identify person and item misfit.

Misfitting persons. Linacre and Wright (1994) note the most acceptable range of infit and outfit mean square values for person fit is 0.6 to 1.4. Of the 328 participants, there were 112 persons misfitting the model, with 69 underfitting it and 43 overfitting it. This was unsurprising based on the results of the simulated data in the dimensionality analysis, where the fit increased substantially when the simulated person data were used. However, person misfit was of less concern than item misfit because another administration of the instrument could include a larger variety of persons who may endorse the statements differently (Bond & Fox, 2015). Additionally, there were no extreme person scores, meaning no participants fit the model too perfectly (i.e., no one endorsed a single category for every question). Winsteps would have omitted their measures from the fit results.

Bond and Fox (2015) identify person misfit as a possible targeting issue, which was likely the case with this data since approximately one-third of participants misfit the model, and the simulated person data shows a substantially better fit.

Misfitting items. Linacre and Wright (1994) postulate that for the items in a rating scale or survey, the most acceptable range of infit and outfit mean square values is 0.6 to 1.4, with 1 being the best possible value. Seven items underfit (i.e., > 1.4) the model, and none overfit (i.e., < 0.6) it. Bond and Fox (2015) note that overfitting items may "have no practical implications at all" though the values can lead to "smaller standard errors and inflated separation/reliability" (p. 271). In contrast, underfit was a greater concern because it suggested there were problems with the model which could be due to poor item design, special knowledge, or guessing, all of which degrade the measures (Bond & Fox, 2015).

Table 4.9 identifies the seven underfitting items. Their difficulty measures are also shown. For perspective, the most difficult to endorse item was S9RCO (3.18, SE 0.24), which was present in Table 4.9, and the easiest item to endorse was S86GR (-2.74, SE 0.07).

Table 4.9

Underfitting Items

Item Code	Measure/Difficulty (SE)	Infit MNSQ	Outfit MNSQ
S6_LD	0.82 (0.07)	1.47	1.95
18VIS	2.22 (0.09)	1.53	1.69
S84LM	-1.95 (0.17)	1.16	1.66
S82PD	-1.60 (0.15)	1.20	1.56
22VIS	0.61 (0.09)	1.42	1.46
11VIS	0.75 (0.09)	1.42	1.45
S9RCO	3.18 (0.24)	1.08	1.44

Even though these seven items underfit the model and indicated too much variability in the responses to them, they were not removed from the analysis. Linacre (1994a) believes that items with infit and outfit mean squares between 1.5 and 2.0 are unproductive when creating measurements, but they do not degrade the measurement system. Thus, because these are all less than 2.0 and did not degrade the measurement system, they have not been removed from the analysis.

Category function. The step calibrations, or Rasch-Andrich thresholds, were analyzed for the data's four scales to determine if they functioned well. There should be two forms of progression that increase with the rating scales (Linacre, 2019). As Bradley, Cunningham, and Gilman (2013) clarify, "advancing average measures with each category and step calibrations ensure the rating scale measure is stable and accurate" (p. 1338). Linacre (1999) proposes step calibrations should advance by at least 1.4 logits; otherwise, "redefining the categories to have wider substantive meaning or combining categories may be indicated" (p. 119), but steps advancing more than 5 logits indicate that "a 'dead zone' develops in the middle of the category [and]… measurement loses its precision” (p. 119). Additionally, Linacre (1999) maintains that “a uniform distribution of observations across categories is optimal for step calibration” (p. 110), which means the intermediate categories should have the observation highest frequency (Linacre, 2019). See Table 4.10 for a comparison of the four scales used in the analysis.

Table 4.10

Scales in the Analysis

Parts of Survey	Item No’s	Winsteps Item No’s	Scales
PCI Survey	S5	1-32	Strongly Disagree, Disagree, Agree, Strongly Agree
OLA Leadership	S6	33	None, Low, Moderate, High
Tech Confidence	S7	34	Almost None, Low, Moderate, High
10 Tech Clusters	S8 & S9	35-44	No, Yes

Category function of the PCI items. As seen in Table 4.11, the overall step calibration thresholds and category measures progressed with the rating scale, with the step calibrations advancing at least 1.4 logits and less than 5 logits.

Table 4.11

Category Function of the 32 PCI Items

Category Labels & Scores	Observed Counts & Percentages	Andrich Step Thresholds	Category Measures
1 Strongly Disagree	1,306 (13%)	None	-3.34
2 Disagree	3,599 (36%)	-2.14	-1.21
3 Agree	4,204 (42%)	-0.23	1.11
4 Strongly Agree	995 (10%)	2.36	3.52

Note. 4% (n=392) of items had missing scores.

The observed counts for the categories in Table 4.11 showed a standard order wherein the intermediate categories had the highest frequencies (Linacre, 2019). However, there were some inconsistencies for six items.

An individual item investigation of the category frequencies for each of the PCI items revealed that each had a standard order with the intermediate categories having the highest frequencies, except for six items: 18VIS, 27VIS, 29VIS, 28EEA, 32EEA, and 25CMX. As seen in Table 4.12, all but 28EEA had high difficulty measures. The second and third highest frequency categories (e.g., *Strongly Agree* and *Disagree*) of 28EEA were very near each other with a difference of only 14 observations. In contrast, the differences between the second and third highest frequency categories for the other five items had differences ranging from 38 to 110. Unsurprisingly, the five items with more substantial differences were also the same items with the largest item measures. In fact, these five items were also the five most difficult-to-endorse PCI items. Of this group, all had positive point measure correlations, and only 18VIS had a higher-than-preferred infit and outfit mean square (e.g., 1.53 and 1.69, respectively).

Table 4.12

Non-Standard Category Frequencies of the PCI Items

Item Measure	Measure S. E.	Item Code	Strongly Disagree	Disagree	Agree	Strongly Agree
2.22	0.09	18VIS	160	115	37	7
2.27	0.10	27VIS	149	135	25	6
1.76	0.09	29VIS	116	149	42	10
-0.96	0.09	28EEA	13	50	185	64
1.99	0.09	32EEA	123	134	39	4
1.54	0.09	25CMX	86	185	48	6

An individual item investigation of the PCI item category measures showed that items 18VIS and 25CMX (see Table 4.13) were the only ones to have category measures that did not progress with the rating scale. However, 25CMX only fell short by 0.13 logits as opposed to 18VIS which fell short by 0.49 logits.

Table 4.13

PCI Items with Category Measures Not Ascending with Rating Scale

Item Measure	Measure S. E.	Item Code	Strongly Disagree	Disagree	Agree	Strongly Agree
2.22	0.09	18VIS	-0.15	0.19	0.91	0.43*
1.54	0.09	25CMX	-0.56	0.14	1.08	0.96*

*categories not ascending with rating scale.

Although the category measure and the category frequency orders for item 18VIS did not perform as expected, its difficulty measure performance matched that of 27VIS, which had a nearly identical meaning once 18VIS's reverse scoring was considered (see Table 4.14). Thus, item 18VIS was not removed from the analysis.

Table 4.14

Contrasting Difficulty Measures of 18VIS and 27VIS

Item Measure	Measure S.E.	Item Code	Item Wording
2.27	0.10	27VIS	I frequently see online ESL being used in my IEP.
2.22	0.09	18VIS	Online ESL classes are rarely seen in my IEP.

The Andrich step thresholds were also displayed as probability curves, which highlighted how well each category was utilized. The numbers used for the Andrich threshold step difficulties were the person minus item difficulty measures found at the intersections of the probability curves of each category. The category probability curves for those 32 items remained balanced (see Figure 4.13).

```
P      -+------+------+------+------+------+------+------+------+-
R  1.0 +                                                         +
O      |                                                         |
B      |                                                         |
A      |11                                                      4|
B   .8 +  111                                                 44 +
I      |     1                                              44   |
L      |      11                                          44     |
I      |        1                         33333          4       |
T   .6 +         11                    333     333      4        +
Y      |           1    22222222     33           33  44         |
    .5 +            1 22        22  3               34           +
O      |            2*1           **                433          |
F   .4 +          22   1         3  2             44   3         +
       |         2      1      33    22          4      33       |
R      |       22        1    3        2       44         33     |
E      |     22           11 3          22    4             33   |
S   .2 +   22              3*1            2244                33 +
P      |222              33   11          4422                  3|
O      |              333       11     444    222                |
N      |         33333            *****          222222          |
S   .0 +*********4444444444444444      1111111111111111**********+
E      -+------+------+------+------+------+------+------+------+-
       -4     -3     -2     -1      0      1      2      3      4
        Person [MINUS] Item MEASURE
```

Figure 4.13. Category probabilities for the 32 PCI items.

Category function of item S6. As seen in Table 4.15, the category measures progressed with the rating scale. However, although the step calibration thresholds progressed with the rating scale, they lacked the minimum 1.4 logit step between categories recommended by Linacre (1999, p. 625), which suggested the presence of "threshold disordering" (Linacre, 2019, p. 540). Furthermore, the observed counts were strongly disordered, meaning the intermediate categories did not have the highest frequencies. The exact wording of item S6 was as follows:

> *S6. Indicate your degree of involvement in leading the adoption of online ESL at your IEP. Choose one:*
>
> | | |
> |---|---|
> | *No Involvement* | *Low Level of Involvement* |
> | *Moderate Level of Involvement* | *High Level of Involvement* |

Item S6 had a solid polarity (e.g., 0.43), and it did not need to be reverse coded because a higher category endorsement meant a greater theoretical likelihood of OLA adoption.

Table 4.15

Category Function of Item S6 on OLA Leadership Interest

Category Labels & Scores	Observed Counts & Percentages	Andrich Step Thresholds	Category Measures
0 None	147 (47%)	None	-1.01
1 Low	72 (23%)	-0.29	0.29
2 Moderate	57 (18%)	-0.26	1.30
3 High	39 (12%)	0.55	2.74

Note. 4% (n=13) of items had missing scores.

Of particular note, categories one and two did not peak (see Figure 4.14). Linacre (2019) explains that "the [category probabilities] plot should look like a range of hills. Categories which never emerge as peaks correspond to disordered Rasch-Andrich thresholds. These contradict the usual interpretation of categories as a being sequence of most likely outcomes" (p. 349-350). Clearly, categories one and two did not peak, which represents disordered thresholds.

Furthermore, Linacre (1999) asserts that step threshold advances of less than 1.4 logits, which is “the distance between 50% success and 80% success on dichotomous items” (p. 625), showed the categories lacked “substantive meaning” (p. 527) and thus need to be redefined and may need to be combined. In fact, Linacre (2019) claims “the chief purpose for collapsing categories is to enable inferences to be made at the item-category-level” (p. 527). However, in the Winsteps manual, Linacre (2019) follows this advice with this warning:

> My own recommendation is usually that "threshold disordering" is a minor problem, (only relevant if category-level inferences are to be drawn from the data

about individuals,) provided that "category disordering" (disordering of the substantive meanings of the categories) is not observed in the data. (p. 527)

While item-level inferences were made in the following sections, category-level inferences were not used; thus, the categories were not combined. However, in later uses of this instrument, redefining the categories may be necessary, depending on targeting considerations.

```
P      -+------+------+------+------+------+------+------+------+-
R  1.0 +0                                                        +
O      | 0000000                                          3333333|
B      |        0000                                  3333       |
A      |            00                              33           |
B   .8 +              00                          33             +
I      |                00                      33               |
L      |                  0                    3                 |
I      |                   0                  3                  |
T   .6 +                    0               33                   +
Y      |                     0             3                     |
    .5 +                      0           3                      +
O      |                       0         3                       |
F   .4 +                        0      2*                        +
       |                         0  2223 222                     |
R      |                     11111**  3     222                  |
E      |                   11    2 01*         22                |
S   .2 +                111    22   * 11         22              +
P      |             111     22    3 0  11         222           |
O      |         1111      22    33   00  111         2222       |
N      | 11111111     22222  3333       0000 1111         2222222|
S   .0 +**************3333333               00000****************+
E      -+------+------+------+------+------+------+------+------+-
       -4     -3     -2     -1      0      1      2      3      4
        Person [MINUS] Item MEASURE
```

Figure 4.14. Category probabilities for OLA leadership.

Category function of item S7. As seen in Table 4.16, the step calibration thresholds and category measures progressed with the rating scale, with the step calibrations advancing at least 1.4 logits and less than 5 logits. Linacre (2019) states, “if the intermediate category has a relatively high frequency, the thresholds will advance, but if the intermediate category has a relatively low frequency, then the thresholds will be reversed (disordered)” (p. 527). The observed counts suggested two problems. First, the “almost none” category for item S7 had no endorsements. Second, the observed counts for the categories implied disordering because the intermediate category did not have the highest frequencies but category three for *High* was the largest (Linacre, 2019). This suggested the categories may need to be redefined in future uses of this instrument. However, Linacre (2019) maintains that threshold disordering is "minor problem" (p. 527).

Table 4.16

Category Function of Item S7 on Confidence in Learning to Use New Technologies

Category Labels & Scores	Observed Counts & Percentages	Andrich Step Thresholds	Category Measures
0 Almost None	0	N/A	N/A
1 Low	23 (7%)	None	-3.41
2 Moderate	124 (39%)	-1.01	-1.21
3 High	167 (53%)	1.01	0.98

Note. 4% (n=14) of items had missing scores.

The category probabilities in Figure 4.15 present no threshold disordering.

```
P      -+------+------+------+------+------+------+------+------+-
R  1.0 +                                                         +
O      |1111                                                 3333|
B      |    1111                                         3333    |
A      |        11                                     33        |
B   .8 +          111                               333          +
I      |             1                             3             |
L      |              11                         33              |
I      |                1                       3                |
T   .6 +                 11        222        33                 +
Y      |                   1    222   222    3                   |
    .5 +                    1 22         22 3                    +
O      |                    2*1           3*2                    |
F   .4 +                  22   1         3   22                  +
       |                 2      1       3      2                 |
R      |               22        11   33        22               |
E      |             22            1 3            22             |
S   .2 +           22              3*1              22           +
P      |        222              33   11              222        |
O      |    2222              333       111              2222    |
N      |2222             33333             11111             2222|
S   .0 +3333333333333333                       1111111111111111+
E      -+------+------+------+------+------+------+------+------+-
       -4     -3     -2     -1      0      1      2      3      4
        Person [MINUS] Item MEASURE
```

Figure 4.15. Category probabilities for technology confidence.

Category function of the technology cluster items. As seen in Table 4.17, the dichotomous items lacked step calibration thresholds and category measures. The observed counts for the categories revealed a higher frequency of *yes* observations.

Table 4.17

Category Function of Items S8 and S9 on the OLA Technology Clusters

Category Labels & Scores	Observed Counts & Percentages
0 No	1,143 (36%)
1 Yes	2,008 (64%)

Note. 4% (n=129) of items had missing scores.

Differential item functioning analysis. Differential item functioning (DIF) “indicates that one group of respondents is scoring better than another group of respondents on an item (after adjusting for the overall scores of the respondents)” (Linacre, 2017, para. 7). A DIF contrast score of at least |0.64| indicates moderate to large DIF and at least |0.43| for slight to moderate DIF (Linacre, 2017), but the probability value must be 0.05 or less to suggest the DIF was not just chance. Linacre (2019) argues that variables with dichotomous labels (i.e., faculty versus directors or adopters versus non-adopters) perform more clearly that polytomous labels. Thus, a DIF analysis was not used on demographic data which could not be divided into meaningful dichotomous labels; thus, age ranges and years of experience teaching or directing ESL were examples of variables excluded from the DIF analysis.

In order to learn whether there was a significant influence on the results by those who responded to the two questions regarding OLA leadership involvement and confidence in learning to use new technologies, the four-category responses to those two questions were divided using three methods to create dichotomous labels. In the first method, those who chose *high* responses were separated from those who chose *moderate*, *low*, and *none*. In the second method, the *high* and *moderate* responses were separated from the *low* and *none*. In the third method, the *high*, *moderate*, and *low* responses were separated from the *none*. By separating the responses in these methods, meaningful DIF results were discovered.

Where possible, a DIF analysis accompanied the presentation of results, such as participants' position, status, and experience with OLA. For useful results, a minimum number of persons was required depending on the type of scale used. For scales with four categories, a sample size of at least 200 was adequate to detect DIF (Scott et al., 2009), but "for dichotomous items, the sample size of each group needs to be around 1,000" (Linacre, 2019, p. 560). Thus, because only 97 responded to question S10a on the current status of OLA in IEPs, no DIF was performed with that data or with any of the S10a-f items. Additionally, because the S8 and S9 items on the technology clusters had dichotomous scales, there was an insufficient number of participants to perform a DIF analysis on them. The DIF analysis results were described alongside the Wright map results.

Person subtotals, means, standard errors, and fit statistics were configured using Winsteps table 28.1 for the dichotomous DIF variables (e.g., the OLA leadership involvement variations, the technology confidence variations, recent OLA experience in the last five years, position, and status). Similarly, item subtotals, means, standard errors and fit statistics were configured using Winsteps table 27.1 for the relevant item groups studied (e.g., each of the six PCI groups and the group of 10 technology cluster items).

Wright maps. Winsteps computed person and item separation indexes which classified people according to their item performance and items into a hierarchy of difficulty. Both were displayed on a Wright map for a visual demonstration of how the item and person performance related to each other: the items directly across from a person have a 50% chance of being endorsed at the highest category. This probability changes for items below and above a person, with items one logit below a person having a 73% chance of being endorsed, and items one logit above a person having a 27% chance of being endorsed. The numbers on the far left (i.e., -3 through 4) are the difficulty measures and written in logits which are a natural log-odds “unit of additive measurement” (Linacre, 2019, p. 624).

The “M” letters found on each side of the vertical line separating the participants from the items represents the mean for each group. The “S” and “T” letters on the line identify the locations which are one and two standard deviations, respectively, from the means. On the left side of the vertical line are the participants who are labeled with a “P” for person plus the chronological number which was determined by the time when they completed the survey. On the right side of the vertical line are the items. For the 32 PCI items, the names begin with the item number as it appeared in the survey, and each number was followed by the abbreviation for the PCI characteristic it was intended to measure. The remaining non-PCI items begin with an “S” followed by their number in the survey and an abbreviation to identify the questions’ wording.

The Wright map in Figure 4.16 presents the mean ability of the participants (i.e., the M on the left side) as slightly greater than the mean difficulty of the items (i.e., the M on the right side), which means the items were slightly less challenging than the participants' abilities. However, this difference was very slight with the mean ability of the persons being only 0.11 logits higher than the mean difficulty of the items. The similarity in item and person means suggested the questions and participants were well-matched.

```
MEASURE      Person - MAP - Item
                 <more>|<rare>
    4                  +
                       |
                       |
                       |
                     . |
                       |  S9RCO
    3                . +
                     . |
                       |
                    .# |
                    .# |T 27VIS
                     . |  18VIS
    2               .# T+ 32EEA
                     . |  29VIS
                    ## |
                     . |  25CMX
                    .# |
                  #### S|S
    1              .## +  20CPB
                ###### |  19CMX  23EEA  S6_LD
                ###### |  11VIS  22VIS
              ######## |  05CPB
              .####### |  02CPB  26GBN
                ###### M| S85DT  S88VF  S89RC
    0      .########## +M 09CMX  10GBN  13GBN  21GBN
                ###### |  15EEA  30EEA
               .###### |  03ART  12CMX  14ART  31GBN
            .######### |  01GBN  08CPB  16ART
              .####### |  07EEA  17EEA
                 .#### S| 04CPB  06EEA  24CPB  S81ST
   -1             .### +  28EEA
                 .#### |S S7_TC  S83VC
                     # |
                    ## |
                     . |  S82PD
                     . T|
   -2                  +  S84LM  S87AC
                     . |
                     . |T
                       |
                       |  S86GR
                       |
   -3                . +
                 <less>|<freq>
```

```
KEY
GBN: General Benefit
EEA: Enrollment &
Economic Advantages
CPB: Compatibility
CMX: Complexity
VIS: Visibility
ART: Articulated Results
OLA Leadership
Tech Confidence
Tech Clusters

EACH "#" IS 3
EACH "." IS 1-2
```

Figure 4.16. Wright map of all items and persons.

Based on the results of the pilot instrument, the *visibility* items were anticipated to be the most difficult items, and half of the *compatibility* items (e.g., 08CPB, 04CPB, and 24CPB) were expected to be the easiest to endorse. The remaining *compatibility* items as well as *articulated results* were expected to be near the person mean. *Complexity* was expected to range from near the person mean to one logit above whereas *general benefit* was expected to be range from near the person mean to 1 logit below. The *enrollment and economic advantages* items were expected to range from the easiest to hardest, with 32EEA being substantially more difficult than the rest. Although the OLA leadership, technology confidence, and technology cluster items were not included in the pilot analysis, the OLA leadership item was expected to be hard to endorse and the technology confidence item was expected to be in the middle of the technology cluster items. The technology cluster items themselves were expected to be increasingly difficult but in staggered groups with the first three being the easiest, the next three being slightly more difficult, and the remaining four being increasingly more difficult.

The Wright map in Figure 4.16 presents the participant mean as close to the *general benefit* item difficulties, which was similar to the modified pilot results and means it had an approximately 50% chance of being endorsed at the highest category by the average participant. However, the *articulated results* items were easier than expected. As occurred in the pilot, the *visibility* items were the most difficult to endorse, and overall, the technology clusters except for item S9RCO were the easiest to endorse. The question related to participants' confidence in learning new technology was 1.32 below the person mean, which meant the average participant had an approximately 78% chance of endorsing it. However, the technology confidence item was expected to perform similarly to the technology cluster items (mean -0.65; median -1.01), which was what occurred. As expected, the *complexity* items ranged from average to moderate difficulty, which meant the average participant had a 25 to 50% chance of endorsing those items at the highest categories. *Compatibility* was more difficult than expected. Except for item 32EEA, which was expected to be more difficult, the *compatibility* and *enrollment and economic advantages* were mostly spread from one logit above and below the person mean. This difficulty range meant the average person had between a 25 and 75% chance of endorsing these two PCI items, excluding item 32EEA which was 1.88 logits above the mean person and thus was nearly outside the endorsement range of the average participant. The OLA leadership question was 0.71 logits above the person mean, which meant the average participant had an approximately 87% chance of endorsing it at the highest category, but it was expected to be closer to the highest difficulty items. See Appendix E for the complete list of items, sorted by the difficulty measure.

In addition to the typical Wright map data, the person details in the following two Wright maps were divided again by those who endorsed *no* and *yes* for question S10 about OLA adoption in the last five years (see Figure 4.17) and question S10a about current OLA use (see Figure 4.18). The items in the Wright map in Figure 4.17 was based on all 328 responses, but the displayed person results are based on the responses of the 315 participants who responded to item S10. The removed persons' data were still calculated but was not visible in order to distinguish the participants who reported their IEP has offered OLA within the last five years (n=97) versus those who reported their IEP has not offered it in the last five years (n=218).

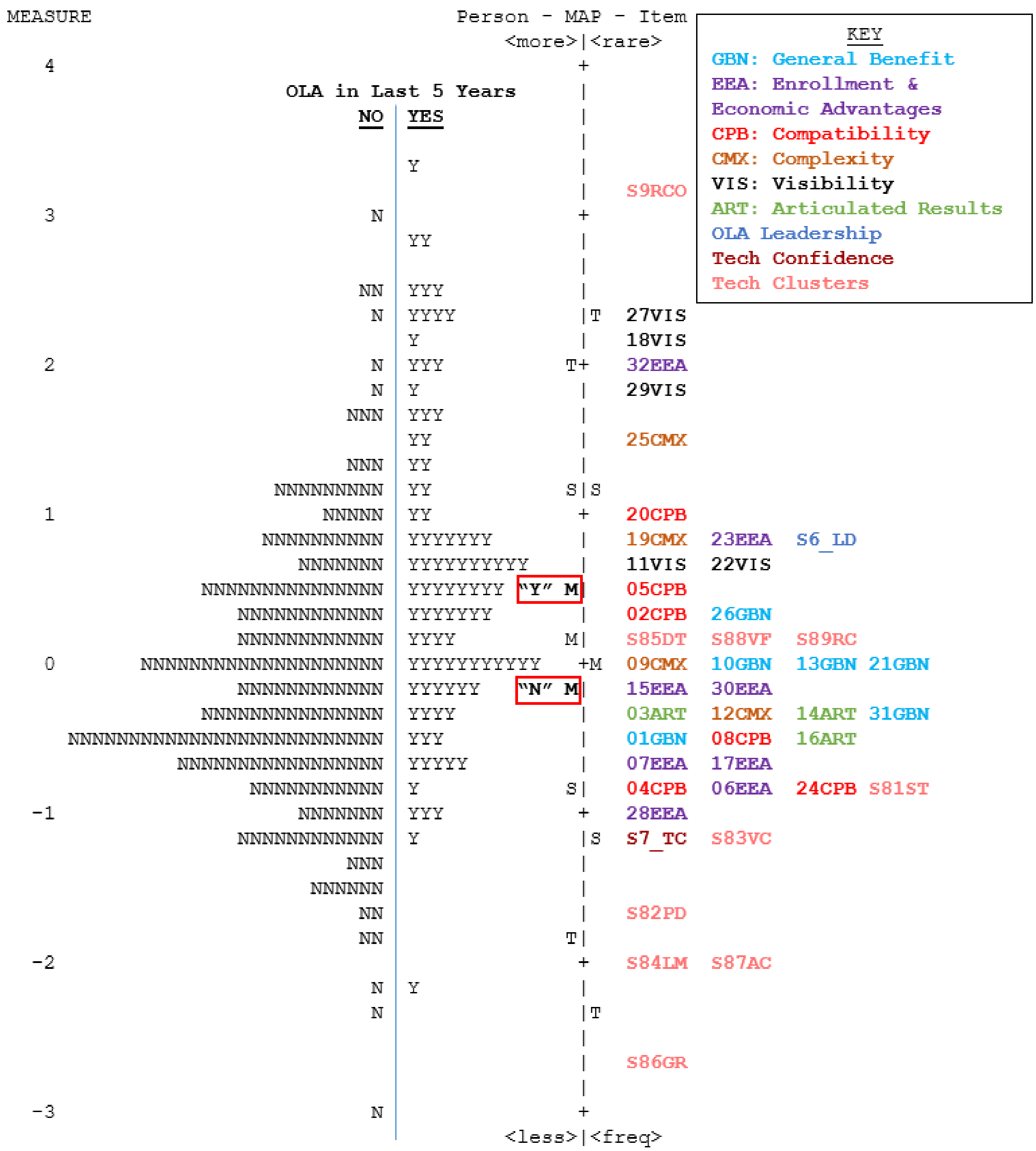

Figure 4.17. Wright map of all items with persons divided by recent OLA adoption experience.

As expected, the average participant whose IEP has had OLA adoption experience in the last five years had a higher mean than the average non-adopter with a difference of 0.68 logits. The OLA adopter mean was 0.57 logits while the non-adopter mean was -0.11. The items in Table 4.18 were located between the means of OLA-experienced adopters and non-adopters in the modified Wright map in Figure 4.17. They were particularly useful because they differentiated between OLA adopters and non-adopters in this sample.

Table 4.18

Items between Recent OLA Adopters and Non-Adopters

Item Measures	Measure S.E.	Item Codes	Item Wording
0.56	0.08	05CPB	I think that offering online ESL classes fits well with the way my IEP operates.
0.39	0.08	02CPB	Offering online ESL classes fits into my IEP's culture.
0.34	0.09	26GBN	Offering online ESL classes improves the performance of my IEP.
0.22	0.12	S89RC	Which of the following do you have experience with? Video recording of all or part of my ESL classes.
0.18	0.12	S88VF	Which of the following do you have experience with? Recorded video feedback to students.
0.15	0.12	S85DT	Which of the following do you have experience with? Digital ESL textbooks.
-0.01	0.09	13GBN	Offering online ESL classes improves the quality of my IEP.
-0.04	0.09	09CMX	Teaching online ESL classes is frustrating.
-0.07	0.09	10GBN	I feel confident in the advantages of offering online ESL classes at my IEP.
-0.08	0.09	21GBN	Offering online ESL classes enhances the effectiveness of my IEP.

The items in the Wright map in Figure 4.18 were based on all 328 responses, but the displayed person results are based on the responses of the 96 participants who responded to item S10a. The removed persons' data were still calculated but was not visible in order to distinguish the participants who reported their IEP *currently* offered OLA (n=64) versus those reporting their IEP did not *currently* offer it (n=32).

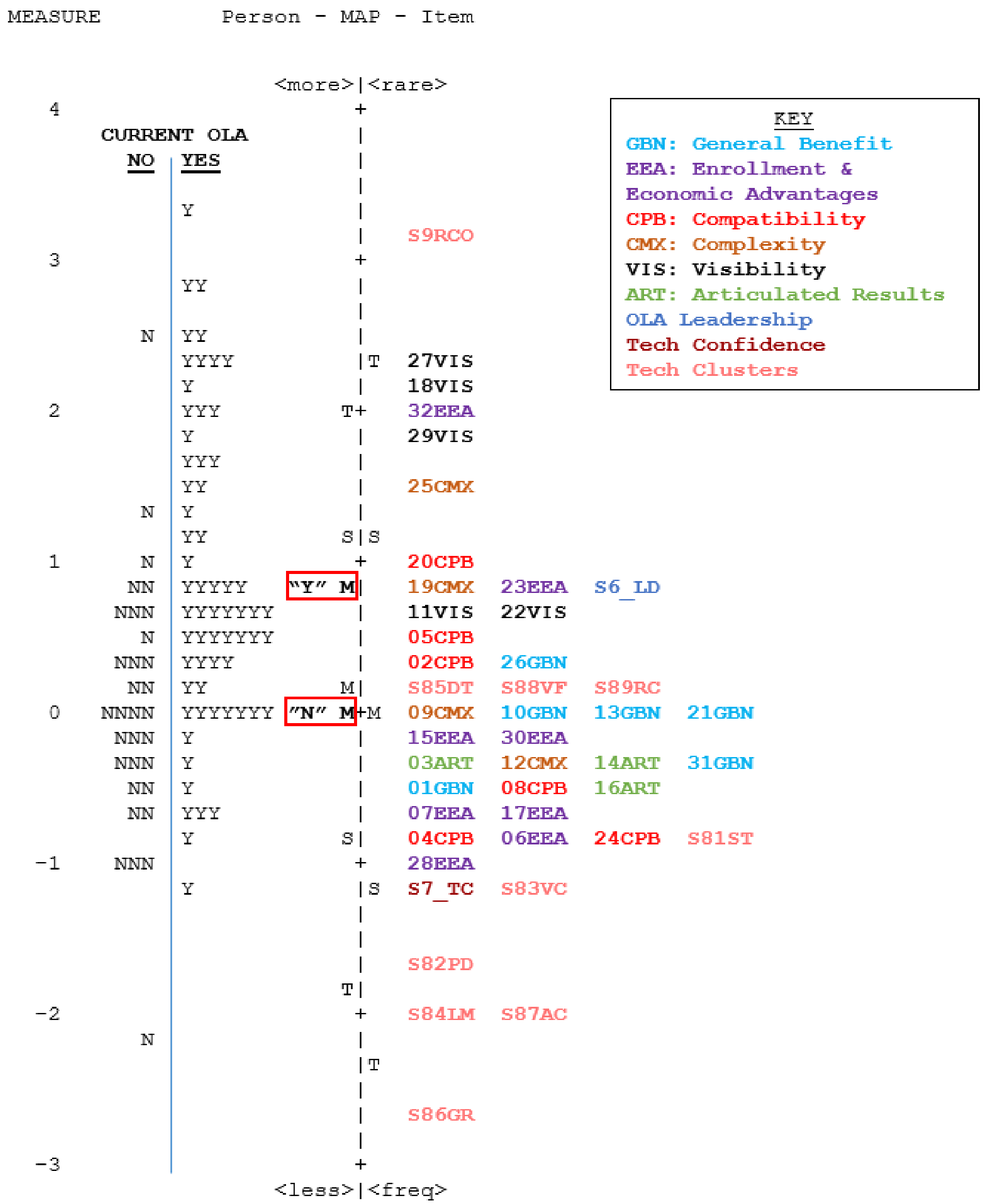

Figure 4.18. Wright map of all items with persons divided by current OLA adoption status.

As expected, the average participant whose IEP had reported *current* OLA adoption experience had a higher mean than the average non-adopter with a difference of

0.82 logits. The *current* OLA adopter mean was 0.85 logits while the non-adopter mean was 0.03. The items in Table 4.19 were located between the means of *current* OLA-experienced adopters and non-adopters in the modified Wright map in Figure 4.18. They were particularly useful because they differentiated between *current* OLA adopters and non-adopters in this sample.

Table 4.19

Items between Current OLA Adopters and Non-Adopters

Item Measures	Measure S.E.	Item Codes	Item Wording
0.83	0.09	23EEA	I feel confident that online ESL classes will increase enrollment in face-to-face classes at my IEP.
0.82	0.07	S6_LD	Indicate your degree of involvement in leading the adoption of online ESL at your IEP.
0.79	0.08	19CMX	Online ESL technology seems to require little effort for teachers to understand.
0.75	0.09	11VIS	I have frequently seen online ESL in use outside my IEP.
0.61	0.09	22VIS	I have rarely been to conferences where speakers presented on their experience with online ESL.
0.56	0.08	05CPB	I think that offering online ESL classes fits well with the way my IEP operates.
0.39	0.08	02CPB	Offering online ESL classes fits into my IEP's culture.
0.34	0.09	26GBN	Offering online ESL classes improves the performance of my IEP.
0.22	0.12	S89RC	Which of the following do you have experience with? Video recording of all or part of my ESL classes.
0.18	0.12	S88VF	Which of the following do you have experience with? Recorded video feedback to students.
0.15	0.12	S85DT	Which of the following do you have experience with? Digital ESL textbooks.

Perceptions of OLA by IEP Directors and Faculty

Research question two focused on how IEP directors and faculty perceived the adoption of OLA in their IEPs. Rogers (2003) claims the PCI characteristics reflect the participants' perceptions of OLA adoption. The perceptions of IEP directors and faculty regarding each PCI characteristic, as well as the responses to items S7 about participants' confidence in using new technology and items S8 and S9 about the 10 specific technologies with which participants had experience follows.

The DIF analysis looked for a significant DIF (i.e., > |0.64| for moderate to large DIF; > |0.43| for slight to moderate DIF) value and Rasch-Welch probability (i.e., > 0.05) in the influence of six variables. This included those whose IEP had experienced OLA within the last five years or who reported their IEP had *currently* adopted OLA. Additionally, the participants' responses to the questions about their status and position in their IEP as well as their OLA leadership involvement and confidence in using new technology were analyzed for signs of DIF. Because both OLA leadership involvement and technology confidence variables were three- or four-category items, they were divided into a dichotomous scale using either high levels versus a combination of moderate, low, and none for OLA leadership and high levels versus a combination of moderate and low for technology confidence (of note, there were no observations of *Almost No* technology confidence, so it was not included in the DIF analysis).

PCI characteristic visibility. The five *visibility* items had the highest PCI group mean difficulty (1.52, SE 0.36) with a median difficulty of 1.76. Based on the *visibility* item measures in Table 4.20, the IEP directors and faculty (mean 0.11, SE 0.05) participating in this study perceived OLA as rarely visible, in general, but especially so when asked whether OLA was visible within their IEPs. The easiest-to-endorse *visibility* items explicitly referred to hearing and seeing it discussed in conferences and seeing it in use outside their IEP. In contrast, the two most difficult *visibility* items explicitly mentioned it being used in their IEPs. Item 27VIS about participants frequently seeing OLA used in their IEPs was two logits above the person mean, which meant there was only a 12% chance of the average participant endorsing it at the highest category. The remaining middle item lacked any specific reference to inside or outside participants' IEPs. Thus, based on the difficulty measures of the *visibility* items, the visibility of OLA inside and outside IEPs may have been an obstacle to adoption, but visibility within respondents' IEPs was clearly more of an obstacle than any other PCI item.

Table 4.20

Item Measures for Visibility

Item Measure	Model S.E.	Item Code	Item Wording
2.27	0.10	27VIS	I frequently see online ESL being used in my IEP.
2.22	0.09	18VIS*	Online ESL classes are rarely seen in my IEP.
1.76	0.09	29VIS	I have frequently observed what happens in online ESL classrooms.
0.75	0.09	11VIS	I have frequently seen online ESL in use outside my IEP.
0.61	0.09	22VIS*	I have rarely been to conferences where speakers presented on their experience with online ESL.
1.52	0.36		Mean of visibility measures

*reversed scoring.

The DIF analysis of the six aforementioned variables revealed that three of them significantly influenced the PCI *visibility*, all with a moderate to high DIF: their IEPs' lack of OLA within the last five years, high OLA leadership involvement, and high technology confidence (see Table 4.21). Regarding OLA adoption, items 18VIS and 27VIS were relatively more difficult to endorse for those whose IEPs lacked OLA within the last five years in contrast with those whose IEPs have adopted OLA. As for OLA leadership involvement, 11VIS and 22VIS were relatively more difficult to endorse for those who identified as having a high level of involvement in OLA leadership than those with moderate, low, or a lack of involvement. Regarding technology confidence, items 18VIS and 27VIS were more difficult to endorse for those who had a high level of confidence in learning how to use new technologies than those who had a moderate or low level of confidence.

Table 4.21

DIF for Visibility

Item Code	Difficult-to-Endorse Items by Variable Grouping	DIF Value	Rasch-Welch Prob.
	For IEPs without OLA in the Last Five Years		
18VIS*	Online ESL classes are rarely seen in my IEP.	|0.99|	0.0000
27VIS	I frequently see online ESL being used in my IEP.	|0.73|	0.0004
	For those with high OLA Leadership Involvement		
11VIS	I have frequently seen online ESL in use outside my IEP.	|0.78|	0.0047
22VIS*	I have rarely been to conferences where speakers presented on their experience with online ESL.	|0.71|	0.0121
	For those with High Confidence in Learning Technology		
18VIS*	Online ESL classes are rarely seen in my IEP.	|0.66|	0.0006
27VIS	I frequently see online ESL being used in my IEP.	|0.84|	0.0000

*reversed scoring.

PCI characteristic complexity. The four *complexity* items had the second-highest PCI group mean difficulty (0.48, SE 0.43) with a median difficulty of 0.38. Based on the *complexity* item measures in Table 4.22, the IEP directors and faculty (mean 0.11, SE 0.05) participating in this study perceived OLA as complex, in general, but especially when implementing it.

Table 4.22

Item Measures for Complexity

Item Measure	Model S.E.	Item Code	Item Wording
1.54	0.09	25CMX	Implementing online ESL classes at my IEP will be simple.
0.79	0.08	19CMX	Online ESL technology seems to require little effort for teachers to understand.
-0.04	0.09	09CMX*	Teaching online ESL classes is frustrating.
-0.37	0.09	12CMX	I believe that the technology for online ESL classes can be learned without difficulty.
0.48	0.43		Mean of complexity measures

*reversed scoring.

The *complexity* items performed at three distinct levels of difficulty. Item 25CMX was notably the most difficult to endorse and was 0.75 logits more difficult than 19CMX, which itself was 0.83 logits harder than the remaining two items. In contrast, 09CMX and 12CMX were substantially less difficult to endorse at the highest category. The average participant had an approximately 62% chance of endorsing 12CMX at the highest category, which suggested participants believed OLA technology could be learned without difficulty. Based on the order of *complexity* item difficulty, participants perceived the implementation and understanding of OLA technology as greater potential obstacles to adoption. Items in the least difficult group only shared the concept of compatibility. Although items 12CMX and 19CMX were both about OLA technology, participants perceived a difference in these similar statements: the former was about the respondent learning it and the latter, the more difficult one, was about faculty understanding it.

The DIF analysis revealed that three variables significantly influenced the PCI *complexity* with a slight to high DIF: their IEPs' OLA experience within the last five years, full-time employment status, and high OLA leadership involvement (see Table 4.23).

Table 4.23

DIF for Complexity

Item Code	Difficult-to-Endorse Items by Variable Grouping	DIF Value	Rasch-Welch Prob.
	For IEPs with OLA in the Last Five Years		
12CMX	I believe that the technology for online ESL classes can be learned without difficulty.	|0.44|	0.0242
19CMX	Online ESL technology seems to require little effort for teachers to understand.	|0.54|	0.0041
	For Full-Time Participants		
19CMX	Online ESL technology seems to require little effort for teachers to understand.	|0.43|	0.0370
	For those with High OLA Leadership Involvement		
19CMX	Online ESL technology seems to require little effort for teachers to understand.	|0.80|	0.0040
25CMX	Implementing online ESL classes at my IEP will be simple.	|0.71|	0.0109
	For those with Any OLA Leadership Involvement		
19CMX	Online ESL technology seems to require little effort for teachers to understand.	|0.84|	0.0000

Regarding OLA adoption, a slight to moderate DIF suggested items 12CMX and 19CMX were relatively more difficult to endorse for those whose IEPs had OLA experience within the last five years in contrast with those whose IEPs had not adopted OLA. As for employment status, a slight DIF suggested full-time participants found item 19CMX to be relatively more difficult to endorse than did part-time participants. Regarding OLA leadership involvement, a moderate to high DIF indicated 19CMX and 25CMX were relatively more difficult to endorse for those who identified as having a high level of involvement in OLA leadership than those with moderate, low, or a lack of involvement. Also, a moderate to high DIF suggested 19CMX was relatively more difficult to endorse for those with any level of involvement in OLA leadership than those with none.

PCI characteristic compatibility. The six *compatibility* items had the next-highest PCI group mean difficulty (-0.03, SE 0.31) with a median difficulty of -0.02. Based on the *compatibility* item measures in Table 4.24, the IEP directors and faculty (mean 0.11, SE 0.05) participating in this study perceived OLA as compatible with work of faculty and their IEPs' mission but not compatible with other IEP-specific compatibility issues. The *compatibility* items performed at two distinct levels of difficulty. Items 20CPB, 05CPB, and 02CPB were all difficult for the average participant whereas 08CPB, 04CPB, and 24CPB were substantially less difficult to endorse at the highest category. These two groups are separated by a difference of 0.81 logits. The items in the most difficult group share a focus on how compatible OLA would be with the IEP, such as its culture, how it operates, and "all" aspects of the IEP. In contrast, the two lowest items in the lower-performing group share a focus on how compatible OLA would be with the faculty’s schedules and responsibilities. However, item 08CPB seemed to buck the trend because it focused on the IEP-specific issue of how compatible OLA was with their IEPs’ mission statement, yet it performed like the easier-to-endorse faculty-focused items. Based on the order of item difficulty, participants perceived faculty’s schedule and responsibilities as being compatible with OLA but several aspects of the IEP itself as being potential obstacles to adoption.

Table 4.24

Item Measures for Compatibility

Item Measure	Model S.E.	Item Code	Item Wording
0.94	0.08	20CPB	Offering online ESL classes is compatible with all aspects of my IEP.
0.56	0.08	05CPB	I think that offering online ESL classes fits well with the way my IEP operates.
0.39	0.08	02CPB	Offering online ESL classes fits into my IEP's culture.
0.63			*Mean of most difficult CPB items: 20CPB, 05CPB, & 02CPB*
-0.42	0.09	08CPB	I think online ESL classes are compatible with my IEP's mission statement.
-0.78	0.09	04CPB	Offering online ESL classes is compatible with the responsibilities of teachers.
-0.89	0.09	24CPB	Teaching online ESL classes is compatible with teachers' work schedules.
-0.70			*Mean of least difficult CPB items: 08CPB, 04CPB, & 24CPB*
-0.03	0.31		Mean of compatibility measures

The DIF analysis revealed that three variables significantly influenced the PCI *compatibility*, all with a slight DIF: both their IEPs’ experience and lack of experience with OLA within the last five years as well as the participants’ full-time employment status (see Table 4.25). Regarding OLA adoption, a slight DIF indicated item 02CPB was relatively more difficult to endorse for those whose IEPs lacked OLA experience within the last five years in contrast with those whose IEPs had adoption experience. However, a slight DIF suggested item 24CPB was relatively more difficult to endorse for those whose IEPs had OLA experience within the last five years rather than those whose IEPs had not adopted OLA. As for employment status, a slight DIF indicated full-time participants found item 24CPB to be relatively more difficult to endorse than did part-time participants.

Table 4.25

DIF for Compatibility

Item Code	Difficult-to-Endorse Items by Variable Grouping	DIF Value	Rasch-Welch Prob.
	For IEPs without OLA in the Last Five Years		
02CPB	Offering online ESL classes fits into my IEP's culture.	|0.52|	0.0077
	For IEPs with OLA in the Last Five Years		
24CPB	Teaching online ESL classes is compatible with teachers' work schedules.	|0.46|	0.0219
	For Full-Time Participants		
24CPB	Teaching online ESL classes is compatible with teachers' work schedules.	|0.56|	0.0126

PCI characteristic enrollment and economic advantages. The eight *enrollment and economic advantages* (*EEA)* items had the next highest PCI group mean difficulty (-0.07, SE 0.36) with a median difficulty of -0.38. The EEA items performed at several levels of difficulty. Based on the *EEA* item measures in Table 4.26, the IEP directors and faculty (mean 0.11, SE 0.05) participating in this study perceived OLA as primarily economically advantageous. However, there were two exceptions with items 32EEA and

23EEA. Item 32EEA, which focused specifically on students being interested in their IEP because it currently offered OLA, was distinctly more difficult than the others and only 0.28 logits below the most difficult PCI item. Item 23EEA, which was 1.16 logits below 32EEA and 0.96 logits above the next EEA item, was also difficult to endorse. It referred to participants' confidence that OLA would increase enrollment in the regular IEP program.

Table 4.26

Item Measures for Enrollment and Economic Advantages

Item Measure	Model S.E.	Item Code	Item Wording
1.99	0.09	32EEA	Students are interested in our IEP because we offer online ESL classes.
0.83	0.09	23EEA	I feel confident that online ESL classes will increase enrollment in face-to-face classes at my IEP.
-0.13	0.09	15EEA	I feel certain that international students will enroll in online ESL classes at my IEP.
-0.15	0.09	30EEA	Offering online ESL classes improves my IEP's profits.
-0.61	0.09	17EEA	Offering online ESL classes gives my IEP a competitive advantage over other IEPs.
-0.70	0.09	07EEA*	The economic disadvantages of offering online ESL classes at my IEP outweigh the advantages.
-0.82	0.09	06EEA*	It is too costly for my IEP to offer online ESL classes.
-0.96	0.09	28EEA	Offering online ESL classes will help my IEP attract new students.
-0.07	0.36		Mean of enrollment and economic advantages measures

*reversed scoring.

Item 23EEA represents the most substantial EEA obstacle to OLA adoption. It suggests that if participants perceived OLA as being more likely to increase enrollment in regular, on-site IEP courses, then more people from this sample would endorse it. Item

32EEA was not included as a potential obstacle because it was more of a statement of what already existed.

Notably, confidence in students enrolling in OLA classes (i.e., 15EEA) and OLA having a positive effect on IEP profits (i.e., 30EEA) were both easier to endorse yet still close to the person mean. Items 17EEA, 07EEA, 06EEA, and 28EEA ranged from 0.72 to 1.07 logits below the person mean. Participants had a nearly 73% chance of endorsing item 28EEA at the highest category, which suggested OLA was commonly perceived as a potential method of attracting new students. However, participants had only a 12% chance of endorsing item 32EEA which spoke specifically about students being interested in an IEP because of existing OLA options. Though similar in meaning, the more difficult item referred to an existing OLA program whereas the easier item referred only to future possibility.

The DIF analysis revealed that two items variables significantly influenced the PCI *enrollment and economic advantages*, with a slight to moderate DIF: their IEPs' OLA experience within the last five years and high confidence in using new technology (see Table 4.27). Regarding OLA adoption, a slight DIF showed item 23EEA was relatively more difficult to endorse for those whose IEPs had OLA experience within the last five years than with those whose IEPs had not adopted OLA. As for technology confidence, which itself had a difficulty measure of -1.21, a moderate DIF indicated item 32EEA was more difficult to endorse for those who had a high level of confidence in learning how to use new technologies than those who had a moderate or low level of confidence.

Table 4.27

DIF for Enrollment and Economic Advantages

Item Code	Difficult-to-Endorse Items by Variable Grouping	DIF Value	Rasch-Welch Prob.
	For IEPs with OLA in the Last Five Years:		
23EEA	I feel confident that online ESL classes will increase enrollment in face-to-face classes at my IEP.	|0.56|	0.0034
	For those with High Confidence in Learning Technology:		
32EEA	Students are interested in our IEP because we offer online ESL classes.	|0.65|	0.0007

PCI characteristic general benefit. The six *general benefit* items had the next highest PCI group mean difficulty (-0.12, SE 0.12) with a median difficulty of -0.07. Based on the *general benefit* item measures in Table 4.28, the IEP directors and faculty (mean 0.11, SE 0.05) participating in this study perceived OLA as having several broad benefits for their IEPs. The *general benefit* items performed primarily at one level of difficulty, with all six items sharing a range of 0.87 logits, though item 26GBN was somewhat difficult for the average participant. Item 26GBN was about the benefits of OLA regarding IEP performance, and it represents only a small possible obstacle to OLA adoption considering how participants had a 45% chance of endorsing it. Additionally, items 31GBN and 01GBN were relatively easier to endorse than the others. Participants had an approximately 66% chance of endorsing 01GBN which focused on the participants' certainty that students, specifically, would benefit from OLA at their IEP.

Table 4.28

Item Measures for General Benefit

Item Measure	Model S.E.	Item Code	Item Wording
0.34	0.09	26GBN	Offering online ESL classes improves the performance of my IEP.
-0.01	0.09	13GBN	Offering online ESL classes improves the quality of my IEP.
-0.07	0.09	10GBN	I feel confident in the advantages of offering online ESL classes at my IEP.
-0.08	0.09	21GBN	Offering online ESL classes enhances the effectiveness of my IEP.
-0.37	0.09	31GBN	Overall, I find offering online ESL classes to be advantageous for my IEP.
-0.53	0.09	01GBN	I feel certain that international students will benefit from online ESL classes offered by my IEP.
-0.12	0.12		Mean of general benefit measures

The DIF analysis revealed no variables significantly influenced the PCI *general benefit*.

PCI characteristic articulated results. The three *articulated results* items had the least high PCI group mean difficulty (-0.39, SE 0.08) with a median difficulty of -0.34. Based on the *articulated results* item measures in Table 4.29, the IEP directors and faculty (mean 0.11, SE 0.05) participating in this study perceived OLA as a topic of which they could communicated the results and potential benefits. All the *articulated results* items were easy to endorse for the average participants. The easiest-to-item was 16ART, and it was the only one which was narrowly focused on articulating results, compared with the other two which also referred to the benefits of OLA.

Table 4.29

Item Measures for Articulated Results

Item Measure	Item Code	Item Wording
-0.28	03ART	I would have no difficulty telling others about the potential benefits of offering online ESL classes.
-0.34	14ART*	I would have difficulty explaining why online ESL classes are beneficial.
-0.54	16ART	I believe I could communicate to others the results of offering online ESL classes.
-0.39	0.08	Mean of articulated results measures

*reversed scoring.

The DIF analysis revealed no variables significantly influenced the PCI *articulated results*.

Confidence in learning to use new technologies. Based on the performance measures (see Table 4.30) of the *confidence in learning new technology* item, which was also referred to as technology confidence, the IEP directors and faculty (mean 0.11, SE 0.05) participating in this study perceived themselves as being very confident in learning new technology.

Table 4.30

Item Measures for Technology Confidence

Item Measure	Model S.E.	Item Code	Item Wording
-1.21	0.10	S7_TC	Indicate your degree of confidence in learning to use new technological innovations.

The average participant had an approximately 78% chance of endorsing item S7 at the highest category, which suggested technology confidence was not an obstacle in the adoption of OLA.

There were 314 participants who answered question S7. The highest percentage of participants reported a high level of confidence in learning to use new technological innovations (see Figure 4.19). No participant reported a lack of confidence, and only 7% (n=23) reported a low level of confidence. However, further investigation as needed to better understand those with a low level of confidence.

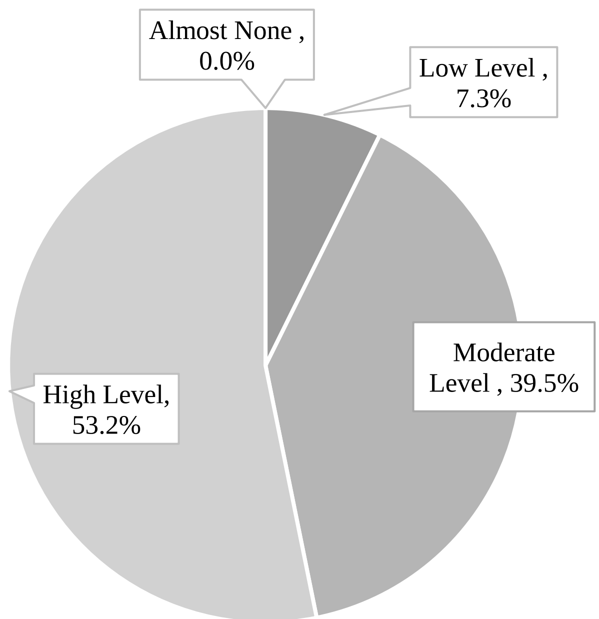

Figure 4.19. Confidence in learning to use new technological innovations.

There were 313 participants who answered both question S7 and S10 regarding OLA adoption within the last five years. The *almost no confidence* option was excluded from Figure 4.20 because no respondent chose it, and it divided respondents into two groups: those who reported their IEP has experimented with OLA in the last five years and those reporting their IEP had not. Figure 4.20 presents 18 of the 23 participants (i.e., 78.3%) who reported both a low level of confidence and their IEP has not experimented with OLA adoption in the last five years.

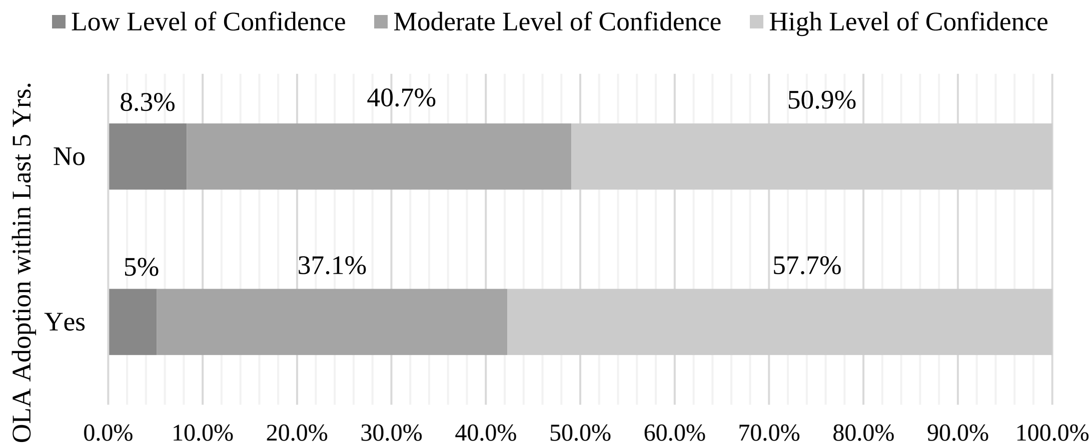

Figure 4.20. Confidence in learning new technological innovations, by OLA adoption within 5 years.

Additionally, 308 participants answered both questions S7 and S2 regarding their position – of director or faculty – in the IEP. The highest percentage (i.e., 92%; n=219) of IEP faculty in the sample reported a moderate or high level of confidence, which was very similar to the percentage of IEP directors who reported a high or moderate level of confidence: 94% (n=67; see Figure 4.21). Nonetheless, the highest percentage (i.e., 81.8%, n=18) of participants reporting a low level of confidence were faculty.

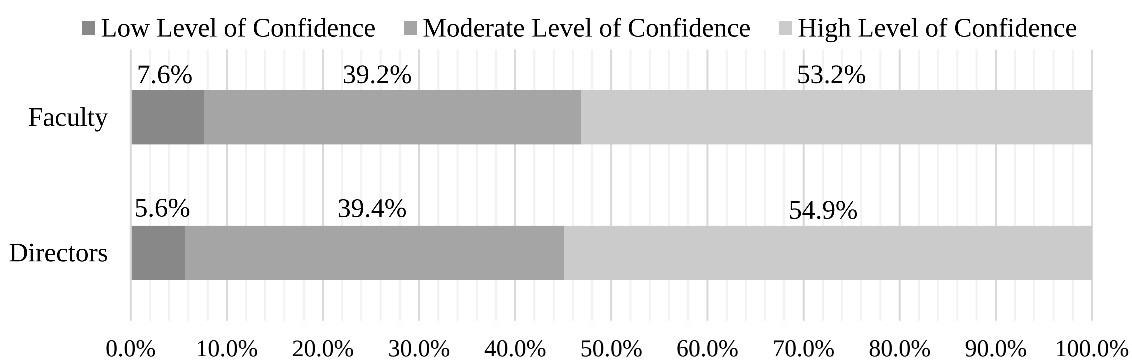

Figure 4.21. Confidence in learning new technological innovations, by IEP position.

Experience with OLA technology clusters. Technology clusters refer to groups of similar technologies in which experience with one could "trigger" the adoption of others within that cluster (Rogers, 2003, p. 249). The ten *OLA technology cluster* items had the lowest group mean difficulty (-0.65, SE 0.53) with a median difficulty of -1.00 (see Table 4.31).

Table 4.31

Item Measures for Technology Clusters

Item Measure	Model S.E.	Item Code	Item Wording
3.18	0.24	S9RCO	Does your IEP record live classes on video and offer those for students to view online?
0.22	0.12	S89RC	Which of the following do you have experience with? Video recording of all or part of my ESL classes.
0.18	0.12	S88VF	Which of the following do you have experience with? Recorded video feedback to students.
0.15	0.12	S85DT	Which of the following do you have experience with? Digital ESL textbooks.
-0.91	0.13	S81ST	Which of the following do you have experience with? Online learning as a student.
-1.10	0.14	S83VC	Which of the following do you have experience with? Video conferencing technology.
-1.60	0.15	S82PD	Which of the following do you have experience with? Online learning through my employer and/or in professional development.
-1.95	0.17	S84LM	Which of the following do you have experience with? Online learning management systems to make or collect assignments.
-1.95	0.17	S87AC	Which of the following do you have experience with? Online activities (other than digital textbooks) with my ESL students.
-2.74	0.22	S86GR	Which of the following do you have experience with? Online grading or online gradebooks.
-0.65	0.53		Mean of technology clusters measures
-1.00			Median of technology clusters measures

Based on the performance measures of the *OLA technology cluster* items, the average participants (mean 0.11, SE 0.05) in this study reported they had experience with six of the tools related to OLA. With an additional three tools, the average participant had a nearly 50% chance of endorsing each one. Only item S9RCO was substantially difficult for the average participant who had only a 5% chance of endorsing it. Item S9RCO represented a technology which was closely related to that required by OLA. This item was also something the IEP performed which was unlike the other technology cluster items which referred to technology skills with which participants had experience.

There were 315 participants who answered the questions related to technology clusters (i.e., S8 and S9). It was anticipated that the technology clusters would be staggered in groups with the first three being commonplace, the next three being slightly less common because some digital inclination was needed, and the seventh through tenth being gradually more difficult to endorse. According to the measure difficulties, the anticipated difficulty level was accurate for the three most difficult, though the measure difference between the most difficult (e.g., S9RCO, 3.18 logits) and the second most difficult (e.g., S89RC, 0.22 logits) was higher than expected. The easiest to endorse item was S86GR about online gradebooks. In fact, with a mean person measure of 0.11, this item was 2.63 logits below the mean person, which indicated the average person had an approximately 93% chance of endorsing it at the highest category.

There were 314 participants who answered the questions related to technology clusters as well as the question about recent OLA experience (i.e., question S10). Participants whose IEPs have had recent experience with OLA and those whose IEPs lacked that experience was delineated in Figure 4.22. For each technology in the following three Figures, the total numbers for each technology represent the number of participants who reported they had experience with that technology. For each of the personal experience technologies (i.e., the nine S8 items) in Figure 4.22, nearly 33% of participants with OLA experience answered in the positive to the technology.

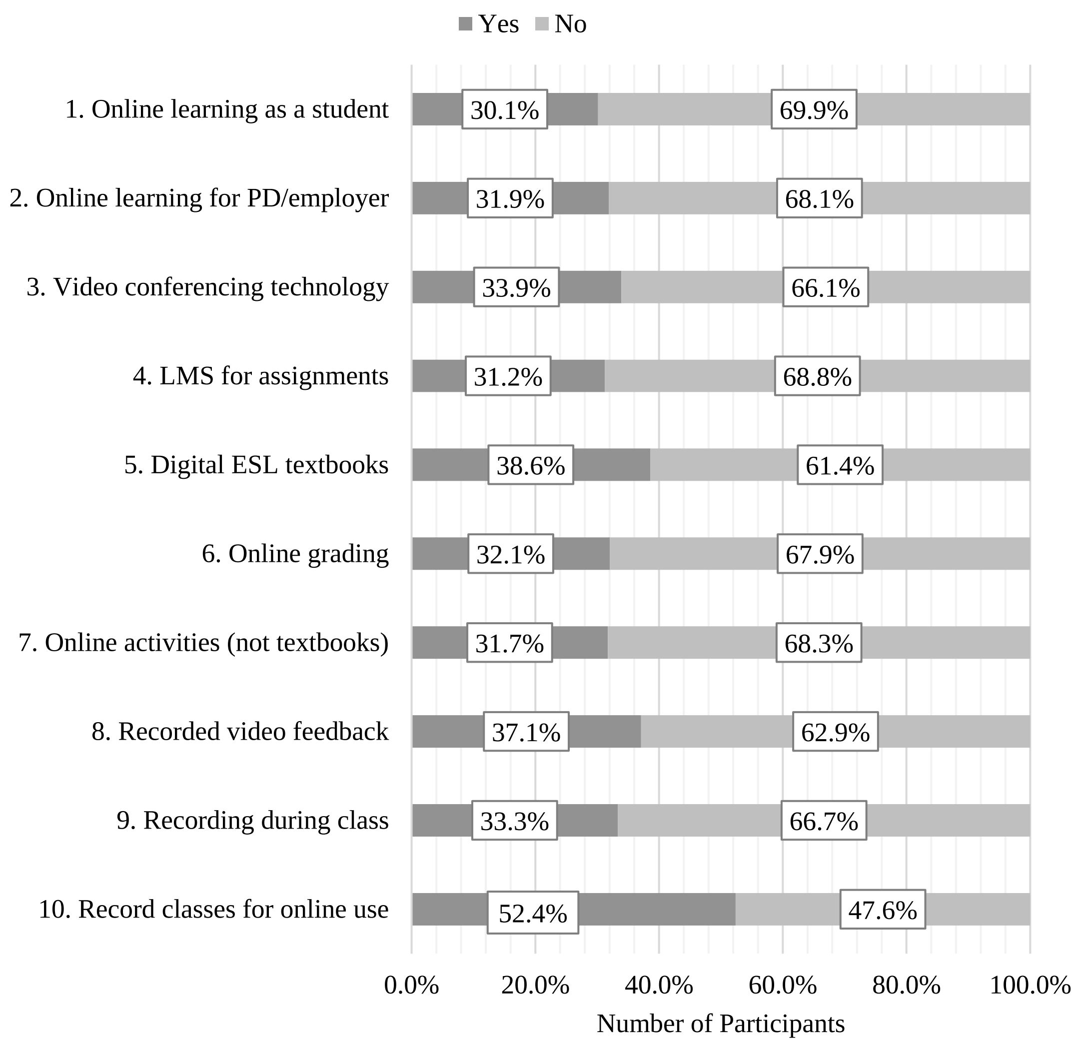

Figure 4.22. OLA technology cluster items, by recent OLA experience.

There were 309 participants who answered the questions related to technology clusters as well as the question about the participants’ position at their IEP – as directors or faculty (i.e., question S2). Directors had experience with nearly 25% of each technology (see Figure 4.23).

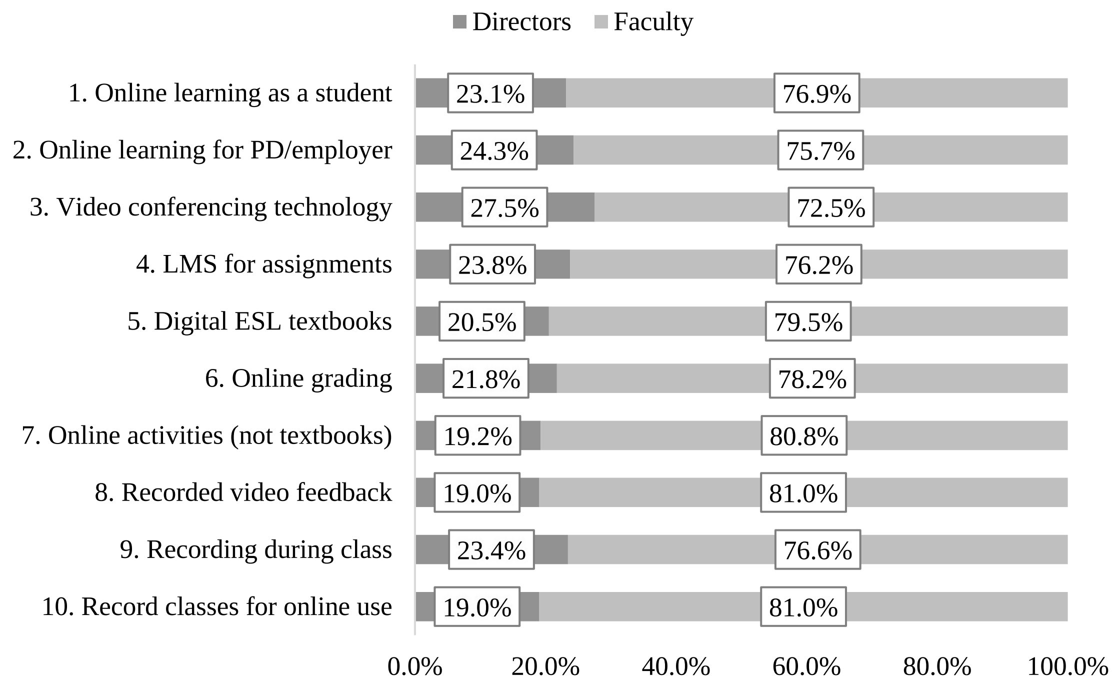

Figure 4.23. OLA technology cluster items, by position.

Research Question Three

The third research question – To what extent do IEP directors and faculty perceive themselves to be leaders in the diffusion of OLA? – explored whether IEP directors and faculty considered themselves to be leaders in the diffusion of OLA. The responses to question S6 informed the results of this research question. Question S6, was listed in Table 4.32.

Table 4.32

Survey Question Informing the Analysis of Research Question Three

Question	Item Wording
S6.	Indicate your degree of involvement in leading the adoption of online ESL at your IEP. *Options: No Involvement, Low Level of Involvement, Moderate Level of Involvement, and High Level of Involvement*

Additionally, the responses to question S10 regarding the participants who reported their IEP has recently experimented with OLA adoption and question S2 about the participants' positions also contributed to a better understanding of research question three.

From the 314 participants responding to the questions about recent OLA experience in the last five years (i.e., question S10) and OLA leadership involvement (i.e., question S6), 53.2% (n=167) reported they were involved in some level of OLA leadership. There were 69.1% (n=217) reporting their IEP had no OLA experience in the last five years. From those 217 without OLA experience, 47.0% (n=102) of the participants reported they were involved in OLA leadership at a low, moderate, or high level. Of the 314 participants, 30.9% (n=97) reported their IEP had OLA experience in the last five years, and 67.0% (n=65) of the 97 reported OLA leadership involvement. The levels of leadership involvement are presented in Figure 4.24.

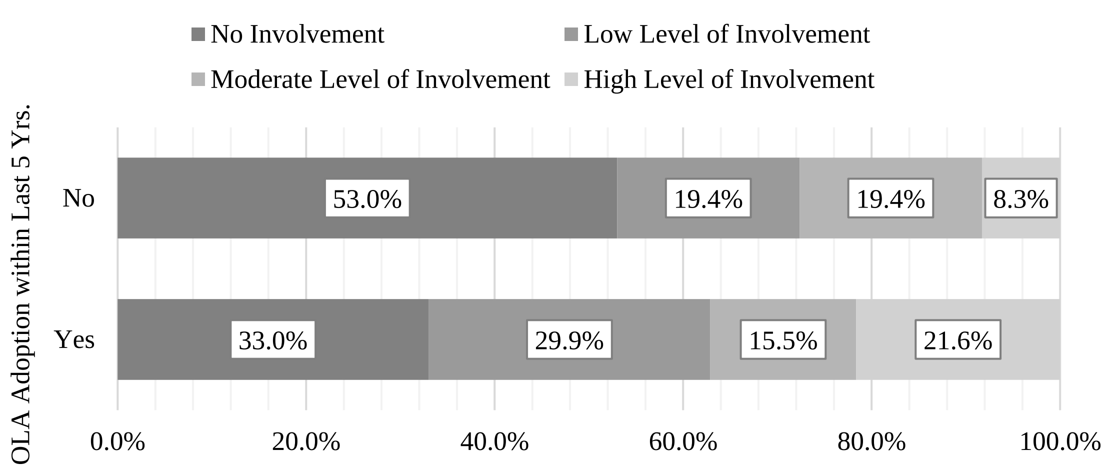

Figure 4.24. OLA adoption in last 5 years, by participants' degree of involvement in adoption leadership.

The highest percentage of participants involved in some level of OLA leadership in IEPs with recent OLA experience reported their involvement level was low (i.e., 29.9%, n=29).

Of the 97 participants in the *Yes* bar in Figure 4.24 who reported their IEPs had experimented with OLA in the last five years, 66.0% (n=64) reported their IEP continued to offer OLA, 33.0% (n=32) reported their IEP no longer offered OLA, and one abstained from question S10a. Figure 4.25 further divides the *Yes* bar in Figure 4.24 to distinguish those whose IEPs *currently* offered OLA. The highest percentage of participants involved in some level of OLA leadership in IEPs with *current* OLA experience reported their involvement level was low (i.e., 29.7%, n=19). Notably, there were 18 respondents whose IEPs had experienced OLA in the last five years but *currently* lacked an OLA program but who also perceived themselves as leading their IEPs towards OLA adoption at some level. There were 46 participants whose IEPs had both experienced OLA in the last five years and *currently* offered it but who were nonetheless still involved in leading their IEPs toward OLA adoption.

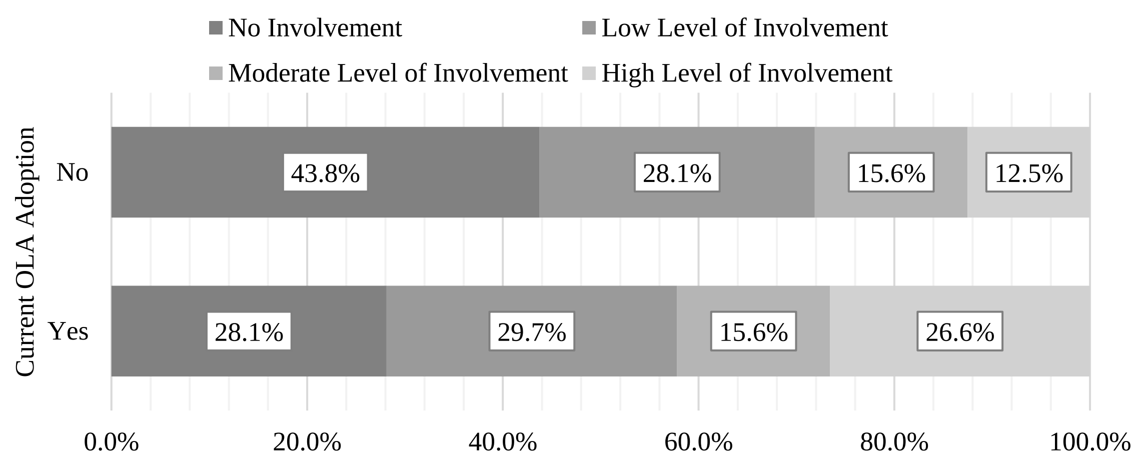

Figure 4.25. Current OLA adoption, by participants' degree of involvement in adoption leadership.

Directors and Faculty

From the 308 participants who responded to the three items about OLA leadership, OLA adoption, and participants' status, 23.1% (n=71) were directors, 35.2% (n=25) of whom reported their IEP had recent OLA adoption experience, and 76.9% (n=237) were faculty, 29.1% (n=69) of whom reported their IEP had recent OLA adoption experience. By classifying the directors and faculty by their IEP's recent adoption experience (i.e., 94 positive and 214 negative), a clearer picture was revealed. In each level of leadership involvement (see Figure 4.26), the highest percentage of the sample were faculty. Only at the highest category of leadership involvement were directors similar in percentage to faculty.

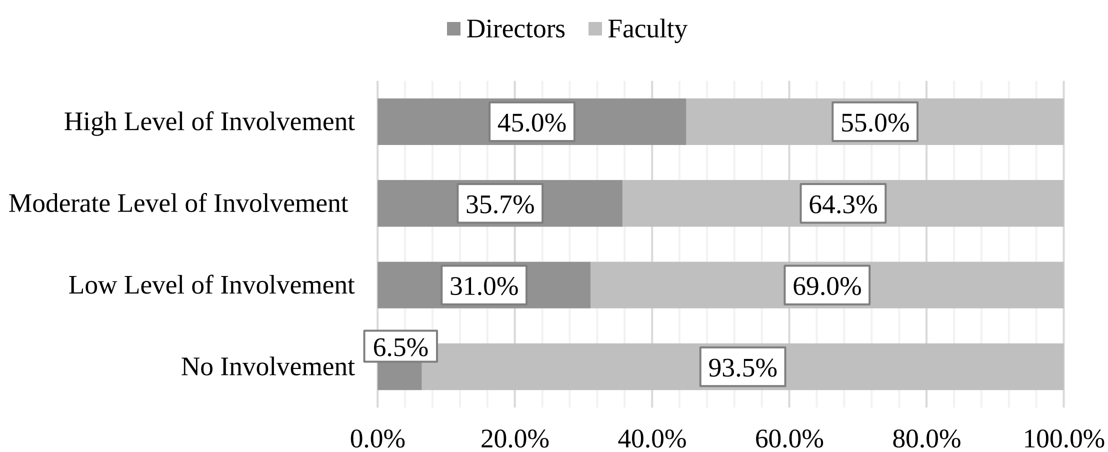

Figure 4.26. OLA adoption in last 5 years, by participants' position and degree of involvement in adoption leadership.

In contrast, an additional 25 directors and 76 faculty have been involved in leading efforts for their IEP to adopt OLA even though those IEPs have not experimented with it in the last five years. Regarding leadership involvement, 81.4% (n=92) of faculty reported their IEPs have not experimented with OLA in the last five years and no involvement in leading their IEPs toward OLA adoption (see Figure 4.27).

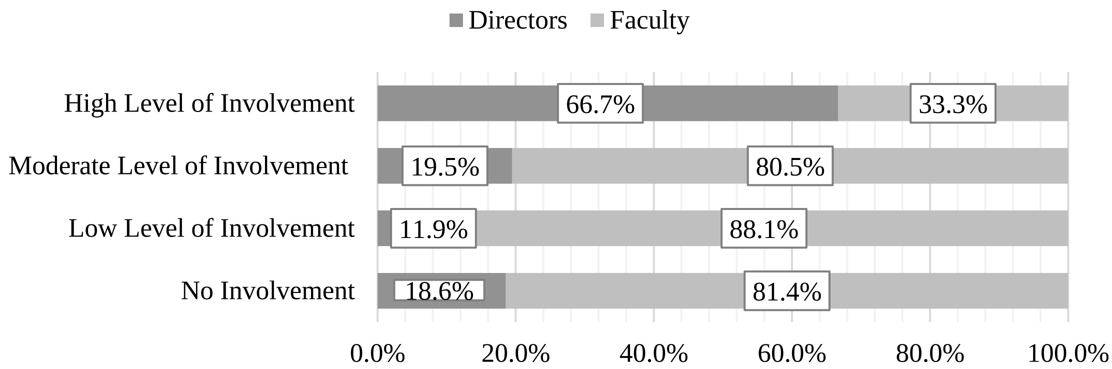

Figure 4.27. Lack of OLA adoption in last 5 years, by participants' position and degree of involvement in adoption leadership.

Based on the *OLA leadership* item measure in Table 4.33, the average IEP directors and faculty (mean 0.11, SE 0.05) participating in this study perceived themselves to have a limited involvement in leading OLA adoption. Participants only had an approximately 33% chance of endorsing S6 at the highest category.

Table 4.33

Item Measures for OLA Leadership

Item Measure	Model S.E.	Item Code	Item Wording
0.82	0.07	S6_LD	Indicate your degree of involvement in leading the adoption of online ESL at your IEP.

DIF analysis. The DIF analysis revealed that three variables significantly influenced the *OLA leadership involvement,* all with a moderate to high DIF: part-time employment status and faculty position (see Table 4.34). As for employment status, a moderate to high DIF meant part-time participants found item S6_LD to be relatively more difficult to endorse than did full-time participants. Additionally, a moderate to high DIF indicated this item was relatively more difficult to endorse for faculty than for directors. A review of the DIF analyses performed on the PCI characteristics for research question two revealed how those with high OLA leadership involvement, in contrast with no, low, or moderate involvement, found items 11VIS, 22VIS, 19CMX, and 25CMX to be significantly more difficult to endorse, with a moderate to high DIF (see Table 4.34).

Table 4.34

DIF for OLA Leadership

Item Code	Difficult-to-Endorse Items by Variable Grouping	DIF Value	Rasch-Welch Prob.
	For Faculty Participants		
S6_LD	Indicate your degree of involvement in leading the adoption of online ESL at your IEP.	|0.85|	0.0000
	For Part-Time Participants		
S6_LD	Indicate your degree of involvement in leading the adoption of online ESL at your IEP.	|0.68|	0.0002
	For those with High OLA Leadership Involvement		
11VIS	I have frequently seen online ESL in use outside my IEP.	|0.78|	0.0047
22VIS*	I have rarely been to conferences where speakers presented on their experience with online ESL.	|0.71|	0.0121
19CMX	Online ESL technology seems to require little effort for teachers to understand.	|0.80|	0.0040
25CMX	Implementing online ESL classes at my IEP will be simple.	|0.71|	0.0109
	For those with Any OLA Leadership Involvement		
19CMX	Online ESL technology seems to require little effort for teachers to understand.	|0.84|	0.0000

*reversed scoring.

Summary

The fourth chapter presented the results from the survey instrument used in this study to measure the OLA adoption status in U.S. university or college-governed IEPs, the perceptions of IEP faculty and director toward OLA, and their perceptions of their interest in OLA leadership. A total of 328 respondents from 121 IEPs opted to participate in the study. Descriptive statistics were presented to offer insights into the demographic characteristics of the survey sample. Once the unidimensionality of the data were determined, the Rasch analysis of the results' construct validity proceeded with a mixed RSM and PCM analysis of the 44 items supporting the latent variable of OLA adoption potential. These 44 items were comprised of the 32 modified perceived characteristics of innovation items, two questions about the participants' confidence with new technology and interest in leading OLA adoption in their IEP, and 10 items which identified the participants' experience with OLA technology clusters. The results from the remaining personal and institutional demographic items were used in the differential item functioning analysis. In the following chapter, the results of this study are discussed, as well as contributions to the field and limitations of the study and the generalizability of the findings.

CHAPTER 5: DISCUSSION

The American Council of Education (2019) reports, because “enrollments in IEPs can fluctuate rapidly, prey to political and economic variances that impact international education, health issues spreading in the world, and visa issuance rates,” intensive English programs (IEPs) need “a diversified cohort of IEP students” to mitigate enrollment drops (p. 6). There is evidence from IEP competitors worldwide to suggest online language acquisition (OLA) could increase enrollment opportunities. Additionally, national research studies have indicated online education has increased in U.S. institutes of higher education, which govern the IEPs in this study (Seaman et al., 2018). However, prior to this study, there had been no nationwide research study on the adoption status of OLA courses by university or college-governed IEPs.

This chapter begins with a summary of the study as well as a discussion of the study findings, which include an interpretation, analysis, and synthesis of the results. This is followed by a discussion of how the results fit within the larger body of literature and how they contribute to the fields of leadership and TESOL (teaching English to speakers of other languages), as well as the limitations of the study and its generalizability. The discussion is organized by the three research questions.

Summary of the Study

The purpose of this study was to determine the status and extent of OLA diffusion in U.S. university or college-governed IEPs, how the IEPs’ directors and faculty perceived OLA, and whether they perceived themselves to be the leaders in its diffusion. This study is relevant because IEPs, like other parts of higher education institutes, have experienced the effects of inconsistent enrollment, and online education could lead to repeat customers. It represents a method with the potential of increasing enrollment and recruiting international students to enroll in an IEPs' more profitable face-to-face programs after first experiencing an IEP's education product through an online course. Without understanding how OLA had diffused throughout IEPs and whether IEP directors and faculty are interested in its adoption, IEP adoption leaders are poorly equipped to effect (i.e., encouraging or discouraging) OLA's adoption process in their IEPs. Three research questions guided this study:

1. To what extent has online language acquisition (OLA) been adopted at university and college-governed, intensive English programs (IEPs) in the United States?
2. How do IEP directors and faculty perceive the adoption of OLA in their IEPs?
3. To what extent do IEP directors and faculty perceive themselves to be leaders in the diffusion of OLA?

A population study of the 249 IEPs was performed. This study employed a quantitative deductive inquiry to investigate the IEP directors' and faculty's perceptions of six OLA innovation characteristics using the diffusion of innovations (DOI) theory as the conceptual framework and Rasch as the methodological framework. The construct validity of the instrument was evaluated through an analysis of its dimensionality, item and person separation and reliability, person and item measure quality, person and item hierarchy, and differential item functioning (DIF).

The study took place among the 249 IEPs who met the following criterion: non-proprietary, university or college-governed IEPs, and located in the United States. From the population of 2,741 IEP directors and faculty in these IEPs, the sample consisted of between 12% (n=1,713) and 19% (n=2,741) of the population who were estimated to have received the research instrument. Of the 328 respondents from 121 IEPs, 23.7% (n=76) were directors and 76.3% (n=245) were faculty, with seven not responding to that question.

Summary of Major Findings

Research question one. The goal of research question one was to learn the extent of OLA adoption in the target IEP population. A total of 40.5% of participants had recent experience with OLA and 24.8% were *currently* using it. Applying Rogers' (2003) theory of adopter categories, OLA adoption has reached the *early majority* stage, which means adopters fall into one of the three categories: innovators, early adopters, and early majority adopters.

Research question two. To better theorize whether adoption would decrease or increase from the *early majority* stage, it was necessary to understand how those involved in its adoption perceived its characteristics (i.e., the six PCI) and the related cluster technologies as well as their own confidence in learning to use new technology. The goal of research question two was to determine how IEP directors and faculty perceived OLA in their IEPs. This was determined using the Rasch measurement model, such as the Wright maps with item and person difficulty measures (see Appendix C) and subtotal means as well as differential item functioning (DIF). For the average participant, *visibility* items were the most difficult to endorse by a substantial margin even considering the SE mean of 0.36, but even for those with OLA adoption experience and leadership involvement, OLA was not often visible in their IEPs.

The remaining PCI items fell within a range from *complexity* as the hardest to endorse to *articulated results* as the easiest. Potential obstacles to adoption included institutional implementation and faculty understanding of OLA technology. While OLA was perceived as having the potential of attracting new students, participants were not confident it would lead to increased enrollment in their regular program. Those with experience with OLA found scheduling to be a significant obstacle. However, cost and confidence in learning new technology were not perceived obstacles. The ease at which participants endorsed most of the technology cluster items suggested they had no bearing on how participants perceived OLA characteristics. Additionally, many participants perceived OLA as improving their IEPs' effectiveness and quality and could communicate the potential benefits of OLA whether or not their IEP had adopted OLA.

Research question three. Beyond understanding how IEP directors and faculty perceived OLA's characteristics, the study was designed to explore whether they perceived themselves to be leaders in its diffusion, which was the focus of research question three. The moderately high OLA leadership involvement implies OLA adoption is slowly rising. This is based both on the 53.2% of the sample who reported they were involved in OLA leadership at some level and on the 31.1% of the sample who reported OLA leadership involvement at IEPs lacking OLA.

Those reporting a high level of OLA leadership involvement had an approximately 50% to 89% chance of endorsing all the other adoption characteristics except *visibility*. This ease by which highly involved OLA leaders endorsed nearly all items related to the latent variable of *OLA adoption potential* suggests this group of participants perceived more positive and fewer negative characteristics of OLA and could endorse more items at higher categories, thus were potentially more likely to adopt OLA if they were in a position to affect their IEP's adoption decision. However, highly involved OLA leaders had only an approximately 33% chance of endorsing the OLA characteristic of *visibility,* which suggests the OLA adoption process among IEPs is still in one of the early stages.

Discussion

The purpose of the discussion is to examine the study's major findings within the context of the existing literature and review the implications and recommendations. The discussion is organized by the three research questions.

Research Question One: OLA Adoption in IEPs

Rogers' (2003) DOI theory describes the innovation adoption process which begins when an innovation becomes available until the time it is widely adopted, if it reaches that point. Of the four types of DOI innovation-decisions, OLA requires a decision first by an authority within the IEP before it can diffuse to the faculty. However, IEP faculty play an important role in IEPs and are not without power to influence the adoption of institute-level innovations, sometimes even managing all major IEP decisions (Soppelsa, 2015). Research has shown IEP faculty are often more innovative than directors (Stoller, 1992). Thus, the perceptions of both directors and faculty were necessary to estimate the adoption status, including whether it was likely to increase or decrease.

The results revealed at least 40.5% (n=49) of IEPs in the sample had experimented with OLA in the last five years, and 24.8% (n=30) *currently* offer it. These numbers are higher than what is implied in the limited literature, which only hints at OLA's existence in IEPs. This contrast reveals IEPs may be experimenting with OLA unofficially or with a limited audience. If these results represented the complete population of 249 IEPs, approximately 20% may have experimented with OLA, and nearly one quarter of IEPs may currently offer it.

In this study, IEPs with OLA courses primarily focused on multi-skill courses with most offering intermediate and/or advanced levels of English. Many of those IEPs had one to three faculty teaching online, though a few reported having between 10 and 25 online instructors. These IEPs can be found in D.C. and all the U.S. states but five: Alaska, North Dakota, Rhode Island, South Dakota, and Wyoming. Less than a quarter of participants reported their IEP could use its OLA program to recruit students to their more profitable face-to-face program, which is highly relevant for those interested in using OLA to increase enrollment.

Rogers' (2003) five adopter categories can be plotted with a normally distributed, bell-shaped curve, with each adopter category consisting of "individuals with a similar degree of innovativeness" (p. 267). Without knowing the OLA adoption status at different time periods in the adoption process, it was not possible to determine the exact location of OLA in the adoption process. However, using the adoption percentage estimates from the results, generalized to the population, it was possible to estimate the current adoption status of OLA within the target IEP population. In Figure 5.1, Rogers' (2003) adopter categories can be seen with the approximate location of OLA adoption, which fell between 24.8% and 40.5%. Of note, 35% of directors reported their IEP had OLA experience within the last five years. If each director worked at only one IEP, then this percentage supported the 25% to 40% adoption status estimate range.

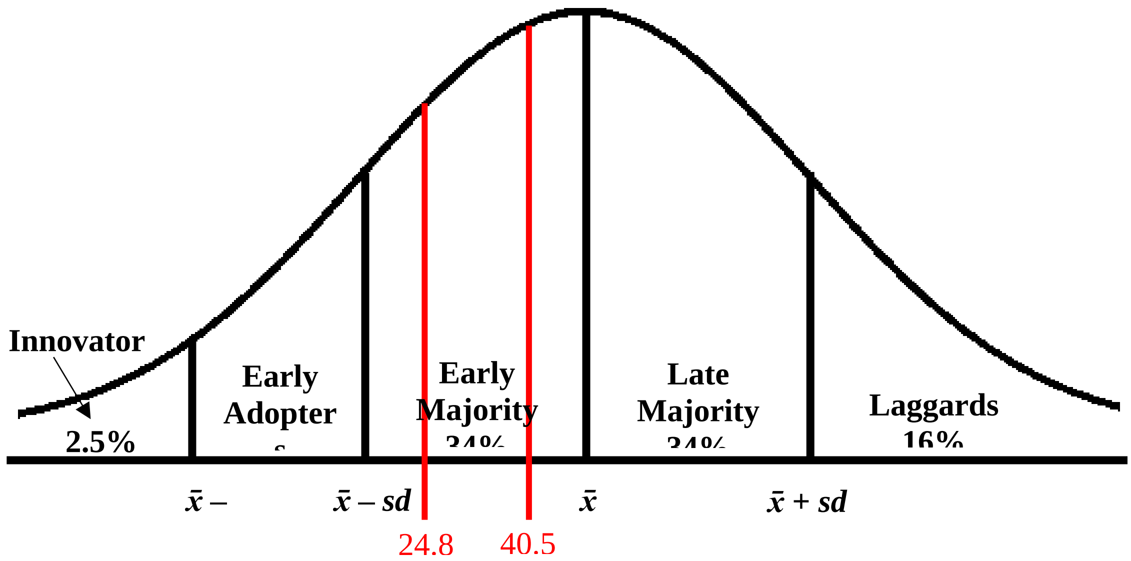

Figure 5.1. Adoption status by adopter categories (Rogers, 2003, p. 281).

Rogers (2003) contends that because *early majority* adopters spend more time in the innovation-decision process than *innovators* and *early adopters*, they rarely lead or hold positions of influence in respect to the innovations. By applying Rogers' (2003) adopter category ordering and percentage estimates, as seen in Figure 5.1, OLA could have already transitioned through the first two categories, *innovators* and *early adopters*, and now rests in the third category, *early majority*. If this observation represented the nationwide population of higher education-governed IEPs, then 2.5% (n=6) of the adopting IEPs could be *innovators*, and 13.5% (n=34) could be *early adopters*. Thus, as many as 61 could be part of the *early majority*. However, unlike the increased momentum implied in Rogers' (2003) adoption curve, the adoption status question alone could not determine if OLA adoption had already reached maximum saturation or whether it was still growing.

To better understand the adoption decision process, it was important to investigate the IEPs who had experimented with OLA in the last five years but did not report it as being *currently* available. While it was possible some decided not to adopt after experimenting with it, Rogers' (2003) insight into the organizational adoption process may shed light on what happened to these IEPs: an "innovation is modified and re-invented to fit the organization, and organizational structures are altered" during the "redefining/restructuring" stage of the implementation phase (p. 421). This suggested OLA could be experiencing redefinition in the many IEPs until it became ready for adoption in a smaller number of IEPs. More research is needed to learn what was happening with the IEPs who had recent experience with OLA but were not actively offering it *currently*.

The results of this study also revealed that if an IEP was not experimenting with OLA adoption, the faculty were often aware of this. However, if the IEP was experimenting with OLA, few faculty knew about it. This was based on the amount of participant agreement and accuracy regarding OLA adoption versus non-adoption at IEPs with more than one participant. If the adoption knowledge was limited to a select number of individuals, it could be because it was still in either the post-decision persuasion step or a limited-implementation step in the innovation-decision process. Although the decision step usually follows the persuasion step, Rogers (2003) claims the opposite may be true if the decision belongs to a group instead of just an individual. At any point in the innovation-decision process, adoption may be rejected.

Summary. Despite a general estimate that OLA adoption was in Rogers' (2003) *early majority* stage, this research is limited given an inability to determine the actual adoption stage of each IEP which would better inform the overall OLA adoption status. Thus, OLA adoption could be decreasing or increasing within the institutions participating in this study. By reviewing the current perceptions of IEP directors and faculty of IEPs who have and have not adopted OLA, more can be understood about OLA adoption potential in the future at those IEPs and possibly all IEPs in the target population. Research question two focused on this aspect.

Research Question Two: Perceptions of OLA Adoption by Directors and Faculty

DOI theory, an innovation's characteristics can "predict the rate of adoption of innovations" (Rogers, 2003, p. 219). Extending this with work from Moore and Benbasat (1991), Zaltman and Lin (1971), Tornatzky and Klein (1982), and Frambach and Schillewaert (2002) to account for the effects of an organization on an innovation's adoption, six PCI were chosen for the survey instrument in addition to questions regarding participants' experience with related cluster technologies and their general confidence in learning new technologies, all of which supported the latent variable of *OLA adoption potential*. Although the results drawn from the difficulty measures in the Wright map were not generalizable, they could be used to highlight areas for future research. The six PCI were *visibility* (VIS), *complexity* (CMX), *compatibility* (CPB), *enrollment and economic advantages* (EEA), *general benefits* (GBN), and *articulated results* (ART), in order of mean item subtotal difficulty measures from highest to lowest.

Visibility. Moore and Benbasat (1991) concluded *visibility* was one of the three "best predictors for distinguishing between the [adopter] categories", along with *relative advantage* and *result demonstrability* (p. 210). The results of this study revealed *visibility* was the most difficult item group to endorse, even for participants from IEPs who had adopted OLA. However, there was a noticeable difference in item focus between the hardest and easiest-to-endorse *visibility* items. Items "I frequently see online ESL being used in my IEP" and "online ESL classes are rarely seen in my IEP", which explicitly referred to seeing OLA in "my IEP," were extremely difficult to endorse whereas the two easiest-to-endorse *visibility* items referred to seeing OLA outside rather than inside their IEP. The difficulty of the two most difficult items suggests OLA was rarely seen by the participants in their own IEPs. This was true even for participants who perceived themselves to be highly involved leaders of OLA as well as for those whose IEPs were *currently* offering OLA. Those two groups, which had similar person subtotal means, had an approximately 33% chance of endorsing the mean *visibility* items at the highest level. This indicates OLA was rarely visible even in IEPs offering OLA courses, which confirms a finding from research question one: if the IEP was experimenting with OLA, few faculty knew about it.

Complexity. *Complexity* refers to the extent "an innovation is perceived as difficult to understand and use" (Rogers, 2003, p. 16), which, Zaltman and Lin (1971) contend, includes complex ideas and a complex implementation process. The latter level of complexity was represented by one item, "implementing online ESL classes at my IEP will be simple", and it was the most difficult to endorse of the four *complexity* items. Its difficulty of 1.54 logits (SE 0.09) meant the average participant had an approximately 20% chance of endorsing it while OLA leaders only had a nearly 30% chance of endorsing it, all of which suggests OLA implementation was perceived as an OLA adoption obstacle. In contrast, based on the lower difficulty measures of the other CMX items, OLA technology was perceived as learnable "without difficulty" but yet requiring substantial "effort" for faculty to understand.

The “online ESL technology seems to require little effort for teachers to understand” item had a slight DIF (|0.43|, p=0.037) suggesting full-time participants perceived OLA technology as requiring more effort to understand than did part-time participants. This may be related to workload or who was most likely to be assigned online classes. Since full-time directors and faculty are often the impetus behind innovation in IEPs (Stoller, 1992), their perception of OLA as requiring more effort to understand may explain why its adoption in IEPs in the United States has been slower than the universities which govern them.

Compatibility. This PCI is “the degree to which an innovation is perceived as being consistent with the existing values… and needs of potential adopters” (Rogers, 2003, p. 15). The two items about the compatibility of OLA with faculty’s schedules and responsibilities represented the most compatible areas (i.e., those with the lowest difficulty measures) and suggests faculty’s schedule and responsibilities were not obstacles to adoption for participants. However, a slight DIF indicated the item regarding faculty scheduling was relatively more difficult to endorse for two groups: those whose IEPs had recent OLA experience as opposed to those who lacked it and for full time participants rather than part-time. This suggests those with recent OLA experience perceived OLA as significantly less compatible with faculty’s work schedules. Similarly, full-time participants also found OLA to be significantly less compatible with faculty’s work schedules. This reveals that those without experience with OLA perceived it as being more compatible than those who had more experience with OLA. More research would be helpful in determining whether this perceived lack of compatibility is due to the recent OLA experience or an unknown variable.

Compatibility includes the "existing values" of an organization, which could include the following: an organization's mission statement, how it is perceived to operate, and its culture. However, further research may be needed to understand why an organization's mission statement with -0.42 logits of difficulty (SE 0.09) was so easy to endorse in contrast to how an organization is perceived to operate and compatibility with the IEP's culture and the way it operates (0.56 and 0.39 logits, respectively, both SE 0.08). The 0.81 to 0.98 logit discrepancy between these groups of *compatibility* items suggests the mission statement was not perceived in the same way as the culture and how it operated. This could have been because the mission statements were broadly written or misunderstood, or participants understood a distinct difference in the mission statement and the IEP's culture and how it operated. Further research into how IEP directors and faculty perceive their mission statements may reveal relevant connections to their perceptions of organizational culture.

Enrollment and economic advantages. Zaltman and Lin (1971) consider cost and profitability to be of great relevance for understanding how innovations diffuse. Similarly, Witbeck and Healey (2015) believe the expenses of starting online programs could discourage some from adopting an innovation. However, the substantially low difficulty measure (-0.82, SE 0.09) of the item about OLA as "too costly for my IEP to offer" suggests this was not an obstacle for OLA. The positioning of the population's IEPs within a university or college could affect their OLA expenses. Many universities provide technology which could be repurposed for OLA. As was described in the technology cluster discussion, the average participant had experience using video conferencing technology, learning management systems, and online gradebooks.

Additionally, the cluster items for experience with digital ESL textbooks, recorded video feedback for students, and video recording for all or part of ESL classes were located close to the item mean, and all of these are used in online courses. While experience with a technology does not indicate affordability for the IEP, it could imply participants have experience with these technologies because they were already available to them in their IEPs.

Another part of the *enrollment and economic advantages* PCI was the potential of OLA to increase enrollment, which represented substantial economic benefit potential. Three EEA items explicitly referred to this type of economic benefit: attract new students, enroll in online ESL classes at my IEP, and increase enrollment in face-to-face classes at my IEP, with measurement difficulties of -0.96, -0.13, and 0.86 (all with SE 0.09), respectively. This order of difficulty was indicative of how OLA was perceived by participants as affecting IEP enrollment: it was easy to imagine OLA would “attract new students”, but believing students would “enroll in online ESL classes at my IEP” because of OLA was of average difficulty, whereas being confident OLA would “increase enrollment in face-to-face classes at my IEP” was the most difficult.

Additionally, a slight DIF (|0.56|, p=0.003) indicated the item “increase enrollment in face-to-face classes at my IEP” was relatively more difficult to endorse for those whose IEPs had recent OLA experience than those who lacked it. This reveals participants with recent OLA experience lacked confidence that OLA would increase enrollment in face-to-face IEP classes. Depending on an IEP’s motivation in adding an OLA program to their IEP, this item could represent an obstacle for IEPs who perceive

OLA primarily as a way to increase enrollment in their more profitable standard IEP program.

Based on the difficulty measures of the six lowest EEA items, all of which are below the mean of all items, participants generally found OLA to be affordable to set up, attractive to new students, potentially profitable, and a competitive advantage for their IEP.

General benefit. This PCI originated from the more general *economic benefit* items which did not explicitly refer to economic or enrollment-focused benefits. Unlike the EEA items, all the GBN items were near the participants' mean although only the item related to how OLA improves the performance of one's IEP, was above it at 0.34 logits (SE 0.09). The remaining items regarding how OLA would improve the IEPs' effectiveness and quality had a 50% or greater chance of being endorsed by the average participant. Specifically, the easiness of endorsing item 01GBN (-0.53 logits, SE 0.09) suggests participants think "international students will benefit from online ESL classes offered by my IEP"; however, this item lacked the wording to distinguish between physically local and physically remote international students.

Articulated results. This PCI originated from the three communication-focused PCI items in *result demonstrability* and refers to the ability of individuals to be able to communicate to others the results of either their experience or their understanding of how an innovation works. All three ART items were easy to endorse for participants with difficulty measures ranging from -0.28 to -0.54. Verbalizing the potential benefits, explaining why the classes are beneficial, and communicating the results of OLA courses were all endorsable by most participants.

Technology confidence. One of the easiest-to-endorse items, with a difficulty measure of -1.21 logits (SE 0.10), was regarding participants' confidence in learning new technologies. Only four of the technology cluster items had a lower difficulty measure. Notably, participants' mean performance measures for those identifying themselves as having no OLA leadership was -0.33 (SE 0.07) and those lacking recent OLA experience at their IEPs was -0.11 (SE 0.06). Yet, with a difficulty measure of -1.21, a high confidence in learning technology suggested it had little to no bearing on OLA leadership or adoption. In fact, those with no OLA leadership involvement still had an approximately 71% chance of endorsing item S7 regarding technological confidence at the highest level. However, there was no DIF to indicate this difference was significant.

Technology clusters. Technology clusters may encourage adoption (Rogers, 2003). Whereas the mean performance of the technology cluster items was nearly the easiest-to-endorse group, the most difficult technology related to OLA was the item referring to recording live IEP classes for the benefit of existing students, which had a difficulty of 3.18 (SE 0.24). The difficulty of this item was unsurprising since it is very similar to what is often required for OLA, with the key difference being that it makes videos available to existing students while OLA must include students not present in the face-to-face classroom. Considering how few OLA adopters said yes to this item, it was also possible that IEPs who offer OLA courses did not offer a similar service to face-to-face students.

The list of difficulty measures for the technology cluster items implies the average participant had experience with online learning as a student, video conferencing technology, online learning through their employer or in professional development, online learning management systems, other online activities, and online grading, all of which were listed in the order of difficulty from -0.91 to -2.74.

Summary. Overall, the average participant found OLA to have many benefits for their IEP with articulable results. Unsurprisingly, they were most challenged by any statement indicating it had been adopted already or was visible in their institute. Both institutional implementation and faculty understanding of OLA technology were viewed as challenging. Despite OLA courses being viewed as helpful for attracting new students, participants were nonetheless not confident online students would lead to an enrollment increase for their regular IEP program. Those less experienced with OLA adoption were significantly less likely to view OLA as compatible with faculty's schedules whereas the others found it easy to endorse along with compatibility with faculty's responsibilities. The cost of setting up OLA courses was not viewed as prohibitive. Lastly, participants were confident in their ability to learn to use new technology while still finding the majority of the items difficult to endorse. Being able to use most of the technology cluster items seemed to have little impact on how participants viewed the PCI characteristics.

Research Question Three: Perceptions of OLA Adoption Leadership

Because a lack of OLA leadership involvement is a potential obstacle to adoption, understanding more on the topic of whether IEP directors and faculty perceived themselves to be leaders in the diffusion of OLA is important to the field of IEP leadership and management. The purpose of research question three was to determine whether and to what extent IEP instructors and directors perceived themselves to be leaders in the diffusion of OLA. Typically, IEP directors have the authority-based power of manager (French & Raven, 1959), and some are leaders as well (Rost, 1991), either though formal or informal leadership which is based on “the way other group members respond to them” (Northouse, 2019, p. 8). Similarly, some IEP faculty have positional management power depending on the power structure of their IEP. IEP faculty’s involvement, in general, is on a spectrum; they may share leadership and management responsibility of the institute, with or without close supervision from the director (Bolden et al., 2009), or they may be responsible for making nearly all decisions through a committee structure (Soppelsa, 2015) while others are less involved in leadership and administration.

Rost (1991) emphasizes that leaders intend to make changes. If the participants in this study interpreted *leadership* in the same way, then those who answered the question “Indicate your degree of involvement in leading the adoption of online ESL at your IEP” with one of the affirmative options may have intended OLA diffusion-related change in their IEP. However, the results were limited by the likelihood that *leadership* was not interpreted equally by all participants. An investigation of the specific wording of the question revealed that the question targeted positive change, as opposed to individuals who intended to lead their IEP away from OLA.

When considering the leadership involvement of directors and faculty, there were several factors which limited how the results could be applied. The imbalance between director and faculty response rates needs to be considered. The majority of participants were faculty rather than directors. Similarly, the likelihood of directors, who have the positional role of managers, to perceive themselves to be leaders within their IEP, potentially on any topic related to their IEP, needed to be considered as potentially affecting the number reporting leadership involvement. Of course, those most interested in the topic of OLA in IEPs were more likely to complete the survey, so their input may have falsely inflated the level of OLA leadership involvement in the sample of IEPs.

Although just over half of the participants were involved in some level of OLA leadership, a high level of OLA leadership was uncommon. Nonetheless, any level of efforts could lead to an increase in OLA adoption. Of the study participants, just under a third whose IEPs lacked OLA adoption experience, perceived themselves as leaders of OLA. If this percentage represented the population, as many as a third of IEP directors and faculty whose IEPs have not adopted OLA could be involved in some level of OLA leadership at their IEP, meaning OLA adoption could be on a positive path.

Because this study focused primarily on OLA adoption potential, the role of directors and faculty in OLA leadership in IEPs lacking OLA adoption was most pertinent. As the level of OLA leadership increased from low to high, the percentage of director involvement increased while the faculty involvement decreased. This suggests those most involved in OLA leadership in IEPs lacking OLA were directors, but this was true only at the highest level in the sample. Within the moderate level of involvement of those IEPs lacking OLA, 64% were faculty, and within the low level of involvement, 88% were faculty. However, since there were more faculty than directors in IEPs and since more faculty responded to the survey, it was not surprising that more faculty were involved in leading OLA adoption.

Unsurprisingly, faculty found it harder to endorse high levels of OLA leadership. Additionally, fewer part-time faculty were involved in OLA leadership. Because of the way OLA must first be adopted at the organizational level before faculty can use it, it was not surprising directors were more involved in OLA leadership at the high levels.

Furthermore, in each level of leadership involvement both for those IEPs with and without OLA, the highest percentage of the sample were faculty, but at the highest level of leadership involvement, directors were similar in percentage to faculty.

Summary. With over half of participants in this study involved in OLA leadership at some level, this bodes well for the future of OLA adoption. This is especially true in IEPs lacking OLA, where a third of respondents perceived themselves as involved in OLA leadership. If the sample represented the population to any extent, it could suggest OLA is on a slow yet positive path toward adoption.

Implications

As Foster and Kaplan (2001) imply, IEPs' current problem of declining enrollment due to political and fiscal factors beyond their control represents "market discontinuities" which "present management with a maelstrom of disorder" (p. 62). Bolman and Gallos (2011) seem to support this idea of managing disorder to encourage innovation: "Innovation comes from managing the enduring differences and political dynamics at the center of university life that can spark misunderstandings, disagreements, and power struggles" (p. 13). They also suggest training for higher education leaders will improve the situation. Such training needs to help academic leaders "understand how the mindsets they have formed from their everyday experiences close them off to options and to new learning" (p. 9). Such options and new learning may include technological innovations like OLA for IEP leaders.

Foster and Kaplan (2001), in response to the "maelstrom of disorder" (p. 62), believe organizations must embrace revolutionary change and innovative ideas to become highly responsive and agile rather than culturally locked-in, which is the result of organizations responding with fear and defensiveness. They further suggest organizations be willing to take risks even if it means “cannibalizing” their primary business (p. 62) which may describe IEPs’ hesitation to adopt OLA.

The enrollment problem is complex and multiple solutions will be needed. OLA could benefit IEPs by attracting students from areas of the world where political and economic issues have limited students wanting to travel to the United States (American Council of Education, 2019). However, Rogers (2003) and Kingdon (2003) warn that the identification of a solution often precedes the problem. Thus, OLA may not necessarily be a response to the problem of IEP enrollment. As Kingdon (2003) suggests, the recent enrollment downturn may represent a “policy window” for those interested in the promotion of OLA (p. 165).

In the process of promoting the adoption of the OLA, IEP directors and faculty may take the role of change agents trying to improve the IEP system (Stoller, 1992; Lippitt et al., 1958 as cited in Ottaway, 1983). IEP instructors, as internally-located change agents, can use their knowledge of the institute to identify weaknesses at the individual, group, or organizational level (Burke, 2014). As potential leaders, they can influence the program and other instructors toward program changes to nullify these weaknesses, such as declining enrollment and obstacles to change when change is needed. When fulfilling the role of leader or follower, IEP directors and faculty may influence their colleagues, managers, students, and eventually, their organization’s policies and decisions (Rost, 1991; Northouse, 2019).

Nonetheless, adoption challenges remain. Resources are always limited in organizations (Lasswell, 1958), and this will affect the adoption of OLA which requires time for individuals to plan and implement adoption at the cost of deprioritizing other work. While all types of changes require resources, this is especially true of revolutionary, incremental, deep organizational, and double-loop learning-based changes which necessitate considerable resources. Argyris and Schön (1978) suggest type II changes are needed to change organizations' underlying policies, assumptions, goals, and cultural values. Burke (2014) believe this deep level of organizational change will be very challenging. Despite the espoused perceptions of those interested in leading OLA changes, it is their theories-in-use which are most relevant to IEPs interested in change (Argyris & Schön, 1996). The latter theories will affect whether adoption increases or decreases from its current state.

Policy and practice recommendations. If IEPs want to determine if online ESL courses will benefit them, they need to make policy decisions in advance and share that with instructors and administrative staff. These can help the institute provide a unified front when international students inquire about OLA options. By offering just one online ESL class now, IEPs can begin to gauge the level of interest of international students.

IEPs need to write guidelines for remote online students. This includes specifying that online international students must be located outside the United States for visa purposes and clarifying the conditions under which those located in the United States can take supplementary online ESL courses alongside their regular higher education courses. IEPs need to determine the tuition for online ESL courses and whether it will vary depending on the course content, such as English writing versus English reading. Similarly, IEPs will need to decide how instructors are compensated for online courses, especially if some teach receptive skills like reading and listening while others teach more feedback-focused productive skills like writing and speaking.

If the goal of online ESL students is to continue their English language training in the United States, then IEPs need to determine how those online ESL students will be integrated with the ESL students in their face-to-face program. For example, will the remote ESL students be treated like new or existing students? Such decisions could facilitate the growth of an online ESL program where student interest exists.

Future research. An investigation of the IEPs who have experimented with OLA adoption and those *currently* adopting it is warranted. Understanding their OLA implementation process, the obstacles they overcame, and how they overcame them could assist other IEPs in similar situations. This study was limited because it was unable to determine the actual adoption stage of each IEP, but a study of the OLA implementation process in those IEPs could give a fuller picture of the adoption process. Such a study of the OLA implementation process could also investigate the reasons why IEPs, such as the 19 in this study, who had recent OLA experience no longer offered OLA.

Instrumentation. Rogers (2003) claims research into an innovation's adoption process should occur both in the early stages and after it has ended because those involved in the adoption process will be better able to recall their perceptions of the innovation. While this study intended to sample the perceptions of stakeholders in the early stages of adoption, another study of this subject would contribute to the field of IEP leadership and management. However, some changes to the instrument would benefit the study. Moore and Benbasat's (1991) PCI instrument, which served as a template for the one used in this study, used a mix of future “will” and present tense statements, yet anecdotal information in the form of unrequested feedback from the survey participants frequently implied that they could not complete the survey because their IEP had not adopted OLA. However, the purpose of the survey was for all IEPs to take it, and although this purpose was clearly stated in the email introduction, some participants were nonetheless confused. Thus, future research into this area could benefit from addressing this problem where needed.

Conclusion

Online education is not well-understood or defined within IEPs, and it is perceived differently among the wide variety of stakeholders in IEPs. The results of this study contributed to the field of IEP leadership and management a better understanding of where OLA adoption is currently among U.S. university or college-governed IEPs and the direction it may be headed. With the recent fluctuations in IEP enrollment, IEPs have been experimenting with ways to increase enrollment. OLA could help IEPs compete with other ESL and EFL institutions, and it could give them an edge over IEPs who have been slow to adopt online practices. The results of this study imply OLA had been adopted to some extent to a larger degree than current literature indicated although it was still likely in the early stages of Rogers’ (2003) adoption process. The results also suggest OLA is still experiencing a process where it is being redefined and re-invented (Rogers, 2003) to better fit the needs of university or college-governed IEPs in the United States. The resulting product, with the help of change agents, could lead to greater levels of adoption. Furthermore, the perceptions and leadership involvement of the sample of directors and faculty suggested OLA adoption may be increasing, yet there were signs it has not been happening quickly. The results of this study could give direction to change agents – both within and outside of the IEP – regarding the best way to target their efforts to decrease or increase the OLA adoption rate.

Appendices

Appendix A

Pilot Instrument Introduction, Consent, and Survey

Introduction Emailed to Directors

Subject Line: Online ESL classes in IEPs: A Nationwide Research Study

Hello [first name, last name],

My name is Brandon Decker. I'm an IEP instructor myself and a PhD Candidate in the Dept. of Educational Leadership Studies at the University of Kentucky.

This is a nationwide study on the **status of online education within U.S. IEPs**. I want to know how much it has spread, what directors and instructors think about its characteristics, and who the leaders are in the diffusion process. Your responses are important whether your IEP is or is not interested in online ESL. IEP leaders need a more complete picture of how IEP staff perceive online ed for ESL and what's happening in other IEPs.

I know there's rarely a time when you aren't busy, so I've kept the **survey** to 10-15 minutes. **Please take it yourself AND send/forward it to all of your FT and PT instructors** (and other directors) within all the parts of your IEP (including special programs).

I think the results of this survey will be beneficial to the leaders, change agents, stakeholders, IEP software designers, and everyone who is interested in learning how online education has already diffused or will diffuse in U.S. IEPs.

If you are interested in the results of this study, please email brandon.decker@uky.edu with that request, and I'll send you a link to the published report when it is available (this is not a reward). You don't have to complete the survey to receive the link.

This study has been approved by the International Review Board for use through 5/31/19. My research is led by my faculty advisor, Dr. Beth Rous, of the University of Kentucky.

Click on this link to the Survey: **Take the Survey**. Or copy and paste the URL below into your internet browser (Apple Safari doesn't work well): https://uky.az1.qualtrics.com/jfe/form/SV_7PukKPwdeDzM8EB

If you have any questions, please contact me.

Thank you,

Brandon Decker
brandon.decker@uky.edu
[cell number hidden]

Follow the link to opt out of future emails:
${l://OptOutLink?d=Click here to unsubscribe}

Informed Consent to Participate in a Research Study

Online Education within IEPs: A Diffusion Study

KEY INFORMATION: We are asking you to choose whether or not to volunteer for a research study about how online education is being used within intensive English programs (IEPs) in the United States. You do not have to participate in this study. You may stop taking the survey at any time. If you do decide to participate, we will treat your answers confidentially. Reports will only discuss answers by groups of participants, and your personal information will not be shared. This page is to give you key information to help you decide whether to participate. If you have any questions at any time, the contact information for the research investigator is below.

This study is being conducted by Brandon Decker, a Ph.D. candidate at the University of Kentucky, and an IEP instructor at Missouri State's ELI. Dr. Beth Rous is the committee chair and providing oversight.

WHAT IS THIS STUDY ABOUT AND HOW LONG WILL IT LAST? The purpose of this study is to determine the extent to which online education has been adopted within IEPs and explore what IEP directors and faculty think about online language acquisition in IEPs. This study will take approximately 10-15 minutes.

WHAT ARE THE KEY REASONS YOU MIGHT CHOOSE NOT TO VOLUNTEER FOR THIS STUDY? There are no anticipated risks, and no reasons not to participate in this study except that you choose to do so. There are no penalties for not participating.

DO YOU HAVE TO TAKE PART IN THE STUDY? If you decide to take part in the study, it should be because you really want to volunteer. You will not lose any services, benefits, or rights you would normally have if you choose not to volunteer.

WHAT IF YOU HAVE QUESTIONS, SUGGESTIONS OR CONCERNS? The person in charge of this study is Brandon Decker (Principal Investigator, PI), a student at the University of Kentucky, Department of Educational Leadership, College of Education. If you have questions, suggestions, or concerns regarding this study or you want to withdraw from the study, his contact information is: brandon.decker@uky.edu, [cell number hidden]. If you have any questions, suggestions or concerns about your rights as a volunteer in this research, contact staff in the University of Kentucky (UK) Office of Research Integrity (ORI) between the business hours of 8am and 5pm EST, Monday-Friday at 859-257-9428 or toll free at 1-866-400-9428.

WHO WILL SEE THE INFORMATION THAT YOU GIVE? When we write about or share the results from the study, we will write about the combined information. We will keep any identifying information private. We will make every effort to prevent anyone who is not on the research team from knowing that you gave us information, or what that information is. Your responses are stored on a secure server and will be saved in password-protected computers. We will make every effort to safeguard your data, but as with anything online, we cannot guarantee the security of data obtained via the internet. Qualtrics, a secure online survey software, hosts this survey. You may review the Qualtrics terms of service and privacy/security policies here: https://www.qualtrics.com/privacy-statement/. The investigator will retain the data for IRB records for at least six years after study closure.

CAN YOU CHOOSE TO WITHDRAW FROM THE STUDY EARLY? You can choose to leave the study at any time. You will not be treated differently if you decide to stop taking part in the study. If you choose to leave the study early, data collected until that point will remain in the study database and may not be removed. If you do not want to be in the study, there are no other choices except not to take part in the study.

WILL YOU RECEIVE ANY REWARDS FOR TAKING PART IN THIS STUDY? You will not receive any rewards or payment for taking part in the study. Other than the satisfaction from contributing to the knowledge in the field of IEP leadership and administration, you will not get any personal benefit from taking part in this study.

WILL YOUR INFORMATION BE USED FOR FUTURE RESEARCH? All identifiable information, such as the name of your institute and its host university, if it has one, will be removed from the information collected in this study. After we remove all identifiers, the information may be used for future research or shared with other researchers without your additional informed consent.

BY CONTINUING WITH THE SURVEY YOU CONSENT TO PARTICIPATE IN THIS STUDY

I have read the above information. I have had the opportunity to ask questions and have my questions answered. By clicking the button below, I acknowledge that my participation in the study is voluntary, I am 18 years of age, and that I am aware that I may choose to terminate my participation in the study at any time and for any reason.

- ○ *I consent, begin the study*
- ○ *I do not consent; I do not wish to participate*

Pilot Instrument Content for Digital Version

Instructions: We are interested in your candid responses about your feelings <u>toward online ESL classes, even if your IEP doesn't offer them</u>. Please complete the survey by January 21, 2019.

<u>Section 1</u>

Are your IEP duties primarily those of a director or teacher?

Choose one: Primarily a Director Primarily a Teacher

Regarding your intensive English program (IEP**), indicate how strongly you agree or disagree with the following statements** by choosing the response that best represents your opinion. There are 6 characteristics.

Economic Advantages		Choose one option for each statement:			
1	Offering online ESL classes will help my IEP attract new students.	Strongly Disagree	Disagree	Agree	Strongly Agree
2	The economic disadvantages of offering online ESL classes at my IEP outweigh the advantages.	Strongly Disagree	Disagree	Agree	Strongly Agree
3	Online ESL classes are too expensive for my IEP to maintain.	Strongly Disagree	Disagree	Agree	Strongly Agree
4	Offering online ESL classes improves the quality of my IEP.	Strongly Disagree	Disagree	Agree	Strongly Agree
5	Overall, I find offering online ESL classes to be advantageous for my IEP.	Strongly Disagree	Disagree	Agree	Strongly Agree
6	Offering online ESL classes enhances the effectiveness of my IEP.	Strongly Disagree	Disagree	Agree	Strongly Agree
7	It is too costly for my IEP to offer online ESL classes.	Strongly Disagree	Disagree	Agree	Strongly Agree
8	Offering online ESL classes increases the productivity of my IEP.	Strongly Disagree	Disagree	Agree	Strongly Agree
9	My IEP's enrollment has grown in response to the online ESL classes we offer.	Strongly Disagree	Disagree	Agree	Strongly Agree
10	Students are interested in our IEP because we offer online ESL classes.	Strongly Disagree	Disagree	Agree	Strongly Agree
11	Offering online ESL classes improves the performance of my IEP.	Strongly Disagree	Disagree	Agree	Strongly Agree
12	The IEP would lose students if it stopped offering online ESL classes.	Strongly Disagree	Disagree	Agree	Strongly Agree

13	Offering online ESL classes improves my IEP's profits.	Strongly Disagree	Disagree	Agree	Strongly Agree
14	Offering online ESL classes gives my IEP a competitive advantage over other IEPs.	Strongly Disagree	Disagree	Agree	Strongly Agree
Compatibility		Choose one option for each statement:			
1	Offering online ESL classes is compatible with all aspects of my IEP.	Strongly Disagree	Disagree	Agree	Strongly Agree
2	I think online ESL classes are compatible with my IEP's mission statement.	Strongly Disagree	Disagree	Agree	Strongly Agree
3	Teaching online ESL classes is compatible with teachers' work schedules.	Strongly Disagree	Disagree	Agree	Strongly Agree
4	Offering online ESL classes is compatible with the responsibilities of teachers.	Strongly Disagree	Disagree	Agree	Strongly Agree
5	I think that offering online ESL classes fits well with the way my IEP operates.	Strongly Disagree	Disagree	Agree	Strongly Agree
6	Offering online ESL classes fits into my IEP's culture.	Strongly Disagree	Disagree	Agree	Strongly Agree
7	There is no conflict between teaching online ESL classes and teachers' working hours.	Strongly Disagree	Disagree	Agree	Strongly Agree
Complexity		Choose one option for each statement:			
1	I believe that the technology for online ESL classes is complex.	Strongly Disagree	Disagree	Agree	Strongly Agree
2	I believe that the technology for online ESL classes can be learned without difficulty.	Strongly Disagree	Disagree	Agree	Strongly Agree
3	Online ESL classes seem to require a lot of mental effort for teachers.	Strongly Disagree	Disagree	Agree	Strongly Agree
4	Teaching online ESL classes is frustrating.	Strongly Disagree	Disagree	Agree	Strongly Agree
5	Overall, I believe that the technology needed for teaching online ESL classes is easy to use.	Strongly Disagree	Disagree	Agree	Strongly Agree

6	Online ESL technology seems to require little effort for teachers to understand.	Strongly Disagree	Disagree	Agree	Strongly Agree
7	Learning to operate the technology needed for teaching online ESL classes is easy.	Strongly Disagree	Disagree	Agree	Strongly Agree
8	Including online ESL classes at my IEP will be challenging.	Strongly Disagree	Disagree	Agree	Strongly Agree
9	Implementing online ESL classes at my IEP will be simple.	Strongly Disagree	Disagree	Agree	Strongly Agree
Visibility		Choose one option for each statement:			
1	I have frequently observed what happens in online ESL classrooms.	Strongly Disagree	Disagree	Agree	Strongly Agree
2	I have frequently watched videos where teachers taught online ESL classes.	Strongly Disagree	Disagree	Agree	Strongly Agree
3	I have rarely been to conferences where speakers presented on their experience with online ESL.	Strongly Disagree	Disagree	Agree	Strongly Agree
4	Teachers in my IEP have often spoken or written about their experience teaching online ESL.	Strongly Disagree	Disagree	Agree	Strongly Agree
5	In my IEP, teachers often teach online ESL classes.	Strongly Disagree	Disagree	Agree	Strongly Agree
6	I have frequently seen online ESL in use outside my IEP.	Strongly Disagree	Disagree	Agree	Strongly Agree
7	Online ESL classes are rarely seen in my IEP.	Strongly Disagree	Disagree	Agree	Strongly Agree
8	I have often seen videos demonstrating online ESL classes.	Strongly Disagree	Disagree	Agree	Strongly Agree
9	I have frequently read about ESL teachers – in my IEP or in others – teaching online ESL classes.	Strongly Disagree	Disagree	Agree	Strongly Agree
10	I know ESL teachers in other U.S. IEPs who teach ESL online.	Strongly Disagree	Disagree	Agree	Strongly Agree

11	I frequently see online ESL being used in my IEP.	Strongly Disagree	Disagree	Agree	Strongly Agree
12	I have rarely seen other teachers teaching online ESL classes.	Strongly Disagree	Disagree	Agree	Strongly Agree
Result Demonstrability		Choose one option for each statement:			
1	I would have no difficulty telling others about the potential benefits of offering online ESL classes.	Strongly Disagree	Disagree	Agree	Strongly Agree
2	I believe I could communicate to others the results of offering online ESL classes.	Strongly Disagree	Disagree	Agree	Strongly Agree
3	The positive and negative effects of offering online ESL classes are apparent.	Strongly Disagree	Disagree	Agree	Strongly Agree
4	I would have difficulty explaining why online ESL classes are beneficial.	Strongly Disagree	Disagree	Agree	Strongly Agree
Certainty		Choose one option for each statement:			
1	I feel confident in the advantages of offering online ESL classes at my IEP.	Strongly Disagree	Disagree	Agree	Strongly Agree
2	I feel certain that international students will benefit from online ESL classes offered by my IEP.	Strongly Disagree	Disagree	Agree	Strongly Agree
3	I feel confident that online ESL classes will be a waste of time, money, and effort at my IEP.	Strongly Disagree	Disagree	Agree	Strongly Agree
4	I feel certain that international students will enroll in online ESL classes at my IEP.	Strongly Disagree	Disagree	Agree	Strongly Agree
5	I feel confident that online ESL classes will increase enrollment in face-to-face classes at my IEP.	Strongly Disagree	Disagree	Agree	Strongly Agree
6	I feel uncertain whether online ESL classes will help students who want to learn English.	Strongly Disagree	Disagree	Agree	Strongly Agree

Note. Adapted from Moore & Benbasat (1991, p. 216), with permission from Izak Benbasat (personal communication, Oct. 10, 2018).

Section 2

1. Indicate your degree of confidence in learning to use new technological innovations. Choose one:

   Almost No Confidence   Low Level of Confidence
   Moderate Level of Confidence   High Level of Confidence

2. Which of the following do you have experience with? Choose all that apply.
   a. ___ Online learning as a student
   b. ___ Online learning through my employer and/or in professional development
   c. ___ Video conferencing technology
   d. ___ Online learning management systems to make or collect assignments
   e. ___ Digital ESL textbooks
   f. ___ Online grading or online gradebooks
   g. ___ Online activities (other than digital textbooks) with my ESL students
   h. ___ Recorded video feedback to students
   i. ___ Video recording of all or part of my ESL classes
3. Does your IEP record live classes on video and offer those for students to view online?

   No   Yes

Section 3

1. Has your IEP had an online ESL class of any kind in the last five years?   No   Yes

IF YOU ANSWERED YES TO THE LAST QUESTION, complete the next 6 questions:

2. Are online ESL classes of any kind <u>currently</u> offered in your IEP?   No   Yes
3. Which student proficiency levels are/were offered with your online ESL class(es)? Choose all that apply. ___ Beginner   ___ Intermediate   ___ Advanced
4. Which skills are/were taught using online ESL? Choose all that apply.

   ___ Reading ___ Writing ___ Listening ___ Speaking ___ Grammar
5. Which part(s) of your IEP offer or have offered online ESL? Choose all that apply.

   ___ Regular EAP Program ___ Short-Term EAP Program ___ Other Programs

   If you chose "other programs" in the last question, please list them here.
6. Approximately how many teachers total have taught or are teaching online ESL class(es) at your IEP? __

7. How often have students began with your online ESL class(es) while in their home country before joining the face-to-face classes at your IEP? Choose one:

    Almost Never Happens　Sometimes Happens
    Often Happens　Almost Always Happens
    Unknown

Section 4

1. Indicate your degree of involvement in leading the adoption of online ESL at your IEP. Choose one:

    No Involvement　Low Level of Involvement
    Moderate Level of Involvement　High Level of Involvement

Section 5

1. What is the name of your IEP? [short answer space]
2. What state is your IEP located in? [drop down list of states]
    a. Follow-up question: What is the name of the university or college which governs your IEP? *This is necessary to learn how much online classes have diffused in U.S. IEPs.* [drop down list + write-in option]
3. What is your age? Choose a range from the list: 18-21　21-25
    26-30　31-35　36-40　41-45　46-50
    51-55　56-60　61-65　66-70　71 and above
4. Are you a full-time or part-time IEP teacher? Choose one: Full-time　Part-time
5. What is the total number of years you have been employed (full or part-time) in <u>any U.S. IEP</u>? (Round to the nearest whole number.)
    a. Choose a range from the list: less than 1 year　1-3 years　4-6 years
    7-9 years　10-12 years　13-15 years　16-18 years　19-21 years
    22 or more years

Appendix B

Final Instrument Introduction, Consent, and Survey

Introduction Emailed to Directors

Subject Line: Perceptions of Online ESL Classes in IEPs

Hello [first name, last name],

My name is Brandon Decker. I've been an IEP instructor for 17 years. I'm also a PhD Candidate in the Dept. of Educational Leadership Studies at the University of Kentucky.

This is a survey on instructors' and directors' **perceptions of online education in IEPs**. **Even if your IEP doesn't offer any online ESL classes, your responses are still relevant to this study**.

As a **thank you** for taking part in this study, you may choose to be entered into a **drawing to receive one of five $20 Starbucks gift cards**.

The survey takes **10 minutes**. It will be available for one month. [*For directors only*: **Directors, please forward it** to all of your IEP's FT and PT instructors and directors.]

Please email me (brandon.decker@uky.edu) if you want a link to the final report from this study (this is not a reward; you don't have to complete the survey to receive the link).

This study has been approved by the International Review Board for use through 12/31/19. My research is led by my faculty advisor, Dr. Beth Rous, of the University of Kentucky.

Click to Take the Survey.

If opening in Outlook, sometimes copy/pasting the full link is better: [complete link here]

If, by chance, you already completed this survey for me last month, then this email was accidentally sent to you a second time, so please ignore it. I don't want anyone to take the survey twice.

If you have any questions, please contact me.

Thank you,
Brandon Decker
brandon.decker@uky.edu
[cell number hidden]

Follow the link to opt out of future emails:

[unsubscribe link here]

Informed Consent to Participate in a Research Study

Online Education within IEPs: A Diffusion Study

KEY INFORMATION: We are asking you to choose whether or not to volunteer for a research study about how online education is being used within intensive English programs (IEPs) in the United States. You do not have to participate in this study. You may stop taking the survey at any time. If you do decide to participate, we will treat your answers confidentially. Reports will only discuss answers by groups of participants, and your personal information will not be shared. This page is to give you key information to help you decide whether to participate. If you have any questions at any time, the contact information for the research investigator is below.

This study is being conducted by Brandon Decker, a Ph.D. candidate at the University of Kentucky, and an IEP instructor at Missouri State's ELI. Dr. Beth Rous is the committee chair and providing oversight.

WHAT IS THIS STUDY ABOUT AND HOW LONG WILL IT LAST? The purpose of this study is to determine the extent to which online education has been adopted within IEPs and explore what IEP directors and faculty think about online language acquisition in IEPs. This study will take approximately 10-15 minutes.

WHAT ARE THE KEY REASONS YOU MIGHT CHOOSE NOT TO VOLUNTEER FOR THIS STUDY? There are no anticipated risks, and no reasons not to participate in this study except that you choose to do so. There are no penalties for not participating.

DO YOU HAVE TO TAKE PART IN THE STUDY? If you decide to take part in the study, it should be because you really want to volunteer. You will not lose any services, benefits, or rights you would normally have if you choose not to volunteer.

WHAT IF YOU HAVE QUESTIONS, SUGGESTIONS OR CONCERNS? The person in charge of this study is Brandon Decker (Principal Investigator, PI), a student at the University of Kentucky, Department of Educational Leadership, College of Education. If you have questions, suggestions, or concerns regarding this study or you want to withdraw from the study, his contact information is: brandon.decker@uky.edu, [cell number hidden]. If you have any questions, suggestions or concerns about your rights as a volunteer in this research, contact staff in the University of Kentucky (UK) Office of Research Integrity (ORI) between the business hours of 8am and 5pm EST, Monday-Friday at 859-257-9428 or toll free at 1-866-400-9428.

WHO WILL SEE THE INFORMATION THAT YOU GIVE? When we write about or share the results from the study, we will write about the combined information. We will keep any identifying information private. We will make every effort to prevent anyone who is not on the research team from knowing that you gave us information, or what that information is. Your responses are stored on a secure server and will be saved in password-protected computers. We will make every effort to safeguard your data, but as with anything online, we cannot guarantee the security of data obtained via the internet. Qualtrics, a secure online survey software, hosts this survey. You may review the Qualtrics terms of service and privacy/security policies here: https://www.qualtrics.com/privacy-statement/. The investigator will retain the data for IRB records for at least six years after study closure.

CAN YOU CHOOSE TO WITHDRAW FROM THE STUDY EARLY? You can choose to leave the study at any time. You will not be treated differently if you decide to stop taking part in the study. If you choose to leave the study early, data collected until that point will remain in the study database and may not be removed. If you do not want to be in the study, there are no other choices except not to take part in the study.

WILL YOU RECEIVE ANY REWARDS FOR TAKING PART IN THIS STUDY? You may choose to be entered into a drawing to receive one of five $20 Starbucks gift cards as a thank you for taking part in this study. The odds of winning are approximately 1 in 72.

WILL YOUR INFORMATION BE USED FOR FUTURE RESEARCH? All identifiable information, such as your email address, if you choose to participate in the gift card drawing, and the name of your institute and its host university, if it has one, will be removed from the information collected in this study. After we remove all identifiers, the information may be used for future research or shared with other researchers without your additional informed consent.

BY CONTINUING WITH THE SURVEY, YOU CONSENT TO PARTICIPATE IN THIS STUDY

I have read the above information. I have had the opportunity to ask questions and have my questions answered. By clicking the button below, I acknowledge that my participation in the study is voluntary, I am 18 years of age, and that I am aware that I may choose to terminate my participation in the study at any time and for any reason.

- ○ *I consent, begin the study*
- ○ *I do not consent; I do not wish to participate*

Final Instrument Content for Digital Version

Instructions: We are interested in your candid responses about your feelings toward online ESL classes, **even if your IEP doesn't offer them**. There is an option for a drawing for one of five **$20 Starbucks gift cards** at the end of this survey. Please complete the survey by [date].

S2. Are your IEP duties primarily those of a director or teacher?

Choose one: Primarily a Director Primarily a Teacher

Please help us determine how much online ESL has diffused among U.S. IEPs by providing the name of your IEP below.

S3. What is the name of your IEP? [short answer space]

S4. What is the name of the university or college which hosts/governs your IEP. Find by choosing the state. [drop down list]

S4b. If your host university or college was not in the previous list, please write it here.

S5. Regarding your intensive English program (IEP**), indicate how strongly you agree or disagree with the following statements** by choosing the response that best represents your opinion.

		SD	D	A	SA
1	I feel certain that international students will benefit from online ESL classes offered by my IEP.	☐	☐	☐	☐
2	Offering online ESL classes fits into my IEP's culture.	☐	☐	☐	☐
3	I would have no difficulty telling others about the potential benefits of offering online ESL classes.	☐	☐	☐	☐
4	Offering online ESL classes is compatible with the responsibilities of teachers.	☐	☐	☐	☐
5	I think that offering online ESL classes fits well with the way my IEP operates.	☐	☐	☐	☐
6	It is too costly for my IEP to offer online ESL classes.	☐	☐	☐	☐
7	The economic disadvantages of offering online ESL classes at my IEP outweigh the advantages.	☐	☐	☐	☐
		SD	D	A	SA
8	I think online ESL classes are compatible with my IEP's mission statement.	☐	☐	☐	☐
9	Teaching online ESL classes is frustrating.	☐	☐	☐	☐
10	I feel confident in the advantages of offering online ESL classes at my IEP.	☐	☐	☐	☐
11	I have frequently seen online ESL in use outside my IEP.	☐	☐	☐	☐

		SD	D	A	SA
12	I believe that the technology for online ESL classes can be learned without difficulty.	☐	☐	☐	☐
13	Offering online ESL classes improves the quality of my IEP.	☐	☐	☐	☐
14	I would have difficulty explaining why online ESL classes are beneficial.	☐	☐	☐	☐
		SD	D	A	SA
15	I feel certain that international students will enroll in online ESL classes at my IEP.	☐	☐	☐	☐
16	I believe I could communicate to others the results of offering online ESL classes.	☐	☐	☐	☐
17	Offering online ESL classes gives my IEP a competitive advantage over other IEPs.	☐	☐	☐	☐
18	Online ESL classes are rarely seen in my IEP.	☐	☐	☐	☐
19	Online ESL technology seems to require little effort for teachers to understand.	☐	☐	☐	☐
20	Offering online ESL classes is compatible with all aspects of my IEP.	☐	☐	☐	☐
21	Offering online ESL classes enhances the effectiveness of my IEP.	☐	☐	☐	☐
		SD	D	A	SA
22	I have rarely been to conferences where speakers presented on their experience with online ESL.	☐	☐	☐	☐
23	I feel confident that online ESL classes will increase enrollment in face-to-face classes at my IEP.	☐	☐	☐	☐
24	Teaching online ESL classes is compatible with teachers' work schedules.	☐	☐	☐	☐
25	Implementing online ESL classes at my IEP will be simple.	☐	☐	☐	☐
26	Offering online ESL classes improves the performance of my IEP.	☐	☐	☐	☐
27	I frequently see online ESL being used in my IEP.	☐	☐	☐	☐
28	Offering online ESL classes will help my IEP attract new students.	☐	☐	☐	☐
		SD	D	A	SA

29	I have frequently observed what happens in online ESL classrooms.	☐	☐	☐	☐
30	Offering online ESL classes improves my IEP's profits.	☐	☐	☐	☐
31	Overall, I find offering online ESL classes to be advantageous for my IEP.	☐	☐	☐	☐
32	Students are interested in our IEP because we offer online ESL classes.	☐	☐	☐	☐

Note. Adapted from Moore & Benbasat (1991, p. 216), with permission from Izak Benbasat (personal communication, Oct. 10, 2018).
Note. Category abbreviations were not used for the survey but only for this table.

S6. Indicate your degree of involvement in leading the adoption of online ESL at your IEP. Choose one:

No Involvement Low Level of Involvement
Moderate Level of Involvement High Level of Involvement

S7. Indicate your degree of confidence in learning to use new technological innovations. Choose one:

Almost No Confidence Low Level of Confidence
Moderate Level of Confidence High Level of Confidence

S8. Which of the following do you have experience with? Choose all that apply.

a. ___ Online learning as a student
b. ___ Online learning through my employer and/or in professional development
c. ___ Video conferencing technology
d. ___ Online learning management systems to make or collect assignments
e. ___ Digital ESL textbooks
f. ___ Online grading or online gradebooks
g. ___ Online activities (other than digital textbooks) with my ESL students
h. ___ Recorded video feedback to students
i. ___ Video recording of all or part of my ESL classes

S9. Does your IEP record live classes on video and offer those for students to view online?

No Yes

S10. Has your IEP had an online ESL class of any kind in the last five years? No Yes

[If participant answered "yes" to the last question, the following questions will appear.]

S10a. Are online ESL classes of any kind currently offered in your IEP? No Yes

S10b. Which student proficiency levels are/were offered with your online ESL class(es)? Choose all that apply. ___ Beginner ___ Intermediate ___ Advanced

S10c. Which skills are/were taught using online ESL? Choose all that apply.
___ Reading ___ Writing ___ Listening ___ Speaking ___ Grammar

S10d. Which part(s) of your IEP offer or have offered online ESL? Choose all that apply.
___ Regular EAP Program ___ Short-Term EAP Program
___ Other Programs

S10d1. If you chose "other programs" in the last question, please list them here.

S10e. Approximately how many teachers total have taught or are teaching online ESL class(es) at your IEP? __

S10f. How often have students begun with your online ESL class(es) while in their home country before joining the face-to-face classes at your IEP? Choose one:
Almost Never Happens Sometimes Happens
Often Happens Almost Always Happens
Unknown

S11. What is your age? Choose a range from the list: 18-21 21-25
26-30 31-35 36-40 41-45 46-50 51-55
56-60 61-65 66-70 71 and above

S12. Are you a full-time or part-time IEP teacher/director? Choose one: Full-time Part-time

S13. What is the total number of years you have been employed (full or part-time) in any U.S. IEP? (Round to the nearest whole number.)
Choose a range from the list: less than 1 year 1-3 years
4-6 years 7-9 years 10-12 years 13-15 years 16-18 years
19-21 years 22 or more years

DR1. As thanks for completing this survey, you can be entered in a drawing to win 1 of 5 Starbucks gift cards worth $20 each. If you want to be entered into this drawing, please indicate this by entering your email address below. Only the winners will be contacted.

____

Appendix C

Rasch Pilot Instrument Optimization Process

The instrument's reliability and validity were demonstrated through a Rasch analysis of the pilot and final surveys. To address content validity threats, the survey design and constructs of the instrument (see Appendices C and D) were built on innovation characteristics and items designed by Rogers (2003), Moore and Benbasat (1991), Frambach and Schillewaert (2002), Zaltman and Lin (1971), and Tornatzky and Kline (1982). In particular, Moore and Benbasat's PCI survey items were the model for those designed for this study's survey. Permission was gained from Izak Benbasat (personal communication, Oct. 10, 2018) to use their survey.

Because it was necessary to introduce new innovation characteristics and items to focus the results on organizations' adoption and away from personal adoption, a developmental sample and pilot survey instrument were needed to address face and content validity. Creating new or modified items increased the odds of introducing error into the measurement tool. Thus, it was necessary to pilot the survey with a very similar group of participants. By having a very similar pilot sample, results could be applied directly to the population, though they could not be generalized to non-university or college-governed IEPs or those not in the United States.

Independent proprietary (i.e., not university or college-governed but also not part of a multi-site franchise) IEPs in the United States were chosen as the first part of the developmental sample. Despite not being governed by a university or college, these IEPs have also been affected by the recent downturn in student enrollment, which may serve as motivation to seek out innovations leading to increased enrollment. IEPs who were not located in multiple locations (i.e. multi-site) were chosen for the pilot because a centralized power system may prevent individual institutes from making institute-level adoption decisions without the permission of the larger organization (Rogers, 2003). The second part of the developmental sample included 26 IEPs from the 249 university or college-governed IEPs. These 26 IEPs represented approximately 10% of the population and were randomly chosen. They were added to the pilot sample of independent IEPs due to a low number of responses.

Wright and Douglas (1975, 1976) and Linacre (1994b) propose piloting a survey with at least 30 items with 30 participants to "produce statistically stable measures" (Linacre, 1994b, para. 2). In general, it is best to have at least 10 observations of each category per item (Linacre, 2019). The individuals in the developmental sample were very similar to the population, which contributed to addressing the face validity threats. Also, face validity threats were addressed by having committee members who were experts in education review the survey instrument and provide feedback during the developmental phases.

Pilot Sampling Strategy

A large population design minimized sampling errors and improved the relevance of the study's results. The design was achieved by contacting the individual directors and instructors whose email addresses were listed on publicly available websites. Also, the directors of the remaining IEPs were asked to complete the survey and also forward it to their instructors. The participants from the 10% of the population who were contacted for the pilot sample were also included in the Results and Discussion chapters. This was possible because all the final survey questions were also present in the pilot survey.

Developmental sampling of the survey allowed the items to be fine-tuned with iterative revisions until the instrument was ready. Whereas developmental samples are common in statistical methodologies, the Rasch model's unique focus on item fit statistics improved the effectiveness of the measurement items. It identified redundant questions, making it possible to shorten the survey to a length which allowed all the innovation characteristics to fall within an acceptable endorsement range by all the participants (Granger, 2008).

In this study, randomization was used twice: to choose approx. 10% of the target population for the pilot and the winners of the drawing for the gift cards. The randomization procedure was completed in Excel. A new column was pasted into cells adjacent to the data (e.g., IEPs or participants), and then a random number generator formula [i.e., =RAND()] was inserted into each of these new cells. A random number was automatically generated in each cell where the formula was used. Then, the list of numbers was filtered according to the column of random numbers, from highest to lowest. The top numbers were chosen as the randomized selection.

Pilot Survey Questions

The self-reporting pilot survey instrument (see Appendix C) was designed to collect the perceptions of IEP directors and faculty regarding the innovation OLA for their IEPs. Perception was important because the behavior was not directly observable. DeVellis (2017) contends, "When we cannot rely on behavior as an indication of a phenomenon, it may be more useful to assess the construct by means of a carefully constructed and validated scale" (p. 16), and Nardi (2017) implies all self-reporting questionnaires are based on perceptions.

Questions supporting research question one. In order to answer research question one on the extent OLA been adopted at university and college-governed U.S. IEPs in the United States, participants were asked for the name of the university or college which governs their IEP, as well as a question on whether their IEP had adopted OLA (see Table C1). If they answered yes to this OLA adoption question, then they received six contingency questions to learn more about their IEP's use of OLA. To learn what percentage of the population had adopted OLA, it was necessary to identify the participants' IEP. However, asking for the IEP's name was of little use because many IEPs have the same or a similar name, such as *English Language Institute* of which there were 34 in the population. Using the complete population list of the 249 IEPs, a list of choices was created using the IEPs' governing university or college, which was more distinctive than the IEPs' names. An additional write-in option was available to allow for missing or misunderstood options.

The second question in this section focused on whether an OLA course of any kind had been adopted in the last five years, based on the knowledge and recollection of each participant. If the participants answered *yes* to this question, then an automatic filtering process opened six more contingency questions related to their IEP's OLA experience. All of these adoption status questions were placed after those supporting research question two on the survey because it was possible participants may have answered *no* to the adoption question and perceived that they no longer needed to answer questions on their perceptions of the characteristics of adoption, even though these were not mutually exclusive questions.

Table C1

Pilot Survey Questions Supporting Research Question One

OLA Adoption Status	Survey Questions
Identify University or College	1. What state is your IEP located in? [only to narrow list of institutes] • Follow-up question: What is the name of the university or college which governs your IEP? [drop down list + write-in option]
OLA Adoption	2. Has your IEP had an online ESL class of any kind in the last five years? N/Y
IF YES to Question 2	*Answer contingency questions describing the use of OLA:*
Proficiency Levels	1. Are online ESL classes of any kind <u>currently</u> offered in your IEP? N/Y 2. Which student proficiency levels are/were offered with your online ESL class(es)? a. Check all that apply: Beginner, intermediate, advanced
Subjects	3. Which skills are/were taught using online ESL? a. Check all that apply: Reading, writing, listening, speaking, grammar
IEP Support	4. Which part(s) of your IEP offer or have offered online ESL? a. Check all that apply: regular EAP program, short-term EAP program, other programs b. If you chose "other programs", please list them here.
OLA Teachers	5. Approximately how many teachers total have taught or are teaching online ESL class(es) at your IEP? ___
Student Transition Frequency	6. How often have students began with your online ESL class(es) while in their home country before joining the face-to-face classes at your IEP? a. Almost never happens, sometimes happens, often happens, almost always happens, unknown

Questions supporting research question two. Research question two was focused on investigating the perceptions of both IEP directors and faculty regarding the innovation OLA. However, since the participants' perceptions of OLA characteristics were not directly observable, it was measured by asking individuals to self-report their perceptions of these 52 value statements. Bond and Fox (2015) claim the Rasch measurement model can be "meaningful only if each and every question contributes to the measure of a single underlying attribute" (pp. 40-41). Each of the PCI survey items contributed to one supporting construct (e.g., economic advantage) and to the single underlying attribute of *OLA adoption potential*, which refers to how OLA adoption was perceived to potentially benefit IEPs and which informed the current state of OLA adoption in the study's population.

The characteristic *economic advantage* focused solely on how faculty perceived OLA to financially benefit their IEP directly. However, with the remaining characteristics, the items were worded so that the participants' *beliefs* of their perceptions were stated. For example, for complexity, the statement, "I believe that the technology for online ESL classes is complex," refers to a personal belief. What individuals believed about the characteristics of OLA was considered relevant to whether they want their organization to adopt it. Also, Frambach and Schillewaert (2002) believe perceptions of complexity and certainty are negatively related to the probability of organizational innovation adoption, and economic advantage, compatibility, visibility, and result demonstrability are positively related to it.

Of the 52 statements in the pilot instrument, 22 begin with the pronoun *I* and were followed with a subjective verb such as *feel, know, have observed, believe,* or *think*. However, all the statements focus on *online ESL classes* because classes are something that belongs to the IEP, so its use relates each statement to an innovation which benefits or harms the entire organization, which was the focus of this study. The statements in Table C2 focus on economic advantage, compatibility, complexity, visibility, result demonstrability, and certainty. These questions provided insight into how IEP directors and faculty perceived OLA for their institutes.

Table C2

Pilot Survey Questions Supporting Research Question Two

PCI Groups		52 Pilot Survey Questions
Economic Advantage (ECO; item prefix # 31	1	Offering online ESL classes will help my IEP attract new students.
	2	The economic disadvantages of offering online ESL classes at my IEP outweigh the advantages.
	3	Online ESL classes are too expensive for my IEP to maintain.
	4	Offering online ESL classes improves the quality of my IEP.
	5	Overall, I find offering online ESL classes to be advantageous for my IEP.
	6	Offering online ESL classes enhances the effectiveness of my IEP.
	7	It is too costly for my IEP to offer online ESL classes.
	8	Offering online ESL classes increases the productivity of my IEP.
	9	My IEP's enrollment has grown in response to the online ESL classes we offer.
	10	Students are interested in our IEP because we offer online ESL classes.
	11	Offering online ESL classes improves the performance of my IEP.
	12	The IEP would lose students if it stopped offering online ESL classes.
	13	Offering online ESL classes improves my IEP's profits.
	14	Offering online ESL classes gives my IEP a competitive advantage over other IEPs.
Compatibility (CPB; item prefix # 32)	1	Offering online ESL classes is compatible with all aspects of my IEP.
	2	I think online ESL classes are compatible with my IEP's mission statement.

Table C2 (continued)

Compatibility (CPB; item prefix # 32) (continued)	3	Teaching online ESL classes is compatible with teachers' work schedules.
	4	Offering online ESL classes is compatible with the responsibilities of teachers.
	5	I think that offering online ESL classes fits well with the way my IEP operates.
	6	Offering online ESL classes fits into my IEP's culture.
	7	There is no conflict between teaching online ESL classes and teachers' working hours.
Complexity (CMX; item prefix # 33)	1	I believe that the technology for online ESL classes is complex.
	2	I believe that the technology for online ESL classes can be learned without difficulty.
	3	Online ESL classes seem to require a lot of mental effort for teachers.
	4	Teaching online ESL classes is frustrating.
	5	Overall, I believe that the technology needed for teaching online ESL classes is easy to use.
	6	Online ESL technology seems to require little effort for teachers to understand.
	7	Learning to operate the technology needed for teaching online ESL classes is easy.
	8	Including online ESL classes at my IEP will be challenging.
	9	Implementing online ESL classes at my IEP will be simple.
Visibility (VIS; item prefix # 34)	1	I have frequently observed what happens in online ESL classrooms.
	2	I have frequently watched videos where teachers taught online ESL classes.
	3	I have rarely been to conferences where speakers presented on their experience with online ESL.
	4	Teachers in my IEP have often spoken or written about their experience teaching online ESL.
	5	In my IEP, teachers often teach online ESL classes.
	6	I have frequently seen online ESL in use outside my IEP.
	7	Online ESL classes are rarely seen in my IEP.

Table C2 (continued)

Visibility (VIS; item prefix # 34) (continued)	8	I have often seen videos demonstrating online ESL classes.
	9	I have frequently read about ESL teachers – in my IEP or in others – teaching online ESL classes.
	10	I know ESL teachers in other U.S. IEPs who teach ESL online.
	11	I frequently see online ESL being used in my IEP.
	12	I have rarely seen other teachers teaching online ESL classes.
Result Demonstrability (RDM; item prefix # 35)	1	I would have no difficulty telling others about the potential benefits of offering online ESL classes.
	2	I believe I could communicate to others the results of offering online ESL classes.
	3	The positive and negative effects of offering online ESL classes are apparent.
	4	I would have difficulty explaining why online ESL classes are beneficial.
Certainty (CRT; item prefix # 36)	1	I feel confident in the advantages of offering online ESL classes at my IEP.
	2	I feel certain that international students will benefit from online ESL classes offered by my IEP.
	3	I feel confident that online ESL classes will be a waste of time, money, and effort at my IEP.
	4	I feel certain that international students will enroll in online ESL classes at my IEP.
	5	I feel confident that online ESL classes will increase enrollment in face-to-face classes at my IEP.
	6	I feel uncertain whether online ESL classes will help students who want to learn English.

The PCI statements were followed by an even, four-point scale of response options. The scale consisted of the following categories: 1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, and 4 = *strongly agree*. Lopez (1996) strongly discourages the use of categories such as *no opinion* because these are “prime candidates for misplacement in the category hierarchy” and “such category labels provoke irrelevant and evasive responses" (para. 4). In research on rating scales in survey research, Bradley, Peabody, Akers, and Knutson (2015) found "the inclusion of a neutral middle category distorts the data to the point where it is not possible to construct meaningful measures" (p. 8). Nunnally (1967) also claims removing the neutral category even if respondents had never considered or formed an opinion on the topic. Thus, lacking a middle option, participants were encouraged to consider the topic and choose *agree* or *disagree,* with two levels of granularity for each. If they chose to skip a question to which they had no response, then, Lopez (1996) asserts, this was still better than including the neutral response because such response options were already the equivalent of a missing response. Lopez also contends it is important to label all the categories because unlabeled ones may lead to poor category definition and discrimination; thus, the words were written above each set of options for the pilot survey and every seven statements in the final survey format.

Linacre (2002) proposes, "how the variable is divided into categories affects the measurement qualities of a test" (p. 5). In contrast to the classical approach which favors longer scales in an attempt of imitating interval data (Carifio & Perla, 2007), the Rasch model converted the results into interval data, which meant it could focus on the performance of each category. Stone and Wright (1994) proffers that fewer scale categories should be used if there was not a good reason for using more: "rating scale categories… must also be clearly differentiated in the behavior of the respondents, otherwise more categories do not mean more information" (para. 1). Too many category options often confuse respondents and lead to "more noise than information" (Lopez, 1996, para. 5). A four-point scale was chosen for this instrument because two points of agreement and two points of disagreement allowed participants to indicate a small amount of granularity in their responses. Lopez (1996) postulates that “sometimes 2 or 4 levels are all [the respondents] can negotiate” (para. 5). Participants do not always notice the granularity in a longer scale, and for valid Rasch analysis, it was important for each category to be endorsed at least 10 times (Linacre, 2019). If participants do not discriminate distinctly between the nuances of agreement or disagreement, then one of the categories may not be effective for Rasch analysis. For these reasons, a four-point scale was chosen.

In further support of research question two and the underlying trait of *OLA adoption potential*, participants were asked to self-rate their level of experience with similar technologies, which Rogers (2003) calls *technology clusters* (see Table C3).

Table C3

Additional Pilot Survey Questions Supporting Research Question Two

Groups	Survey Questions
Pre-OLA Technology Clusters	1. Which of the following do you have experience with? a. Check all that apply: Online learning as a student; online learning through my employer and/or in professional development; video conferencing technology; online learning management systems to make or collect assignments; digital ESL textbooks; online grading or online gradebooks; online activities (other than digital textbooks) with my ESL students; recorded video feedback to students; video recording all or part of your classes. 2. Does your IEP video record live classes and offer those for students to view online? N/Y
Confidence	3. Indicate your degree of confidence in learning to use new technological innovations. a. almost no confidence, low level of confidence, moderate level of confidence, high level of confidence

Technology clusters are predictive of a greater level of adoption; they can "trigger the adoption of [other technologies]" (Rogers, 2003, p. 249). Thus, participants were asked to indicate which related technologies they had experience using.

Another technology cluster item which was controlled at the institute-level was access to video-recorded classroom lessons for current students. Witbeck and Healey (2015) recommend IEPs offer asynchronous activities on their websites as an early step in the process of building an OLA program. Thus, participants were asked if their IEP offered video recordings of F2F classroom lessons (see Table C3).

It was also important to consider the influence of participants' degree of confidence in learning to use new technological innovations. Compeau et al.'s (1999) research indicated a strong relationship between computer self-efficacy and confidence in using new technology. In a study of Malaysian library and media teachers, Noh et al. (2014) found that those who felt the most confident with computers and technological innovations also felt more willing to try and adopt new technologies. Thus, participants were asked about their degree of confidence in learning to use new technological innovations. Responses were on a four-point scale, beginning with *almost no confidence* and progressing a *high level of confidence*. This set of questions followed the PCI statements because they were deemed to require the most thought and thus would be the most tiring questions on the survey (Nardi, 2017).

Questions supporting research question three. To answer research question three on whether IEP directors and faculty perceived themselves to be leaders in the diffusion of OLA, participants were asked to indicate the extent they viewed themselves as leaders in encouraging the spread of OLA in their IEP (see Table C4). Responses were elicited with a four-point scale, beginning with their perception of having *no involvement* in the leadership of OLA's diffusion and progressing to a *high level of involvement*. Nardi (2017) recommends avoiding absolute frequency statements, such as *no leadership in OLA's diffusion*; however, it was chosen for this question to represent participants who wanted to indicate absolutely no involvement in diffusing OLA in their IEP. If OLA adoption was shown to be in its early stages, then there could be individuals who endorsed this option.

Table C4

Pilot Survey Questions Supporting Research Question Three

Group	Survey Question
Degree of Involvement	1. Indicate your degree of involvement in leading the adoption of online ESL at your IEP. a. no involvement, low level of involvement, moderate level of involvement, high level of involvement

Demographic questions. The last questions were demographic in nature to account for factors which may be shown to influence perceptions of the innovation. These questions were used to identify differential item functioning and further distinguish the perceptions of the participants. Nardi (2017) urges professionals to ask demographic questions at the end because participants tire quickly of questions. Thus, the most useful questions were put at the beginning, and simple questions were saved for the end, even though this increased the risk of these questions being omitted. However, it was necessary to put one of these questions (i.e. whether the participants' primary responsibility was as an instructor or director) at the beginning because learning whether the participants represented the sample of directors or faculty was important because it was necessary for the first research question. The later-occurring demographic questions included age range, full or part-time position, and the total years of experience employed – full and part-time – in any U.S. IEP. Multiple choice options were given for each demographic question.

Missing values. With Winsteps (Linacre, 2018b), the Rasch model estimates the missing values using “the marginal raw scores and counts of the non-missing observations” (Linacre, 2019, p. 636). Granger (2008) explains that in the Rasch model’s linear measures of item difficult and person ability, “item values are calibrated and person abilities are measured on a shared continuum that accounts for the latent trait. Should an item rating be missing, the model estimates the person's probable rating without imputing the missing data” (para. 8). Linacre (2019) reveals that although missing data are relevant because they decrease the amount of data available for analysis, they are also not a concern in the Rasch model. In the Winsteps manual, Linacre (2019) explains how “generally, missing data are missing essentially at random (by design or accident) or in some way that will have minimal impact on the estimated measures…” (p. 635). Thus, missing data were not a concern.

The responses were downloaded from *Qualtrics*^{XM} and converted for use in an Excel spreadsheet. The data was coded numerically to prepare for the Rasch analysis. Response frequencies were summarized using text and bar charts in this section. Response numbers from the pilot study guided decisions on the deployment of the final survey.

Rasch Analysis of the Pilot Survey Instrument

An abbreviated and focused Rasch analysis of the pilot study’s PCI survey results was included in this section. Because potentially redundant questions were included in the pilot, the Rasch analysis of the pilot PCI survey focused on identifying redundant or poorly worded items used. Thus, Rasch analysis tools which lead to data interpretations were omitted from this analysis, but they are present in the next chapter.

Summary of Pilot Instrument Analysis

Of the 1,936 observations by 39 participants, there were 291 observations (15%) of category 1 (i.e., *strongly disagree*), 804 (42%) of category 2 (i.e., *disagree*), 717 (37%) of category 3 (i.e., *agree*), and 124 (6%) of category 4 (i.e., *strongly agree*). There were 92 missing observations, which were excluded from the aforementioned observation statistics.

Dimensionality Analysis

Because all the items in a Rasch measurement analysis need to support a single dimension, it was necessary to confirm first that no unexpected dimensions existed. Linacre (2018a) claims Rasch measurement prefers the primary components analysis (PCA) over a factor analysis (FA) because a factor analysis omits error variance whereas error variance is essential to Rasch measurement. Thus, Bond and Fox (2015) assert, the Rasch dimensionality analysis is effectively the “primary components factor analysis of the Rasch residuals” (p. 163). By identifying the factor loadings in Rasch dimensionality tables, unexpected secondary dimensions may become visible. Among the PCI items, there was expected to be six strands within the larger, unifying dimension of *OLA adoption potential*. Each strand was expected to measure the same dimension differently. Linacre (2018a) postulates these strands within a single dimension could be different content areas, such as addition and subtraction within an arithmetic assessment, or different types of assessment item responses.

Linacre (2018a) proposes five general steps in the process of identifying and confirming the existence of secondary dimensions.

Step one. *Confirm lack of displacement between the observed and expected variance.* This was the case with the data in the analysis. At the extreme, the raw variance explained by the measures differed the most by 0.1%, which was only found in the raw variance explained by the items. Thus, no displacement was found.

Step two. *Confirm the unexplained variance in the first contrast is not accidental.* Linacre (2018a) postulates the second dimension must have the strength of 2-3 items to be large enough to affect the measurement and discount the possibility of coincidental correlations. The eigenvalue of the first contrast was 8.6, which was 10.1% of the total unexplained variance. Additionally, the remaining four contrasts all had eigenvalues higher than 3.0, which suggested several other possible dimensions or strands (see Table C5).

Table C5

Unexplained Variance of Original PCI Survey

Unexplained Variance by Contrast	Eigenvalues	Observed Percentages
1	8.60	10.1%
2	6.31	7.4%
3	4.15	4.9%
4	3.74	4.4%
5	3.25	3.8%

Step three. *Determine if patterns of residuals are present in the items loading high and low in the first contrast.* Winsteps' table 23.2 "decomposes the matrix of item correlations based on residuals to identify possible other contrasts (dimensions) that may be affecting response patterns" (Linacre, 2019, p. 404). However, Linacre warns that this was not a typical factor analysis in that it indicated "contrasts between opposing factors, not loadings on one factor" (para. 1). As seen in Table C6, there was a pattern among those items loading high in the first contrast. Of the 25 items loading high in the first contrast, 11 of the top 14 (loading from 0.78 to 0.37) focused on the visibility of OLA in an IEP. This included 11 of the 12 items of the PCI *visibility* (VIS). The remaining VIS PCI was also present, loading at 0.21.

Table C6

Items Loading High and Low by Contrast

	Patterns of Residual Items	
Contrast	Loading High	Loading Low
1	VIS 34.12, 8, 2, 6, 1, 4, 10, 11, 5, 7	CRT 36.3, 2, 1, 6; ECO 31.6, 4, 2, 5, 3, 8, 1
2	ECO 31.10, 12, 8, 11, 9	CMX 33.2, 3, 1, 7, 6, 5
3	CPB 32.1, 2, 4, 5	ECO 31.1, 9, 12
4	RDM 35.2, 1, 4	*None*

Among the items loading low, the lowest 14 are all related to *certainty* (CRT) and *economic* (ECO) benefits. A review of the items related to *certainty* revealed that all were related to either the general benefits of OLA or the economic benefits of OLA, both of which were included under the original topic of economics. The second contrast also revealed ECO items loading high and all but one of the complexity (CMX) items loading low. The pattern of residuals in the third contrast was smaller, which was expected, but nonetheless, the top four items were all *compatibility* (CPB), with three ECO items loading low in a pattern. Again, a smaller number in the pattern of residuals was found in the fourth contrast. Three of the top four items loading high in the fourth contrast were the PCI *results demonstrability* (RDM), but there was no clear pattern in the items loading low. Lastly, in the fifth contrast, most of the items were closer to zero and less likely to be a second dimension.

Step four. *Determine if there is a negative correlation between items in contrast one and three.* Winsteps' table 23.0 also identified the correlations between contrasts one and three using two statistics: the Pearson and disattenuated correlations. Linacre (2018a) claims the disattenuated correlation was a more helpful indicator because it estimated a correlation similar to the Pearson but without measurement error. A Pearson correlation or disattenuated correlation of >0.7 suggested the items were measuring the same thing whereas a correlation of <0.3 indicated multiple dimensions are very likely (Linacre, 2018a). A correlation from 0.4 to 0.6 was more ambiguous but still less likely to suggest multiple dimensions. The disattenuated correlations for the data in the first and second contrasts were below 0.3, and the fourth contrast was low (see Table C7).

Table C7

Approximate Relationships between the Person Measures

PCA Contrast	Item Clusters	Pearson Correlation	Disattenuated Correlation
1	1-3	0.06	0.07
2	1-3	0.15	0.18
3	1-3	0.36	0.44
4	1-3	0.29	0.39
5	1-3	0.41	0.51

Step five. *Confirm dimensionality analysis using Winsteps' simulated data.* Linacre (2018a) recommends repeating the prior steps using simulated data to confirm the existence of multiple dimensions. For perspective, the simulated data fit the model better than the authentic data but only in regard to person fit (e.g., the person separation improved from 2.83 to 3.61 and person reliability from 0.89 to 0.93).

The simulated dimensionality analysis indicated no displacement between the observed and expected raw explained and unexplained variance. The eigenvalues of the five contrasts of the unexplained variance in the simulated data were all near three except for the first and second contrasts (e.g., 4.72 and 3.87). In a review of the factor loadings in the first and second contrasts, the contrasts between the high and low loadings were more varied, despite small groups of two to three items. Those were not listed because they were different than those found in the authentic data. Lastly, the Pearson and disattenuated correlations were all higher, and none were below 0.3.

Results of Rasch dimensionality analysis of pilot data. Although there were hints to suggest the items loading high and low in the first and second contrasts were secondary dimensions, both the disattenuated correlations and the greater variation in the items loading high and low in the simulated data suggested the items could be very distinct strands all supporting a single dimension. Linacre (2018a) also proposes it was possible narrowly spread person measures could lead to a low correlation without multiple dimensions, which may have been the case for the authentic data because there were only 39 persons in the pilot. It was also possible the item subheadings in the pilot survey form which named each intended PCI for the participants could have encouraged them to endorse those in each group similarly. Because the final version of the instrument used no PCI group titles and randomized the order of the items, it was expected the strands would be less distinct. Furthermore, because this was an analysis of pilot data, the primary purpose was not to interpret the results but to use them to create an improved instrument. Thus, these item groups were treated as strands instead of multiple dimensions. However, in chapter four's analysis of the results, the dimensionality data guided the choices of which items to remove but only if there were other reasons to do so.

Pilot Model Fit

The pilot Rasch analysis of all 52 items in the PCI survey indicated that the data fit the model well although several of the items were notably too challenging for many of the participants to endorse. The models' statistics (see Tables C8 & C9) and the dimensionality analysis supported the idea that the six individual strands supported the greater unidimensionality of *OLA adoption potential* although there was considerable overlap among the *economic* and *certainty* dimensions, which eventually led to a recombination of these characteristics into two new ones.

Except for the removal of redundant and poorly worded items, the items within four PCI groups did not change: *compatibility*, *complexity*, *visibility*, and *result demonstrability*. However, once one item was dropped from the PCI *result demonstrability*, a more cohesive theme was revealed in that characteristic and thus renamed as *articulated results*. Because of the disparate locations of the *economic* items within the Wright map and the dimensionality analysis, the statements were reviewed, and another pattern was revealed which fit the Wright map's results better. It was found that the *economic* characteristic tended to focus on either enrollment and financial issues or more general benefits to the institute or students. Thus, two new characteristics were created and named *enrollment & economic advantages* and *general benefits*. The items from the characteristic *certainty* were integrated into both of the two new groups which originated from the *economic* strand.

Table C8

Model Fit Progression, part 1

	Persons			Items	
	Mean Measure	Separation	Reliability	Separation	Reliability
Original Data (52 items)	-0.44	2.92	0.90	3.40	0.92
Step 2: Removed 4 out-of-order items	-0.30	2.76	0.88	3.06	0.90
Step 3: Removed 4 misfitting persons & items	-0.33	3.06	0.90	3.36	0.92
Step 4: Final Survey Item List (32 items; removed 14 more redundant items)	-0.24	2.83	0.89	3.55	0.93

Table C8 presents the Rasch analysis statistics from the original 52-item pilot survey as well as the results from the last three steps of the four-step optimization process. Infit and outfit mean squares (MNSQ) were used because z standardized scores are strongly dependent on sample size and best suited to determining if the data fits the model perfectly (Linacre, 2014), which was not the goal of the pilot survey optimization process. Additionally, since the pilot survey had only 39 participants, a score which was strongly dependent on sample size was misleading. The pilot survey's original data indicated that there was a nearly one-half logit difference between the mean persons' skills and the mean items' difficulty. Also, the person and item separation and reliability statistics, which were written in MNSQ statistics, were strong. At least 2.00 was sufficient for person separation, which indicated whether the instrument distinguished low and high performers. At least 2.50 was enough for item separation, which indicated whether the instrument distinguished between low and high difficulty items. Person reliability should be at least 0.8 or higher and item reliability is best if it is at least 0.9 or higher. Person and item reliability indicated whether these participants or items would have similar scores when reproduced.

Pilot Survey Optimization Process

In the Winsteps manual, Linacre (2019) proposes four steps to optimize a pilot survey. The first and second steps were to identify the theoretical order of difficulty within the items by arranging them into clusters of the latent variables and then "omit any items that are locating in the wrong place on the latent variable" (p. 632). However, Moore and Benbasat (1991) also argued that each innovation has its own order of difficulty. Online language acquisition (OLA) within IEPs was very unique because it was not an individual-level adoption but one adopted first at the institute level. The institute-level adoption must occur before individuals have a choice; however, the directors' and instructors' views may play a role in whether it was adopted. Due to the institute-level adoption requirement, *visibility* was expected to be the most difficult item measure.

Linacre's third step was a typical Rasch misfit analysis of persons and items, with an eye towards improving the overall model fit. The last step was focused on more detailed content balancing, which included a review of redundant items to choose the ones that fit the model best. The removal process began with zero-weighting items and persons and saving deletion to the last step, when the Wright map was needed again to help identify redundant items.

In deciding whether the rating scale model (RSM) or partial credit model (PCM) was a better model for this data set, Linacre (2000) recommends comparing the "construct and predictive ability" (para. 9) of the two models, especially the item and person measures of difficulty. Linacre (2000) reveals how a lack of meaningful difference between the item difficulties found when RSM and PCM are used means the simpler RSM should be used. Additionally, because all the items shared an identical scale and because categories with less than 10 observations suffered more with PCM than RSM, PCM was not used. RSM items also depended on observations from other items with the same category, which was helpful because all of the items lacked 10 observations of one or more categories. However, this was not considered a significant problem because each scale was expected to garner more observations in the final survey. The Rasch-Andrich Threshold analysis described later in this chapter shed light on how the categories were utilized in the original pilot and final instruments.

Step one. *Identify theoretical order of dimensions.* Any adoption characteristic which implied an IEP institute's adoption experience had already occurred would be the most difficult to endorse; furthermore, any characteristic which indicated that the adoption experience was also a positive experience was expected to be among the most difficult. For those reasons, some of the economic items as well as all the visibility items were expected to be the most difficult to endorse. Less difficult than those would be the ability to articulate the benefits and challenges of OLA. On the other end, any characteristic referring to a vague result for the participants or their organization was expected to be the easiest to endorse. It was expected that the others, such as technological *complexity*, *compatibility*, *certainty*, and some of the *economic* characteristics, would be mixed in the middle. Figure C1 reveals the actual order of item difficulty measures using a Wright map.

A Wright Map allowed a visual demonstration of how the item and person performance related to each other so that the items directly across from a person have 50% chance of being endorsed. Due to its ability to identify too difficult or too easy to endorse items as well as redundant items, the Wright Map was used extensively in the pilot analysis. The numbers on the far left (i.e., -2 through 3) are the difficulty measures which were written in log-odds (i.e., logits). The “M” letters found on each side of the vertical line separating the participants from the items represented the mean for each group. The item mean is always set at zero logit measures. The “S” letters on the line identified the location, which was one standard deviation from the means, and the “T” letters identified the location which was two standard deviations from the means.

On the left side of the vertical line are the participants who were labeled with a “P” for person plus the chronological number which was determined by the time when they completed the survey. On the right side of the vertical line are the items. The item names begin with the characteristic’s number which varied by its original placement in the survey (see the Key to distinguish them). The number after the period was the item’s number within that characteristic. For example, item 34.5 was the fifth item within the PCI *visibility* in the pilot survey. Color coding was added to help distinguish the characteristics. Table C2 presents the original item codes from the pilot survey, as seen in Figure C1, as well as the updated item codes which were used in the final version of the survey. Table C8 presents all the original pilot questions which were organized by the PCI characteristics and the item numbers within each characteristic.

```
MEASURE                     Person - MAP - Item
                                <more>|<rare>
    3                                 +
                                      |
                                      |
                                      |
                                      |
                                 P25  |
    2                                 +
                                      |T 34.5
                                      |  31.9  34.11
                                 P05  |  31.10 31.12 34.4
                                      |  34.1  34.2
                                     T|  34.7
    1                                 +S 31.11 34.12
                                      |  34.6  34.8
                                 P38  |  33.9  34.3  34.9
                                 P07  |  33.8  36.5
                                 P26 S|  32.1
                                 P21  |  33.3  33.6  34.10
    0      P03 P06 P08 P27 P33 P36    +M 32.5
                       P01 P17 P30    |  33.1  33.4  33.7  31.13 35.1
                                 P02  |  32.6  32.7  31.4  35.2
               P14 P19 P20 P31 P32   M|  33.5  36.1  36.4  31.14 31.6  31.8  35.4
                           P22 P37    |  33.2  36.6
               P13 P15 P18 P23 P35    |  35.3
   -1                  P04 P09 P12    +S 36.2  31.2
                   P10 P28 P29 P34   S|  36.3  31.3  31.5
                                 P24  |  32.2
                             P11 P39  |  32.4  31.1  31.7
                                      |
                                 P16  |T 32.3
   -2                                T+
                                      |
                                <less>|<freq>
```

KEY Using Original Item Codes
ECO (31)
CPB (32)
CMX (33)
VIS (34)
RDM (35)
CRT (36)

Figure C1. Wright map of original pilot survey data.

The PCI *certainty* was expected to be challenging to distinguish as a separate variable, and indeed, this was the case. It was included because organization-focused research had indicated it was relevant but had not confirmed it could be distinguished from the other PCI characteristics. The Rasch analysis suggested it was a different way to write existing advantage-oriented statements. It was also the only characteristic which lacked example statements, so considering that, its performance on the pilot, and how it was left out of most adoption characteristic lists, it was not surprising that it performed better with the two new *economic*-related characteristics.

Step two. *Omit out-of-order items.* Further review revealed the presence of three very challenging economic questions (i.e., items 31.9, 31.10, & 31.12), which were so strongly written that a person would must have had experience with an IEP which had adopted OLA and experienced very conclusive and positive results from that adoption in order to endorse them. Similarly, there were three visibility items (i.e., items 34.5, 34.11, & 34.4), which were also extremely challenging for participants to endorse, though one (i.e., item 34.4) was poorly written. It focused more on what others had said or written rather than a person's observations. These six were considered for wholesale removal, but the idea was not pursued because the larger survey population was expected to include a wider range of OLA experience, including those with conclusive, positive OLA experiences.

The 13 most difficult *visibility* and *economic* items (i.e., four *economic* and nine *visibility* items) were only measured by two participants. These 13 items were reviewed carefully for model fit, wording, and content balancing to remove redundant items, which resulted in the removal of four items (i.e., items 31.9, 31.12, 34.4, & 34.5) from among the six most difficult ones. Tables C8 and C9 present the statistics with the removal of those four items. Removing them brought the mean person measure closer to zero, which was the best possible score for mean person measures. Person and item separation and reliability decreased slightly in all four areas, but none dropped below the recommended minimums. It was inevitable that these numbers would decrease to some extent because the pilot results were based on data from 39 participants, and removing data meant there was less available data to measure how the data fit the model.

Step three. *Remove misfitting persons and items.* In the Winsteps manual, Linacre (2019) contends the next step was to "reanalyze the data with the pruned item hierarchy", which refers to omitting those persons who "severely" underfit or overfit the model (p. 632). Due to the low number of participants, person deletion was reserved for those who most severely misfit the model. In fact, except for two persons, the removal of those who misfit the model hurt the fit more than helping it, which was probably due to the relatively low sample number. The two persons who severely underfit the model and whose removal notably improved how the data fit the model were persons 4 and 10 (with the infit or outfit MNSQ as high as 3.79 and 1.94, respectively). It was also found that item 34.10 underfit the model with an infit MNSQ of 1.93 and an outfit MNSQ of 1.95, so it was removed. This was acceptable because another item had similar content and wording, as well as a better fit, so removing item 34.10's contribution to the targeting did not have a substantial effect.

Throughout the various analyses, there were two items (i.e., items 31.3 & 36.3), which often had point biserial correlations near zero. Linacre (2019) asserts the point biserial numbers must be positive and not near zero because low point biserial numbers indicate an item which may have a reversed stem or an error in data input. Item 31.3, which had no clear problem with how it was written and whose biserial correlation increased with the omission of the out-of-order items and the misfitting persons and items, was not removed at this point. However, item 36.3 had problematic wording in the predicate, which could have confused those endorsing it and thus contributed to its low point biserial correlation. Item 36.3 was "I feel confident that online ESL classes will be a waste of time, money, and effort at my IEP." Endorsing this item could have indicated that the participant felt confident that online ESL classes were a waste of either time, money, or effort, a combination of two of these, or all three. Thus, item 36.3 was removed.

Tables C8 and C9 present the model's fit statistics with the removal of persons 4 and 10 and items 34.10 and 36.3. In Table C8, the mean person measure increased by three-hundredths of a logit. However, the person and item separation and reliability all improved over the statistics from the step two changes, and the person separation increased beyond that which occurred in the original 52-item pilot. In Table C9, the statistics indicated an improvement in the point biserial correlations with only one being near zero, and it being slightly further away that it was after the second step was completed. The percentage of raw variance explained by the model also increased to 41%.

Table C9

Model Fit Progression, Part 2

	Low Point Biserial Correlations	Dimensionality: Raw Explained Variance
Original Data (52 items)	31.3 (0.05) 36.3 (0.10)	38.6%
Step 2: Removed 4 out-of-order items	36.3 (0.08) 36.3 (0.12)	35.7%
Step 3: Removed 4 misfitting persons & items	31.3 (0.13)	41%
Step 4: Final Survey Item List (32 items; removed 14 more redundant items)	None	45%

Step four. *Content balancing.* Linacre (2019) proffers the last step to optimizing the pilot items was "content balancing, [and] DIF detection" (p. 632), the last of which was not performed due to a pilot sample significantly lower than the minimally recommended 200 (Scott et al., 2009). As for the content balancing, there were several redundant items which were intentionally included in the pilot survey so that the better performing items could be identified for use in a more concise version of the survey. Sixteen sets of two to four similarly-focused items were identified among the remaining 44 items. Each was reviewed to explore how their item measurements compared and how well they fit the model. Consideration was also given to retaining terminology diversity, including the presence of negative item stems.

This review led to the removal of 14 additional items (i.e., items 31.3, 31.8, 33.1, 33.3, 33.5, 33.7, 33.8, 34.2, 34.8, 34.9, 34.10, 34.12, 35.3, and 36.6). For most items, removal slightly hurt how the data fit the model, but nonetheless, it was necessary to cut redundant items. When possible, the item which fit the model best was retained. However, when in doubt, a Rasch analysis with each option removed was performed, and the one which lowered the model's fit statistics the least was chosen.

There were three pairs of items, which, though similar in focus, were both retained (i.e., 35.1 & 35.2; 36.1 & 31.6; 36.2 & 31.5). This was because the removal of either one created an item measurement gap. It was important for every participant to be measured by at least one item either directly across from it or just one step above or below it on the Wright map (see Figure C2).

```
MEASURE                    Person - MAP - Item
                               <more>|<rare>
   3                              P25  +
                                       |
                                  P05  |
                                       |
                                       |T 34.11/27VIS
   2                                   +  34.1/29VIS
                                      T|  31.10/32EEA
                                       |  34.7/18VIS
                                  P38  |  31.11/26GBN
                                  P07  |S 34.6/11VIS
   1                                   +  33.9/25CMX  34.3/22VIS
                                 P26 S|  36.5/23EEA
                                  P36  |  33.6/19CMX  32.1/20CPB
                                  P03  |  Small Assessment Gap
                      P06 P08 P21 P27  |  32.5/05CPB  31.13/30EEA
   0                  P01 P17 P30 P33  +M 33.4/09CMX  35.1/03ART  35.2/16ART
                                 P14 M|  32.6/02CPB  31.14/17EEA 31.4/13GBN  35.4/14ART
                  P02 P19 P22 P32 P35  |  33.2/12CMX
                          P20 P23 P31  |  36.1/10GBN  36.4/15EEA  31.6/21GBN
                  P10 P12 P13 P18 P37  |  Small Assessment Gap
  -1                                   +  31.2/07EEA
                              P15 P29  |S 32.2/08CPB  36.2/01GBN  31.5/31GBN
                      P09 P11 P24 P34 S|  31.7/06EEA
                                  P39  |  32.4/04CPB
                                       |  31.1/28EEA
  -2                                   +  32.3/24CPB
                                  P16  |T
                                      T|
                                       |
                                       |
  -3                                   +
                               <less>|<freq>
```

KEY Using Original & New Item Codes

GBN (31, 36)
EEA (31, 36)
CPB (32)
CMX (33)
VIS (34)
ART (35)

Figure C2. Wright map of modified pilot survey data.

Tables C8 and C9 present the model's fit statistics with the removal of the 14 items in step four. The difference in person and item mean measures decreased to |0.24|. The person separation mean square was 2.83, which was more than sufficient. Person and item reliability remained strong at 0.89 and 0.93 MNSQ, respectively. Item separation was above that found in the original 52-item pilot data. There were no items with low or near-zero point biserial correlations. The amount of raw explained variance had increased to 45%. The Wright map in Figure C2 also presents the resulting content balance of the remaining 37 persons and 32 items.

There were two assessment gaps which could not be filled with the existing items. These were located directly across from persons P03 and P37 in Figure C3 (note the added boxes). However, there were a total of four items within approx. 0.2 logits of difficulty directly above and below each of these gaps, so the total negative effects of measuring the unifying dimension of OLA adoption were minimized.

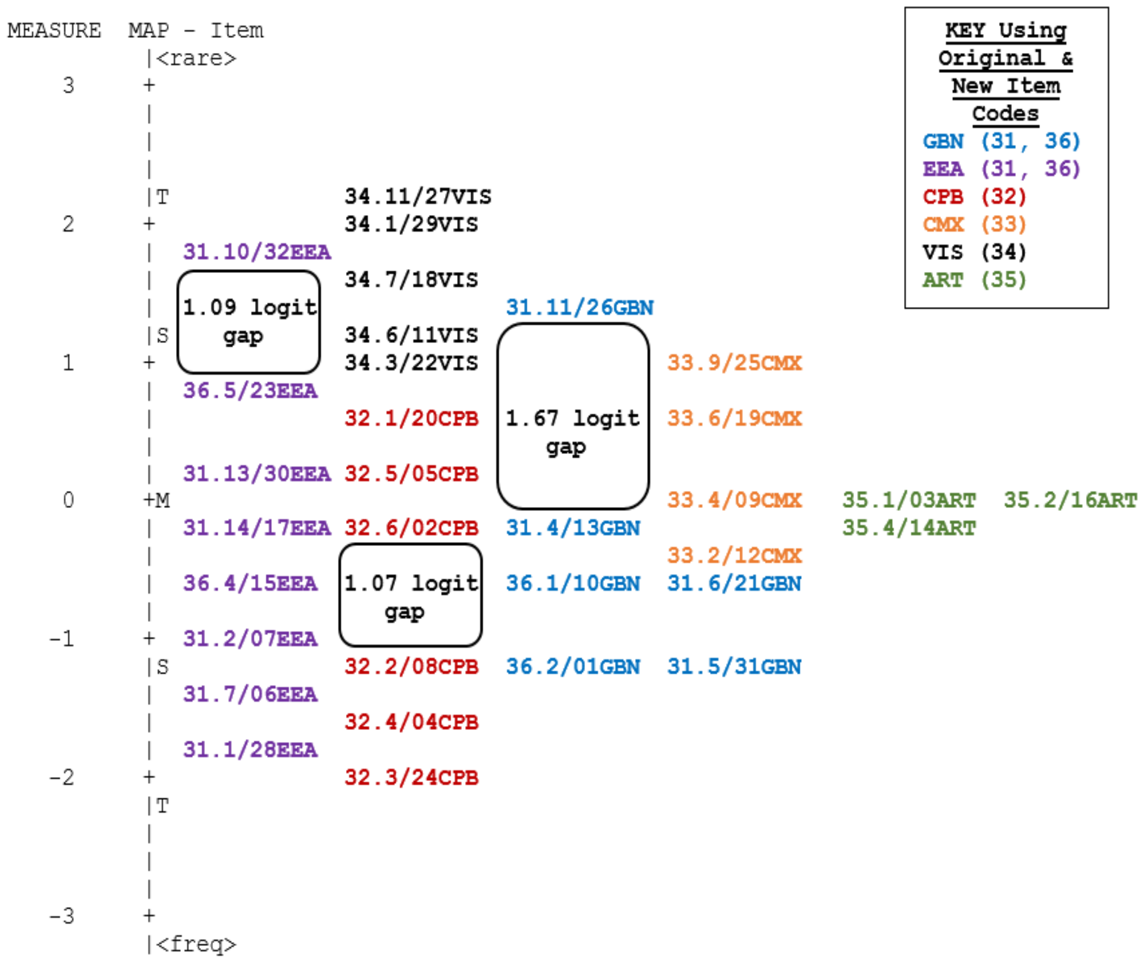

Figure C3. Wright item map of modified pilot survey data divided into characteristics.

Nonetheless, assessment gaps were more readily identified by dividing the six PCI characteristics into more easily identifiable groups. In Figure C3, there were three assessment gaps greater than 0.2 logits within the *enrollment and economic advantages* (EEA), *compatibility* (CPB), and *general benefit* (GBN) characteristics. The most difficult items (i.e., those at the top) within the EEA and GBN characteristics were considered for removal, which would have removed the assessment gaps within the dimension. However, removing each item would have created a small assessment gap within the whole survey among the more difficult-to-endorse items. Another reason not to remove the items was that in the larger sample, it was expected there could be more participants who could endorse these more difficult items.

Regarding the EEA characteristic, all eight items were spread out between 1.86 and -1.75 logits of item difficulty measurement. Item 31.10 had a difficulty measure of 1.86 logits, which was 1.09 logits from the nearest EEA item. Nonetheless, a strong EEA statement, such as item 31.10/32EEA, “Students are interested in our IEP because we offer online ESL classes” could offer unique data input in the survey. Table C10 presents the removal of item 31.10 from the 32-item final survey and its potential effect on that survey’s model.

Table C10

Contrast between the Final Survey Model and the Same Model without Item 31.10

		Persons		Items	
	Mean Measure	Separation	Reliability	Separation	Reliability
Final Survey Item List (32 items)	-0.24	2.83	0.89	3.55	0.93
Removal of item 31.10 (EEA)	-0.18	2.77	0.88	3.45	0.92

Because item 31.10, was at the top of the Wright map, removing it improved the mean measure difference. However, the remaining person and item separation and reliability mean squares were lower with the removal of item 31.10, though still within the suggested ranges. Most importantly, the Wright map of the data without item 31.10 revealed the addition of another assessment gap within the whole survey.

Similarly, item 31.11, with a difficulty measure of 1.40 logits, was 1.67 logits from the nearest GBN item. Thematically, item 31.11/26GBN, “Offering online ESL classes improves the performance of my IEP”, was similar in wording and theme to 31.6, but it measured participants in a unique way within both the whole survey and the smaller strand. Table C11 presents the removal of item 31.11 from the 32-item final survey and its effect on the survey’s model.

Table C11

Contrast between the Final Survey Model and the Same Model without Item 31.11

	Persons			Items	
	Mean Measure	Separation	Reliability	Separation	Reliability
Final Survey Item List (32 items)	-0.24	2.83	0.89	3.55	0.93
Removal of item 31.11 (GBN)	-0.19	2.71	0.88	3.52	0.93

Removing item 31.11 had similar results as removing 31.10 regarding the mean measure difference and person and item scores, except that the person separation decreased more while the item reliability remained the same. With both items 31.10 and 31.11 removed from the survey, the fit statistics did not improve compared with the removal of one of them, and the existence of new survey assessments gaps continued to be a problem. For these reasons, items 31.10 and 31.11 were not removed, but each was reviewed more carefully in the final survey’s data analysis.

Regarding the assessment gap in the *compatibility* (CPB) strand, instead of one CPB strand, it was possible there could actually be two unique strands present: one high CPB strand focused on IEPs and one low CPB strand focused on faculty. All the higher level items were focused on the IEP, and all but one of the lower level items were focused on faculty. Unsurprisingly, faculty found it easier to endorse items related to their work schedule and responsibilities than they did those of their IEP where they have less personal control, with the exception of item 32.2, which was at the higher end of the lower difficulty group. See the following six items (italics added for emphasis):

<u>High CPB items</u> (i.e., hardest-to-endorse items)

- 32.1/20CPB: Offering online ESL classes is compatible with all aspects of my *IEP*.
- 32.5/05CPB: I think that offering online ESL classes fits well with the way my *IEP* operates.
- 32.6/02CPB: Offering online ESL classes fits into my *IEP's* culture.

<u>Low CPB items</u> (i.e., easiest-to-endorse items)

- 32.2/08CPB: I think online ESL classes are compatible with my *IEP's* mission statement.
- 32.3/24CPB: Teaching online ESL classes is compatible with *teachers'* work schedules.
- 32.4/04CPB: Offering online ESL classes is compatible with the responsibilities of *teachers*.

Even though the removal of item 32.2 would have created more distinct high and low CPB dimensions, its removal created a new assessment gap in the whole survey, so it was not removed. Table C12 presents its removal from the 32-item final survey model.

Table C12

Contrast between the Final Survey Model and the Same Model without Item 32.2

	Persons			Items	
	Mean Measure	Separation	Reliability	Separation	Reliability
Final Survey Item List (32 items)	-0.24	2.83	0.89	3.55	0.93
Removal of item 32.2 (CPB)	-0.27	2.82	0.89	3.53	0.93

Although most of the fit statistics only marginally hurt the model or remained the same, a new survey assessment gap appeared with the removal of 32.2. Even though item 32.2 was on the same line as items 36.2 and 31.5, a new gap opens up below this line in the new model. Because the overall model functioned well in support of the *OLA adoption potential* dimension, the benefits of minimizing the number of whole survey assessment gaps was prioritized over the advantage of having one less item in the survey and having two separate types of *compatibility* strands, especially since one of the dimensions would only be measured by two items. Instead, *compatibility* covered a larger range of difficulty, much like the *enrollment and economic advantages* strand. It was also conjectured that a larger sample would affect how the items were arranged and possibly cause the dimensional item gap to shrink or disappear.

Rasch-Andrich Thresholds

Linacre (2019) contends the Rasch-Andrich thresholds (i.e., step difficulties or step calibrations) are used to indicate the difficulty in observing a category. The difficulty in stepping from one response category to another should increase as the category values increase (i.e., from *strongly disagree*, category label 1 to *strongly agree*, category label 4). These thresholds can also be displayed as probability curves, which highlight how well a category is utilized. The numbers used for the Andrich threshold step difficulties are the person minus item difficulty measures found at the intersections of the probability curves of each category. In the comparison of the Andrich thresholds between the original and final surveys (see Table C13), both surveys performed well. There was a positive progression as the category value increased, which meant there was no disordering of these estimates. Disordered estimates would have suggested a category was rarely observed relative to the others. Despite the low category observations of categories 1 and 4 in both the original survey (category 1 was observed 15%; category 4 observed 6%) and the final survey (category 1 was observed 11%; category 4 observed 7%), the Rasch-Andrich thresholds were nonetheless not statistically disordered. Thus, based on Linacre's Winsteps manual (2019), the ordered, progressing categories of both surveys signified the increasing levels of the latent variable *OLA adoption potential*.

Table C13

Andrich Thresholds of Original and Final Survey Models

	Strongly Disagree (category 1)	Disagree (category 2)	Agree (category 3)	Strongly Agree (category 4)
Original 52-item survey	None	-2.24	-0.19	2.43
Final 32-item survey	None	-2.73	-0.20	2.93

Modifications of the Study's Survey Based on the Rasch Analysis of the Pilot Instrument

Based on the problems identified in the pilot and the results of the Rasch analyses, 20 items were removed from the PCI part of the survey instrument, the order of the remaining PCI items was randomized, two questions from the non-PCI part of the survey were moved to locations nearer the beginning of the questionnaire, and an item allowing participants to be included in a gift card drawing was added to the end.

Within the non-PCI part of the survey instrument, two questions were moved. The first one was the question regarding the name of the participants' IEPs, which was moved to the position of second question because it directly related to the first research question. Prioritizing it before the PCI questions could increase the number of responses. The question regarding the participants' involvement in leading the adoption of OLA was also moved to a location directly after the PCI survey to increase the likelihood of responses because it directly answers research question three. While it was believed that had participants indicated a strong negative response regarding leading OLA adoption, it was possible they would have dismissed or discounted the questions regarding their perceptions of it. For this reason, this question was placed after the PCI questions rather than before them. Lastly, a question asking participants if they wanted to enter a drawing for one of five $20 Starbucks gift cards was added to the end of the final version.

Tables C14 and C15 present the new PCI questions. Table C14 presents them by their updated characteristic groups and in the original item order, when possible. This table also included the new item codes which were used in all future analyses.

Table C14

Final 32 Survey Questions with Updated PCI Characteristic Names

New Item Codes	Original Item Codes	Compatibility (CPB)
20CPB	CPB32.1	Offering online ESL classes is compatible with all aspects of my IEP.
08CPB	CPB32.2	I think online ESL classes are compatible with my IEP's mission statement.
24CPB	CPB32.3	Teaching online ESL classes is compatible with teachers' work schedules.
04CPB	CPB32.4	Offering online ESL classes is compatible with the responsibilities of teachers.
05CPB	CPB32.5	I think that offering online ESL classes fits well with the way my IEP operates.
02CPB	CPB32.6	Offering online ESL classes fits into my IEP's culture.
		Enrollment & Economic Advantages (EEA)
15EEA	CRT36.4	I feel certain that international students will enroll in online ESL classes at my IEP.
23EEA	CRT36.5	I feel confident that online ESL classes will increase enrollment in face-to-face classes at my IEP.
28EEA	ECO31.1	Offering online ESL classes will help my IEP attract new students.
07EEA	ECO31.2	The economic disadvantages of offering online ESL classes at my IEP outweigh the advantages.*
06EEA	ECO31.7	It is too costly for my IEP to offer online ESL classes.*
32EEA	ECO31.10	Students are interested in our IEP because we offer online ESL classes.
30EEA	ECO31.13	Offering online ESL classes improves my IEP's profits.
17EEA	ECO31.14	Offering online ESL classes gives my IEP a competitive advantage over other IEPs.
		General Benefit (GBN)
10GBN	CRT36.1	I feel confident in the advantages of offering online ESL classes at my IEP.

Table C14 (continued)		General Benefit (GBN)
01GBN	CRT36.2	I feel certain that international students will benefit from online ESL classes offered by my IEP.
13GBN	ECO31.4	Offering online ESL classes improves the quality of my IEP.
31GBN	ECO31.5	Overall, I find offering online ESL classes to be advantageous for my IEP.
21GBN	ECO31.6	Offering online ESL classes enhances the effectiveness of my IEP.
26GBN	ECO31.11	Offering online ESL classes improves the performance of my IEP.
		Complexity (CMX)
12CMX	CMX33.2	I believe that the technology for online ESL classes can be learned without difficulty.
09CMX	CMX33.4	Teaching online ESL classes is frustrating.*
19CMX	CMX33.6	Online ESL technology seems to require little effort for teachers to understand.
25CMX	CMX33.9	Implementing online ESL classes at my IEP will be simple.
		Articulated Results (ART)
03ART	RDM35.1	I would have no difficulty telling others about the potential benefits of offering online ESL classes.
16ART	RDM35.2	I believe I could communicate to others the results of offering online ESL classes.
14ART	RDM35.4	I would have difficulty explaining why online ESL classes are beneficial.*
		Visibility (VIS)
29VIS	VIS34.1	I have frequently observed what happens in online ESL classrooms.
22VIS	VIS34.3	I have rarely been to conferences where speakers presented on their experience with online ESL.*
11VIS	VIS34.6	I have frequently seen online ESL in use outside my IEP.
18VIS	VIS34.7	Online ESL classes are rarely seen in my IEP.*
27VIS	VIS34.11	I frequently see online ESL being used in my IEP.

*reversed responses.

Table C15 presents the final 32-item PCI survey according to the randomized order presented to the participants. The PCI portion of the final survey instrument was randomized because of the possible influence of the named characteristic group titles. After reading the PCI characteristics' titles, participants could have made a more general and encompassing decision about that PCI and thus answered each item in that section according to that opinion without reading the specific content of each item. While the chances of this phenomenon were unknown and potentially quite low, the disadvantages of randomizing the questions seemed even lower. In fact, the results of the final survey's data indicated a more diverse dimensionality report, which could have been due to this randomization process.

Table C15

Final 32 Survey Questions Supporting Research Question Two

Item Code	32 PCI Statements in Final Survey
01GBN	I feel certain that international students will benefit from online ESL classes offered by my IEP.
02CPB	Offering online ESL classes fits into my IEP's culture.
03ART	I would have no difficulty telling others about the potential benefits of offering online ESL classes.
04CPB	Offering online ESL classes is compatible with the responsibilities of teachers.
05CPB	I think that offering online ESL classes fits well with the way my IEP operates.
06EEA	It is too costly for my IEP to offer online ESL classes.
07EEA	The economic disadvantages of offering online ESL classes at my IEP outweigh the advantages.
08CPB	I think online ESL classes are compatible with my IEP's mission statement.
09CMX	Teaching online ESL classes is frustrating.

Table C15 (continued)

10GBN	I feel confident in the advantages of offering online ESL classes at my IEP.
11VIS	I have frequently seen online ESL in use outside my IEP.
12CMX	I believe that the technology for online ESL classes can be learned without difficulty.
13GBN	Offering online ESL classes improves the quality of my IEP.
14ART	I would have difficulty explaining why online ESL classes are beneficial.
15EEA	I feel certain that international students will enroll in online ESL classes at my IEP.
16ART	I believe I could communicate to others the results of offering online ESL classes.
17EEA	Offering online ESL classes gives my IEP a competitive advantage over other IEPs.
18VIS	Online ESL classes are rarely seen in my IEP.
19CMX	Online ESL technology seems to require little effort for teachers to understand.
20CPB	Offering online ESL classes is compatible with all aspects of my IEP.
21GBN	Offering online ESL classes enhances the effectiveness of my IEP.
22VIS	I have rarely been to conferences where speakers presented on their experience with online ESL.
23EEA	I feel confident that online ESL classes will increase enrollment in face-to-face classes at my IEP.
24CPB	Teaching online ESL classes is compatible with teachers' work schedules.
25CMX	Implementing online ESL classes at my IEP will be simple.
26GBN	Offering online ESL classes improves the performance of my IEP.
27VIS	I frequently see online ESL being used in my IEP.
28EEA	Offering online ESL classes will help my IEP attract new students.
29VIS	I have frequently observed what happens in online ESL classrooms.
30EEA	Offering online ESL classes improves my IEP's profits.
31GBN	Overall, I find offering online ESL classes to be advantageous for my IEP.
32EEA	Students are interested in our IEP because we offer online ESL classes.

Because the Rasch analysis software, Winsteps, automatically assigns a chronological item number beginning at one to the items in the analysis, the new PCI item labels/codes were pre-numbered in that order followed by the PCI's abbreviation. This minimized confusion in reading the Wright maps and discussing the results in chapters four and five.

Appendix D

Control File for Final Analysis with Winsteps® (without response data)

```
&INST
   TITLE = "Rasch Analysis"
  PERSON = Person
    ITEM = Item
   ITEM1 = 20
      NI = 44
   NAME1 = 1
  NAMLMP = 5
 NAMELEN = 18
   XWIDE = 1
   CODES = 01234

ISGROUPS = *
1-32 A
33-34 0
35-44 C
*
CFILE = *
1+4 "SA"
1+3 "A"
1+2 "D"
1+1 "SD"
33+3 "High"
33+2 "Mod"
33+1 "Low"
33+0 "None"
34+3 "High"
34+2 "Mod"
34+1 "Low"
34+0 "Almost None"
35+1 "Yes"
35+0 "No"
*
DIF =
@OLA5YRS = $C6W1
@OLANOW = $C7W1
@LEAD_HMLN = $C8W1
@LEADHM-LN = $C9W1
@LEADH-MLN = $C10W1
@LEADHML-N = $C11W1
@TCON_HMLN = $C12W1
@TCONHM-LN = $C13W1
@TCONH-MLN = $C14W1
```

```
@POSITION = $C15W1
@STATUS= $C16W1
@EXPER= $C17W1
@AGE= $C18W1

DPF =
@PCI = $C3W3
  &END
01GBN
02CPB
03ART
04CPB
05CPB
06EEA ; *inverted response
07EEA ; *inverted response
08CPB
09CMX ; *inverted response
10GBN
11VIS
12CMX
13GBN
14ART ; *inverted response
15EEA
16ART
17EEA
18VIS ; *inverted response
19CMX
20CPB
21GBN
22VIS ; *inverted response
23EEA
24CPB
25CMX
26GBN
27VIS
28EEA
29VIS
30EEA
31GBN
32EEA
S6_LD
S7_TC
S81ST
S82PD
S83VC
S84LM
S85DT
```

```
S86GR
S87AC
S88VF
S89RC
S9RCO
END LABELS
```

Appendix E

Items by Measure Difficulty

Item Measure	Model S.E.	Item Code	Item Wording
3.18	0.24	S9RCO	Does your IEP record live classes on video and offer those for students to view online?
2.27	0.10	27VIS	I frequently see online ESL being used in my IEP.
2.22	0.09	18VIS	Online ESL classes are rarely seen in my IEP.
1.99	0.09	32EEA	Students are interested in our IEP because we offer online ESL classes.
1.76	0.09	29VIS	I have frequently observed what happens in online ESL classrooms.
1.54	0.09	25CMX	Implementing online ESL classes at my IEP will be simple.
0.94	0.08	20CPB	Offering online ESL classes is compatible with all aspects of my IEP.
0.83	0.09	23EEA	I feel confident that online ESL classes will increase enrollment in face-to-face classes at my IEP.
0.82	0.07	S6_LD	Indicate your degree of involvement in leading the adoption of online ESL at your IEP.
0.79	0.08	19CMX	Online ESL technology seems to require little effort for teachers to understand.
0.75	0.09	11VIS	I have frequently seen online ESL in use outside my IEP.
0.61	0.09	22VIS	I have rarely been to conferences where speakers presented on their experience with online ESL.
0.56	0.08	05CPB	I think that offering online ESL classes fits well with the way my IEP operates.
0.39	0.08	02CPB	Offering online ESL classes fits into my IEP's culture.
0.34	0.09	26GBN	Offering online ESL classes improves the performance of my IEP.
0.22	0.12	S89RC	Which of the following do you have experience with? Video recording of all or part of my ESL classes.
0.18	0.12	S88VF	Which of the following do you have experience with? Recorded video feedback to students.

0.15	0.12	S85DT	Which of the following do you have experience with? Digital ESL textbooks.
-0.01	0.09	13GBN	Offering online ESL classes improves the quality of my IEP.
-0.04	0.09	09CMX	Teaching online ESL classes is frustrating.
-0.07	0.09	10GBN	I feel confident in the advantages of offering online ESL classes at my IEP.
-0.08	0.09	21GBN	Offering online ESL classes enhances the effectiveness of my IEP.
-0.13	0.09	15EEA	I feel certain that international students will enroll in online ESL classes at my IEP.
-0.15	0.09	30EEA	Offering online ESL classes improves my IEP's profits.
-0.28	0.09	03ART	I would have no difficulty telling others about the potential benefits of offering online ESL classes.
-0.34	0.09	14ART	I would have difficulty explaining why online ESL classes are beneficial.
-0.37	0.09	12CMX	I believe that the technology for online ESL classes can be learned without difficulty.
-0.37	0.09	31GBN	Overall, I find offering online ESL classes to be advantageous for my IEP.
-0.42	0.09	08CPB	I think online ESL classes are compatible with my IEP's mission statement.
-0.53	0.09	01GBN	I feel certain that international students will benefit from online ESL classes offered by my IEP.
-0.54	0.09	16ART	I believe I could communicate to others the results of offering online ESL classes.
-0.61	0.09	17EEA	Offering online ESL classes gives my IEP a competitive advantage over other IEPs.
-0.70	0.09	07EEA	The economic disadvantages of offering online ESL classes at my IEP outweigh the advantages.
-0.78	0.09	04CPB	Offering online ESL classes is compatible with the responsibilities of teachers.
-0.82	0.09	06EEA	It is too costly for my IEP to offer online ESL classes.
-0.89	0.09	24CPB	Teaching online ESL classes is compatible with teachers' work schedules.

-0.91	0.13	S81ST	Which of the following do you have experience with? Online learning as a student.
-0.96	0.09	28EEA	Offering online ESL classes will help my IEP attract new students.
-1.10	0.14	S83VC	Which of the following do you have experience with? Video conferencing technology.
-1.21	0.10	S7_TC	Indicate your degree of confidence in learning to use new technological innovations.
-1.60	0.15	S82PD	Which of the following do you have experience with? Online learning through my employer and/or in professional development.
-1.95	0.17	S84LM	Which of the following do you have experience with? Online learning management systems to make or collect assignments.
-1.95	0.17	S87AC	Which of the following do you have experience with? Online activities (other than digital textbooks) with my ESL students.
-2.74	0.22	S86GR	Which of the following do you have experience with? Online grading or online gradebooks.

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2004-2006	Adjunct English Instructor	Bluegrass Community & Technical College
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Publications

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