

# **Educational Landscapes Through a Complexity Theory Lens: Using System Mapping to Investigate L2 Shakespeare Studies in Secondary Schools**

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## **Abstract**

*Research interest in Shakespeare studies in mainstream English literature classrooms is a constant (Keilen & Moschovakis, 2017). However, outside limited geographic regions of study (e.g., Germany), little is known about how Shakespeare is used to aid second language (L2) development—despite the ubiquitous attention Shakespeare’s works receive in L2 learning environments (Eisenmann & Lütge, 2014). To address this gap, this study employs complex dynamic systems theory as an explanatory framework and adopts a system mapping approach (Fogal, 2022; Ludlow et al., 2017) to investigate how relevant stakeholders are seen to view Shakespeare studies as a tool for mediating L2 development across the teaching, learning, and administrative landscapes of a set of secondary schools in the Canadian province of Ontario. Findings describe stakeholders’ views as variegated and outline meaningful differences in how constituent groups interpret L2 Shakespeare studies. This work outlines recommendations for steering change that may foster L2 learning and initiates an agenda for continued research into how best to operationalize Shakespeare studies in ways that foster co-adaptive and emergent processes in the service of localized educational contexts. This study appeals to education scholars curious about the value of complex dynamic systems theory, L2 researchers interested in how literary studies can assist L2 learning, and instructors and curriculum designers focused on better understanding the landscape of L2 Shakespeare studies (and by extension, L2 literature studies) in the secondary school context.*

**Keywords:** complex dynamic systems; simplex systems; system mapping; Shakespeare; language education

## INTRODUCTION

A widespread aim of much education research is to offer stakeholders recommendations for affecting educational systems in ways that promote, in its broadest and most general sense, learning. A complex dynamic systems theory (CDST) approach to education research is no different (Jörg et al., 2007; Mason, 2008). As this journal attests to, and as Byrne and Callaghan (2014) note, developing and providing such guidance is a primary objective of much related scholarship. However, where CDST distinguishes itself from other epistemologies is in, *inter alia*, its orientation to educational landscapes as open (landscapes is used throughout this work to describe a context of study, as opposed to its more technical use in CDST studies to explain, for one, state space grids—see Hollenstein, 2013) and evolving systems. Its commitment to methodological apparatuses that can account for these system features. In this vein, scholars (e.g., Byrne, 2002; Haggis, 2008; Larsen-Freeman, 2017) have highlighted engagement with education research along, broadly framed, two complementary pathways that frequently merge: investigations that foreground relationships and relational structures such as interdependencies and their impact on system boundaries and behavior (see Haggis, 2008), and research that is process-focused and explores, for example, co-adaptation and emergence as characteristics of change and development (see Osberg & Biesta, 2007). Related findings have provided insights across a range of learning contexts, including, for instance, perspectives on the teaching and learning of mathematics (English, 2008) and STEM (York et al., 2019), and views on school choice (Maroulis et al., 2014) and general school reform (White & Levin, 2016). Closer to the focus of the present study, research into additional or second language (L2) development has also returned a long list of meaningful insights across an extensive range of foci including, for instance, multilingualism (Herdina & Jessner, 2002), learner agency (Mercer, 2011), writing development (Fogal & Verspoor, 2020), teacher preparation and education (Jackson, 2021), and the pedagogical value of a CDST approach (Levine, 2020). However, despite ongoing and increasingly widespread attention to research on the teaching and learning of additional languages through a complex dynamic systems lens, much remains to be explored. For example, although considerable scholarly attention has focused on the role of literary texts as an affordance for L2 learning (e.g., Carter & McRae, 1996), limited studies (e.g., Fogal, 2019; Tin, 2011) have explored this potential from the perspective of CDST. The present study, then, with a focus on structures and relationships, emphasizes system variables and system interactions as a framework for investigating how literature—with a focus on Shakespeare’s works—is used in L2 settings as a means of advancing L2 literacy in secondary school contexts.

### A 'Simplex Systems' Perspective of Educational Landscapes

To help identify how novel learning experiences and opportunities are structured in secondary schools, this work foregrounds simplex systems, an approach to complex dynamic systems first proposed by van Geert and Steenbeek (2014). A simplex system, echoing notably earlier descriptions of system components (see von Bertalanffy, 1969), is defined as a “*connected whole of beliefs, representations, values, emotions, habits, practices and material tools that serve as a simplifying representation of the overarching complex system* [emphasis in original]” (van Geert & Steenbeek, 2014, p. 23). Employed as a research space, a simplex system functions as an analytic tool capable of operationalizing meaningful chunks of space (and time, when explored longitudinally) embedded in a sound theoretical structure informed by CDST (Fogal, 2020). Given its exploratory nature, this approach is especially useful in providing meaningful insights into, for instance, underdeveloped areas of research such as those concerning the system's initial conditions. Such findings can, importantly, seed new perspectives and hypotheses that can advise research agendas moving forward, a particularly important and germane feature in the present, under-researched context.

Collectively, such benefits underscore the utility of simplex systems as “praxis-based forms of representing complexity” (van Geert & Steenbeek, 2014, p. 22) that are able to maintain a “focus on the properties that make education a complex system” (p. 37). In this regard, a simplex systems view aligns itself with the widely held belief that educational contexts are themselves complex and dynamic spaces that expand beyond classroom borders or individual learners and instructors to include, for example, district school boards, university faculties of education, and government agencies, and related policy and administrative practices (Davis & Sumara, 2006; Koopmans, 2020; van Geert & Steenbeek, 2014). A simplex systems view of such vast contexts offers researchers an opportunity to make meaningful and pragmatic decisions about boundaries and communities of like interests within these larger contexts and operationalizes what Larsen-Freeman (2017), citing Lewontin (1998), describes as “functional wholes”. Doing so directly addresses the boundary problem (Osberg & Biesta, 2010) by providing a theoretically grounded platform that permits researchers to “simplify in a manner that preserves a sufficient sense of the [system's] inherent complexity” (Jörg et al., 2007, p. 148) while ensuring, as Berthoz (2012) notes, that such ‘simplifications’ are by no means simple or less complex (i.e., analyses still maintain a focus on dynamic, non-linear behavior and relationships of heterogenous and interrelated parts).

To aid with boundary setting and a simplex systems approach, this study employs a system mapping technique born of research into network systems analysis and organizational studies (see Kowch, 2012). As the name of the technique suggests, system mapping delineates interrelated connections across a system or landscape of analysis,

leading to, as previous studies in education research have demonstrated (e.g., Ell et al., 2017; Fogal, 2020, 2022; Ludlow et al., 2017), understanding and informed action. As noted, this method is effective at capturing initial perspectives of contexts that have received limited scholarly attention, including for the specific purposes of Shakespeare studies in L2 environments. Prior to expounding on system mapping, this work first outlines this under-researched object of investigation.

### **Literary Works and Shakespeare in L2 Learning**

Researchers, educators, and learners have long realized the benefits of using literary texts to facilitate L2 development (for overviews, see Brumfit & Carter, 1986; Carter, 2007; Carter & McRae, 1996). Related studies have produced an extensive collection of findings that underscore the different uses literary texts have for promoting L2 learning, including developing oral (Jones, 2019), reading (Beglar et al., 2012), and writing (Fogal, 2019; Tin, 2011) proficiency, reading comprehension (Paesani, 2006), vocabulary acquisition (Lao & Krashen, 2000), language awareness (Brumfit & Carter, 1986; Zyngier, 2016), and target-language symbolic or cultural competency (Kramsch, 2006; Volkman, 2014).

More specifically, the study of Shakespeare among L2 learners (also referred to as L2 Shakespeare studies) has also received notable attention, much of which is focused on pedagogy or descriptions of best practice (e.g., Aita, 2013; Cheng & Winston, 2011; Pinnavaia, 2018). In addition to such foci, related studies partially delineate the places and spaces that L2 Shakespeare studies are engaged in (e.g., Austria: Aita, 2013; Australia: Hammond, 2006; Hong Kong: Kooy & Chiu, 1998; Taiwan: Cheng & Winston, 2011; the United States: Straughan, 1996). Although this coverage provides the beginnings of a local overview and some foundation for continued research in these regions, in-depth understandings of how Shakespeare is treated in localized settings is lacking. The one exception is Germany, where considerable scholarly attention (Eisenmann & Lütge, 2014; Schönbauer, 2021) has been devoted to Shakespeare in the L2 secondary school setting.

Eisenmann and Lütge's (2014) edited volume provides meaningful insights into a long tradition of Shakespeare studies in German secondary schools—including perspectives into the unique emphasis German schools place on Shakespeare for L2 learners. Among these perspectives, Merkl (2014) suggests that Shakespeare was viewed in the early and middle of the twentieth century “not only as the prototypical English author but as well as a Germanic author” (p. 63) that could serve to develop target language cultural competency and to acknowledge “the value of the German culture” (p. 63), a momentum that was nurtured and continues through notable scholarly attention to related publications (Ahrens, 1982; Petersohn & Volkman, 2006) that translate into classroom practice. Eisenmann and Lütge's collection captures theoretical and practical considerations related to studying Shakespeare within this context, including, for example, the relevance of Shakespeare to

today's L2 learner, the place of motivation and engagement, the language of Shakespeare, the application of performance-based pedagogies, and the aspect of cultural learning and cultural capital. Given this coverage, this volume addresses in-depth perspectives and provides commentary on how Shakespeare has been used in German secondary schools and, primarily, how his works can be adapted for modern-day classrooms in various L2 contexts in Germany. The studies in this volume, alongside those in Schönbauer (2021), provide clear direction for L2 educators and researchers in Germany in locally meaningful ways. Such attention to localized pedagogies comes at a time when education researchers are increasingly interested in exploring regional particularities rather than relying on universals or a one-size-fits-all approach (Benson, 2021), an outlook that pairs well with attempts by CDST researchers and others to impact local education systems. These regional investigations are crucial, then, for developing understandings of how learning is managed and guided locally, and developments in the German context are a helpful start. However, much more research is required to understand how Shakespeare's works in other parts of the world inform secondary school L2 education, where the vast majority of Shakespeare studies occur in L2 contexts.

As literature and linguistics scholars alike have argued, studies of a canonical figure like Shakespeare remain relevant, despite critiques to the contrary (e.g., Akhimie, 2018). Research cited above documents how studying Shakespeare supports L2 development. In addition, Shakespeare remains accessible and teachable (Pickett, 2011) through increasingly diverse media (e.g., graphic novels, graded readers, and performance pedagogies) and presents learners with opportunities to engage contemporary themes such as issues of social justice (Eklund & Hyman, 2019). Moreover, as Paran (2016) notes in a review of Eisenmann and Lütge's (2014) edited volume, Shakespeare studies position all students "as thinking and feeling human beings, who are forming their view of the world, dealing with issues of evil and how to confront it; dealing with issues of coming of age, gender relations, gender identity, and coming out; dealing with inter-generational relations" (p. 461-662). Doing so speaks to the seemingly "dated" nature of Shakespeare's works and presents L2 educators with continued opportunities to expand the linguistic repertoires of students while simultaneously offering teachers and learners a platform to consider questions of modern-day relevance.

To address the need, then, to better understand L2 Shakespeare studies, and through the lens of different stakeholder groups, the present work provides an initial glance into English as a second language (ESL) Shakespeare studies in secondary schools in the Canadian province of Ontario. To do so, this work employs system mapping as an analytic and exploratory technique intended to first portray a systems orientation to Shakespeare studies and second, to generate a framework for future research that can be employed to develop programs, interventions, and hypotheses that may facilitate L2 learning in these

and similar contexts. With these aims in mind, and guided by parameters set by the local education ministry for defining L2 development (i.e., proficiency in listening, speaking, reading, writing, and socio-cultural competency—reviewed below), this work explores L2 Shakespeare studies through the following research questions (RQ) at the group and intra-group levels: (RQ<sub>1</sub>) Are there differences across stakeholders concerning how many variables are seen to influence L2 development? (RQ<sub>2</sub>) How do stakeholders interpret the influence of system variables on L2 development? (RQ<sub>3</sub>) What links and interactions across system variables do stakeholders see as facilitating L2 development? These questions operationalize von Bertalanffy's (1969) description of system components as distinct in three ways: via their "*number*" (see RQ<sub>1</sub>), their "*species*" (see RQ<sub>2</sub>), and their "*relations*" (p. 55; emphasis in original) (see RQ<sub>3</sub>).

## METHOD

In education research, Ludlow and colleagues (e.g., Ell et al., 2017; Ludlow et al., 2017), and later Fogal (2022), outline system mapping as a tool for investigating educational landscapes as simplex systems. This approach reflects earlier calls in the literature (e.g., Ferreira & Ryan, 2012; Jörg et al., 2007) to operationalize research spaces "as manageable analytic components that... examine phenomena without overtly breaking the object of study away from the larger system within which it is embedded" (Fogal, 2022, p. 3), an approach to systems analysis that considers the breaking down of nested systems into appropriate "levels of decomposition" (Holland, 2012, p. 17). As Ludlow and colleagues and then Fogal demonstrated, system mapping serves as a functional tool in this regard, designed to outline the landscape of simplex systems, "including its major elements and structures, its interdependencies and overlapping areas, and its ambiguous boundaries" (Ludlow et al., 2017, p. 39). Doing so helps to examine which variables, to what degree of strength, and how these variables are seen to influence and interact within "highly localized educational landscapes" (p. 16) in ways that allow researchers and other stakeholders to formulate and steer interventions aimed at assisting emergent (L2) development (see Ludlow et al., 2017, and Fogal, 2022, for extensive discussions related to system mapping in education research). Following suggestions in these works for operationalizing this research technique (outlined below), this approach was employed to better understand the landscape of Shakespeare studies in Ontario ESL programs and is, as a first glance into said context, accordingly descriptive.

## Secondary School ESL Programs in Ontario

The present work is part of a larger project that explores how Shakespeare is employed to facilitate L2 development in Ontario secondary schools. Governed by Ontario Ministry of Education (OME) policies, the province's secondary school ESL curriculum is guided by "the belief that broad proficiency in English is essential to students' success in both their social and academic lives, and to their ability to take their place in society as responsible and productive citizens" (Ontario Ministry of Education, 2007, p. 3). To help English language learners realize these expectations, Ontario ESL programs are divided into five instructional levels. Level one classes register students with the lowest English proficiency, and placement is based primarily on students' literacy competence. For each instructional level, the OME directs ESL programs to organize around four interrelated strands: listening and speaking, reading, writing, and socio-cultural competency and media literacy. Instructors are expected to blend these strands into their curricula, guided in part by an academic achievement chart (Ontario Ministry of Education, 2007) that facilitates the developing of teaching materials and assessment rubrics. Although learners may join mainstream subject area classes after completing *ESL Level 3*, with few exceptions, mainstream English literature classes are only open to learners who have completed the *ESL Level 5* class.

**Table 1**

*Sample OME (2007) Curriculum Objectives and Classroom Activities for Level 5 ESL Class*

Interrelated Curriculum Strands	Sample OME Objectives	Sample Classroom Activities <sup>a</sup>
Listening & speaking	- demonstrate the ability to understand, interpret, and evaluate spoken English for a variety of purposes	- comprehension worksheets based on video and/or oral reading of text
Reading	- locate and extract relevant information from written and graphic texts for a variety of purposes	- literature circles
Writing	- write in a variety of forms for different purposes and audiences	- journal writing; composing a movie review
Socio-cultural competency & media literacy	- demonstrate an understanding of, interpret, and create a variety of media texts	- designing graphic organizers

<sup>a</sup> Sample activities are sourced from the educational contexts explored in this study.

The OME makes no provisions for the study of Shakespeare in ESL classes. Rather, individual ESL programs are autonomous in designing curricula and teaching materials provided that OME objectives are met (Table 1 provides OME sample objectives and related classroom activities). Despite research not having explored the extent Shakespeare is used

in this context, informal discussions with relevant instructors and administrators across the province suggest that Shakespeare's works are commonplace in *ESL Level 5* classes.

### System Mapping

This study explores the use of Shakespeare in three school districts that are simultaneously heterogenous (e.g., enrollment numbers, location and urban density, and classroom syllabi) and homogenous (e.g., operating under the same OME curriculum objectives and serving similar immigrant populations by age, gender, proficiency level, and countries of origin). Organized by school district, Table 2 documents the number of schools, classes and stakeholders recruited for this study, as well as the period of time of each Shakespeare unit. The stakeholders hold different (and at times overlapping) interests and represent potentially unique perspectives and interpretations of the systems under investigation. All stakeholders were members of semester-long *ESL Level 5* English literature classes or were related administrators.

The instructors and administrators all possessed a Bachelor of Arts degree, and all received their teaching accreditation from an Ontario university (all *ESL* instructors in Ontario also require formal *ESL* teacher qualifications). Regarding students, Table 3 documents their biodata.

**Table 2**  
*School District Data*

Category	District Red <sup>a b</sup>		District Green <sup>c</sup>		District Blue <sup>d</sup>		Total
	1	2	3	4	5	6	
School	1	2	3	4	5	6	6
Class	A	B	C	D	E	F	6
Administrators	2	1	1	2	1	1	8
Teachers	1	1	1	1	1	1	6
Students	12	14	16	15	16	12	85 <sup>e</sup>
Length (in weeks) of Shakespeare unit	4	4	5	4	6	5	

<sup>a</sup> All proper nouns have been anonymized.

<sup>b</sup> Serving approximately 70,000 K-12 students.

<sup>c</sup> Serving approximately 250,000 K-12 students.

<sup>d</sup> Serving approximately 20,000 K-12 students.

<sup>e</sup> A representative sample of the population (there were 99 students across all classes).



**Table 3***Student Biodata (N = 85)*

Category	(N)	(%)	Age on Arrival			Years in Canada		
			M	SD	Mdn	M	SD	Mdn
Gender								
Female	49	57.64	12.1	2.3	13	3.7	1.27	4
Male	36	42.35	14.4	4.6	14	3.6	0.78	4
<b>Home country</b>								
China	18	21.17						
India	16	18.82						
Pakistan	10	11.76						
Afghanistan	8	9.41						
Lebanon	8	9.41						
Iran	5	5.88						
Brazil	4	4.70						
Iraq	4	4.70						
Mexico	4	4.70						
Other <sup>a</sup>	8	9.41						

<sup>a</sup> Where countries were represented by a single student, they were grouped together to protect students' identities.

Following suggestions from Ludlow et al. (2017) and Fogal (2022) for implementing system mapping, participants were asked to consider, relative to Shakespeare studies, the strength of influence of a series of variables related to L2 development (see Table 4). The variables were derived from a review of the literature and OME guidelines, and discussions with administrators, instructors, and learners as part of a pilot study informing the larger project this work is embedded in. In addition, to make some concepts easier for learners to understand, when necessary, items in Table 4 were rephrased for the mapping activity described subsequently. For example, with variables 22 and 23 in Table 4, “ESL pedagogy” was replaced with “how to teach ESL students”.

To consider the influence of the variables in Table 4 on L2 learning, participants engaged in a mapping task within one week of completing the Shakespeare study unit. Rather than following Ludlow et al. (2017) and Fogal (2022), where the mapping activity was completed using paper and writing utensils, the mapping task followed Fogal (2020) and was performed electronically. This decision was made because of ongoing health concerns related to the COVID-19 pandemic (e.g., the widespread exchange and handling of papers and pens). Instruction in all three school districts was delivered primarily face-to-face, with one exception. Because of health concerns, school C returned to emergency remote teaching in the last week of the Shakespeare unit.

**Table 4***System Variables Related to Class Environment, Shakespeare Focus, Agents, and Experiences*

<b>Related to class environment &amp; praxis</b>	<b>Related to focus of Shakespeare study</b>	<b>Related to agents</b>	<b>Related to experiences</b>
v <sup>a</sup> <sub>1</sub> - assisted readers <sup>b</sup>	v <sub>11</sub> -historical context	v <sub>16</sub> -teacher (e.g., enthusiasm for & knowledge of Shakespeare)	v <sub>22</sub> -teacher's knowledge of ESL pedagogy
v <sub>2</sub> - video aids (e.g., viewing a film of the play)	v <sub>12</sub> -present-day relevance	v <sub>17</sub> -ESL program director (e.g., guiding curricular decisions)	v <sub>23</sub> -ESL program director's knowledge of ESL pedagogy
v <sub>3</sub> - audio aids (e.g., listening to a play)	v <sub>13</sub> -acculturation (e.g., Shakespeare in pop culture)	v <sub>18</sub> -motivation to study Shakespeare	v <sub>24</sub> -school's overall ESL program
v <sub>4</sub> - quizzes, tests, or essays	v <sub>14</sub> -language issues (e.g., grammar or vocabulary)	v <sub>19</sub> -classmates	v <sub>25</sub> -classroom dynamic
v <sub>5</sub> - final project/test/essay for Shakespeare unit	v <sub>15</sub> -reading Shakespeare for pleasure	v <sub>20</sub> -personal outside help (e.g., family member)	v <sub>26</sub> - previous knowledge of Shakespeare
v <sub>6</sub> -homework		v <sub>21</sub> -professional outside help (e.g., librarian)	v <sub>27</sub> -language(s) other than English
v <sub>7</sub> - class discussions			
v <sub>8</sub> - individual work			
v <sub>9</sub> - pair work			
v <sub>10</sub> - finding & using outside sources (research skills)			

<sup>a</sup> Variable number.<sup>b</sup> Example: *No Fear Shakespeare* series.

Participants received a digital folder via email containing a brief video file that outlined the project and the mapping task, and a second file that allowed them to place variables from Table 4 onto a mapping diagram. Due to psychological stress that long-term emergency remote teaching can engender (in the present study, primarily as a result of COVID-19, see Kirsch et al., 2021), combined with the digital nature of the mapping activity, the number of variables was kept to a minimum to reduce participant stress and instances of cognitive overload (Ludlow et al., 2017; Ruiz-Primo & Shavelson, 1996). Variables that were initially considered but were excluded include, for example, those that inform the wider learning environment (e.g., viewing a theatrical performance), and administrators' and instructors' professional development (e.g., attending workshops).

More specifically, the mapping task asked participants to consider the strength of influence of each variable relative to a guiding question positioned in the middle of series

of nested rectangles, each labelled according to their strength of influence (strong, moderate, or weak), with the innermost rectangle containing a guiding question for participants to consider. For this study, participants reflected on the following question: *Considering your Shakespeare studies, what degree of impact did each variable [from Table 4] have on improving your general English proficiency?* (Instructors and administrators had a slightly reworded version of this question that asked them to consider the English proficiency of learners.) English proficiency was defined broadly, based on OME (2007) guidelines that emphasized competency in listening, speaking, reading, and writing, as well as media literacy and socio-cultural competency.

Participants placed each variable into its corresponding rectangle and were asked to add variables of their own and to ignore variables that they deemed of no influence. Participants were also encouraged to move items if, while interacting with the task, they changed their minds about the strength of influence of any of the items. When this initial phase of the mapping task was completed, participants were then asked to reflect upon the map holistically (rather than viewing the map as an assemblage of disconnected items) and were directed to consider connections among the variables and to insert lines connecting variables to highlight links or relationships.

### **Coding and Analysis**

For the first two research questions, this study followed Ludlow et al. (2017) and Fogal (2022) and coded each variable on each map according to its strength of influence. A code of 3, 2, or 1 was designated to variables deemed strongly, moderately, or weakly influential, respectively. Variables that were not employed were coded 0. To investigate patterns of influence at intra- and inter-group levels, mean scores were calculated for each item. Cut-off scores (2.5–3 for strong; 1.9–2.4 for moderate; 1–1.8 for weak) were also employed to highlight differences in degrees of influence.

To address RQ3, a hierarchical cluster analysis using SPSS (version 27) was conducted. This analysis can underscore group differences and similarities, foregrounding how variables in the present contexts are seen to relate to L2 learning. Hierarchical clustering is also suitable in that it offers opportunities to detect outlier clusters (Bruce & Bruce, 2017), which may be useful here given the diversity of educational and life experiences across groups that may draw out unique perspectives on the system landscape (Crowther et al., 2021; Staples & Biber, 2015). Hierarchical clustering was performed on each constituent group using Ward's method. This technique uses the squared Euclidean distance between variables as part of an agglomeration process, iteratively combining the closest links on the maps (see Kane & Trochim, 2007, for an extensive discussion of cluster analyses and CDST mapping techniques). Finally, as the present project is an exploratory one, the number of cluster solutions reflected Kane and Trochim's (2007) recommendation to maximize the

number of clusters, when possible, so as to facilitate future research (i.e., limited cluster outputs can be, they suggest, more useful when immediate changes are needed). The dendrograms that follow from the analysis show which items were grouped together, and at what step in the process, providing a window into how constituent groups interpret the interaction of variables informing how Shakespeare studies facilitate L2 learning.

## RESULTS

RQ<sub>1</sub> explored the number of variables interpreted to influence L2 development across the different groups. Across school districts, there was little variation in the number of variables employed: District Red ( $M = 24.55$ ;  $SD = 1.63$ ); District Green ( $M = 24.92$ ;  $SD = 1.78$ ); District Blue ( $M = 25.56$ ;  $SD = 1.19$ ). Similarly, there was minimal variation across stakeholder groups: administrators ( $M = 24.85$ ;  $SD = 2.19$ ); instructors ( $M = 24.5$ ;  $SD = 2.07$ ); learners ( $M = 25.06$ ;  $SD = 1.54$ ).

Regarding RQ<sub>2</sub>, Table 5 documents which variables participants deemed strongly influential. The initial four rows in Section A and B indicate which variables are shared across groups as strongly influential. In Section A, only school district Blue highlighted experiences (*teacher's knowledge of ESL pedagogy* [v22] and *overall classroom dynamic* [v25]) as strongly influential. School district Blue also mapped notably more variables as having a strong impact. In Section B, the three constituent groups mapped the same shared variables as strongly influential as Section A, with the exception of *assisted readers* (v1). Stakeholders in Section B also highlighted more variables as strongly influential than did school districts in Section A, with the exception of district Blue. In addition, Section B also documents how administrators noted more items as strongly influential, with a focus on classroom-based activities (*video aids* [v2], *quizzes, tests, or essays* [v4], *final project/test/essay for Shakespeare unit* [5], *homework* [v6], and *individual work* [v8]). Absent from the administrators' and instructors' lists, with the exception of professional working knowledge of ESL pedagogy, are items directly related to a wider conceptualization of the learning space that moves beyond the teacher-student dyad (e.g., *classmates* [v19], *personal outside help* [v20], *professional outside help* [v21], *school's overall ESL program* [v24], *classroom dynamic* [v25]), while learners foregrounded the importance of *classmates* (v19) and the *classroom dynamic* (v25).

Research question three explored how participants perceived the system variables to interact. Figure 1 documents dendrograms across constituent groups. (Figure 1 shows variables that are perceived to be meaningfully connected, rather than highlighting the degree of strength such clusters exert.) Almost all of the dendrograms (i.e., school districts Red and Green, and then instructors and learners) illustrate how variables deemed strongly

influential are narrowly distributed into limited sets of clusters. In addition, dendrograms for school districts Red and Green, and then for administrators and learners show clusters with no strongly influential variables. The dendrograms for school district Blue and administrators show the widest distribution of strongly influential variables across clusters, while only those for school district Blue and instructors show at least one such variable appearing in each cluster.

## DISCUSSION

This work provides a first look at L2 Shakespeare studies in secondary schools across three regional school boards in the Canadian province of Ontario. By way of an overview of the findings, the system mapping technique revealed variegated interpretations of the learning landscape across constituent groups. Stakeholders were greatly similar in their views of the quantity (RQ<sub>1</sub>) of variables deemed influential, yet there were differences in the quality or strength (RQ<sub>2</sub>) of said variables, with school district Blue and the administrators listing markedly more strongly influential variables. In addition, these groups were somewhat similar in the distribution of variables and how they are perceived to interact (RQ<sub>3</sub>). An exception to the latter is school district Blue, with a series of strongly influential variables distributed across two of three clusters, and all clusters containing at least one strongly influential variable.

The focus of stakeholders on distinct sets of variables (RQ<sub>2</sub>) as strongly influential documents important differences in how the Shakespeare studies landscape is interpreted. The data underscore how administrators and instructors focus on the classroom space and on the individual student as driving learning. Table 5 highlights that administrators, for example, interpret student engagement (i.e., students acting or doing) and the classroom experience as unfolding in conventional ways (e.g., students completing quizzes [v<sub>4</sub>], working independently [v<sub>8</sub>], and realizing a final project [v<sub>5</sub>]). Learners too see the value of engagement (i.e., reading with assisted readers [v<sub>1</sub>]), but also interpret the space as situated and relational as per the instructor (v<sub>16</sub>), peers (v<sub>19</sub>) and the general classroom dynamic (v<sub>25</sub>). These findings highlight—in parallel with CDST principles—a broader set of constructs perceived by learners as impacting their educational environment, underscoring a wider and more social and networked interpretation of the learning systems than outlined by the system maps of administrators and instructors and potentially speaks to.

**Table 5***Strongly Influential Variables Across Groups*

A. Strongly influential variables within school districts		
<b>District Red (n=31)</b>	<b>District Green (n=36)</b>	<b>District Blue (n=32)</b>
v1 <sup>a</sup> -assisted readers	v1-assisted readers	v1-assisted readers
v2-video aids	v2-video aids	v2-video aids
v14-language issues	v14-language issues	v14-language issues
v18- motivation to study	v18-motivation to study	v18- motivation to study
Shakespeare	Shakespeare	Shakespeare
v16-teacher	v16-teacher	v7-class discussions
		v9-pair work
		v15-reading Shakespeare for pleasure
		v19-classmates
		v22-teacher's knowledge of ESL
		pedagogy
		v25-classroom dynamic
B. Strongly influential variables within constituent groups across school districts		
<b>Administrators (n=8)</b>	<b>Instructors (n=6)</b>	<b>Learners (n=85)</b>
v2-video aids	v2-video aids	v2-video aids
v14-language issues	v14-language issues	v14-language issues
v16-teacher	v16-teacher	v16-teacher
v18-motivation to study	v18-motivation to study	v18-motivation to study Shakespeare
Shakespeare	Shakespeare	
v4-quizzes, tests, or essays	v1-using assisted readers	v1-using assisted readers
v5-final project/test/essay for Shakespeare unit	v5-final project/test/essay for Shakespeare unit	v19-classmates
v6-homework	v22-teacher's knowledge of	v25-classroom dynamic
v8-individual work	ESL pedagogy	
v12-present-day relevance		
v13-acculturation		
v22-teacher's knowledge of ESL pedagogy		

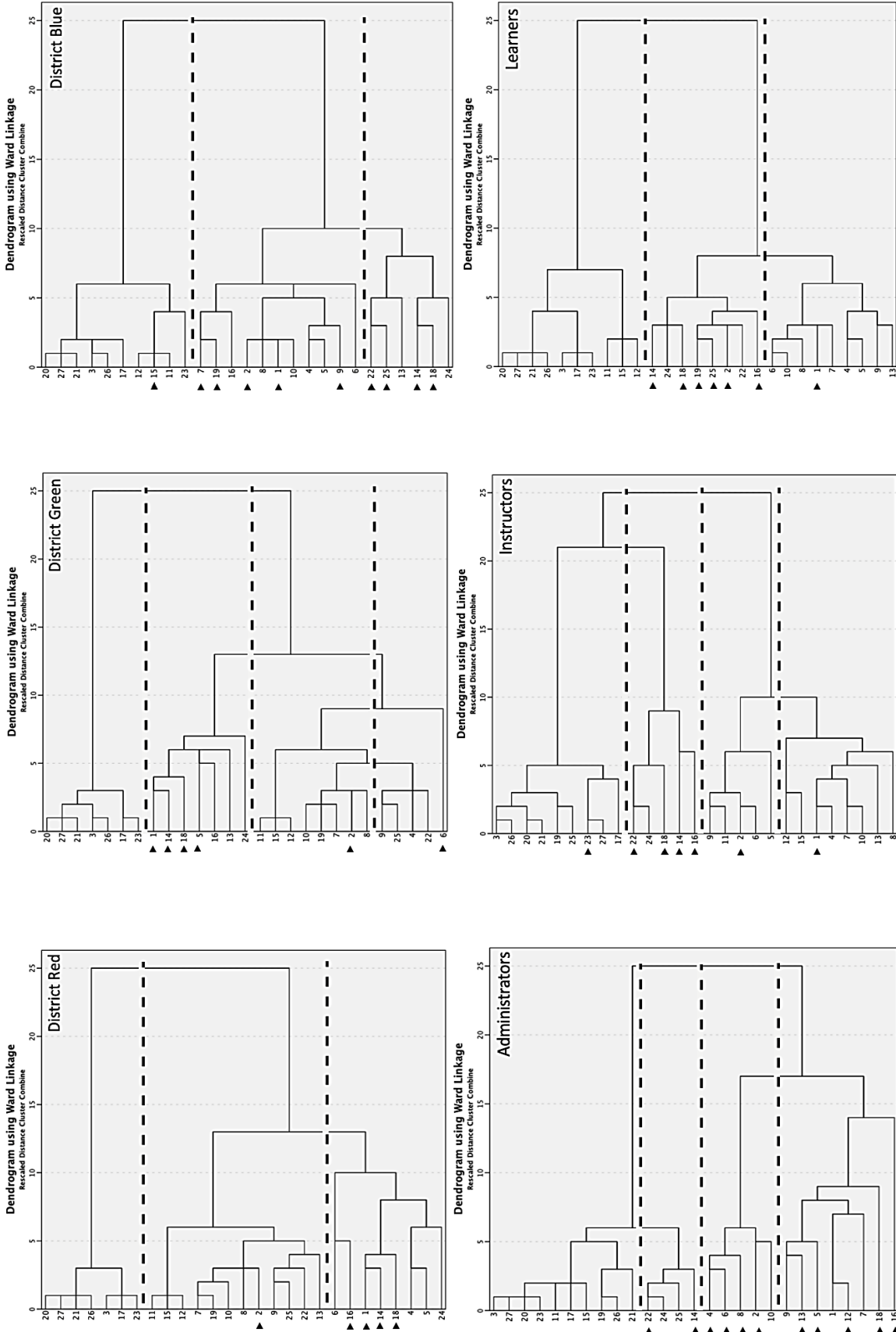
<sup>a</sup> Variable number.

These differences in perspective bring to light two important considerations. First, these unique stakeholder interpretations reveal a gap between educators and learners (i.e., distinct outlooks on what is driving learning) where opportunities to steer L2 development may be absent as educators remain focused on conventional praxis (e.g., quizzes [v4] and independent work [v8]). To remedy this, and as a way forward, educators involved in these contexts can re-envision their L2 Shakespeare studies curricula in ways that foster co-

adaptation and emergence by, for instance, taking advantage of students' peers (e.g., more group-centered tasks or tapping into performance-based pedagogies—e.g., Aita, 2013; Cheng & Winston, 2011). Such differences may also underscore how different resources and constraints serve or hinder perceived development (Bouchard, 2021). Further, researchers can build on these findings as means of testing further solutions (e.g., the impact of refining teacher training, or professional development on classroom practice).

Second, differences in how stakeholders interpret the educational space stresses the need to gather input from dissimilar sets of stakeholders when trying to assemble system-wide information. That is, the data here enable a more nuanced understanding of L2 Shakespeare studies that related scholarship has yet to widely capture. For example, aspects of cultural competency (Harzem, 2021, cites lovesickness, betrayal, same sex affection, and racism) are frequently interpreted as “of particular interest for today’s EFL learners who are growing up in a globalized world” (p. 39) and are thought to be central to L2 Shakespeare studies (Eisenmann & Lütge, 2014; Schönbauer, 2021). However, framed as *present-day relevance* (v12) and *acculturation* (v13), cultural competency received little attention in this study. Rather, with the exception of administrators, Shakespeare studies are seen to be influenced by other drivers, as outlined in Table 5 and summarized above. This difference may be propelled by responses from unique sets of stakeholders—in contrast to previous related research that is primarily informed by instructors’ perceptions. Considering the diverse set of variables laid out here, follow-up work may iteratively consider how distinct sets of variables can be brought together in different ways to bear on L2 learning through the study of Shakespeare.

Concerning the distribution of strongly influential variables (RQ3) across clusters, the data provide insights into potential system dynamics and highlight areas for further consideration. First, the present study reveals a limited distribution of such variables across the dataset, with the exception of the administrators and school district Blue. These exceptions aside, such a composition could limit opportunities for stakeholders to stimulate learning across unique cluster sets, thus negatively impacting learning outcomes. For instance, with a wide distribution of strongly influential variables (e.g., dispersing motivated students across different groups during a classroom activity), instructors may increase the likelihood of less able students benefitting from the motivation of their peers. As Fogal (2022) suggests, given the perception of strongly influential variables to greatly influence system behavior, their wide distribution may act as a series of anchors that foster emergence.



**Figure 1.** Dendrograms Highlighting links and clusters across constituent groups. Numbers on the vertical axes correspond to variables in Table 4. ▲ Indicates strongly influential variables, as determined by Table 5.



Second, examining the distribution of strongly influential, or anchor, variables can also address the robustness of these Shakespeare studies programs. For example, unlike the long list of variables and their wide distribution in district Blue, school districts Red and Green show limited sets of strongly influential variables (Table 5) and a narrow distribution of anchor variables (Figure 1). These latter configurations reveal centralized educational mechanisms (i.e., a narrow scope of agents, foci, experiences, and practices). These centralized tendencies are known to decrease system robustness (Davis et al., 2012; Goldspink, 2007), making the stability of these educational landscapes more vulnerable to shifts and changes (e.g., new curriculum mandates or a new principal or department chair). Considering both of these concerns, follow-up studies are required that can provide detailed analyses into the general structure and workings of the ESL programs in school district Blue, for example.

As a descriptive study, one aim of this work is to generate a platform for continued research. The following recommendations address this goal. First, across stakeholders learners perceive a wider set of variables as strongly influencing system behavior. Agent-based modelling may serve as a way of exploring how the foregrounding of wider sets of variables can impact learning outcomes. This suggestion takes advantage of agent-based modelling's ability to analyze "underlying interactions in a system and for achieving a clearer understanding of some of the system-level causal effects of such interactions" Hiver & Al-Hoorie, 2020, p. 126). Pursuing this objective may yield results that can, as Benson (2021) and others (e.g., van Geert & Steenbeek, 2014) have stressed, impact local contexts in meaningful ways.

Second, as stakeholders focus on wide-ranging variables, the recommendation above to explore how different sets of variables interact to foster emergence may benefit from design-based research (Design Based Research Collective, 2003). Design-based research complements CDST principles, serves to build on and test hypotheses derived from previous studies, and foregrounds intervention and iteration (Collins et al., 2004; Hiver & Al-Hoorie, 2020; Rodríguez, 2017) aimed at bringing co-adaptive and emergent processes into the service of education needs.

Last, given school district Blue's wide distribution of anchor variables, a follow-up study that focuses on this district may benefit from retrodictive qualitative modeling (Byrne, 2010; Dörnyei, 2014). This approach may prove useful here, given the technique's focus on working backwards from outcomes (i.e., of tracing the signature dynamics of self-organizing systems), resulting in potentially actionable recommendations for developing (a) increased opportunities for emergence and (b) system robustness, both in the service of L2 Shakespeare studies in the present context.

Alongside these findings and recommendations are limitations. First, including classroom observations and interview data would have enriched the dataset by providing

additional perspectives of the systems under study and insights into stakeholders' mapping decisions. Unfortunately, among other obstacles, it was not possible to collect these data given concerns associated with the COVID-19 pandemic. In addition, although it may have proven fruitful to consider nuanced constructs such as vocabulary growth or oral proficiency (rather than the more general, L2 development), this work aimed to produce a general view of the present landscape as a means of pinpointing principled targets for follow-up studies. Last, this study is largely descriptive, an aspect that some readers may find concerning. Yet, what Davis and Sumara highlighted in 2006 (and which Ludlow et al., 2017, remind us of again) remains germane—namely, that “the descriptive aspect of complexity research remains especially relevant” (p. 79), as it provides baseline descriptions that serve as important foundational work. This sentiment is all the more pertinent when one considers how little attention has been paid to researching Shakespeare studies in secondary school ESL programs.

## CONCLUSION

Following van Geert and Steenbeek's (2014) recommendation to “reduce the epistemic complexity of the [education] system” (p. 22) under investigation, this work employed a simplex systems framework to explore L2 Shakespeare studies. Using system mapping as a data collection and analytic tool, this work (a) described the complexity of said studies in Ontario secondary schools (i.e., similar orientations in the quantity of variables seen as influential; dissimilar in their degree of influence; differences in how variables are seen to interact), and (b) recommended an agenda for future research (i.e., foregrounding iteration and intervention through design-based research as a means of exploring how variable sets can be combined to foster emergence and, consequently, L2 development; retrodictive qualitative modeling for investigating system outcomes, particularly with school district Blue; agent-based modeling as a means of identifying local causal effects that can then serve as actionable principles to guide change). The findings and suggestions described herein help lay a foundation for continued research and insights into how students, instructors, and administrators can operationalize L2 Shakespeare studies in ways that foster co-adaptive and emergent behavior in service of L2 learning. In doing so, this work underscores the utility of CDST and system mapping as a meaningful framework for exploring the system-level interactions of localized learning environments, highlighting, as Ludlow et al. (2017) noted, that such an approach can be “useful more broadly in most areas of professional education where the point is to create the initial conditions that will prompt the emergence of critical ideas and practices to be taken up in the crucible of practice” (p.

72). As noted at the outset of this paper, such an approach complements a common goal of much education research: to impact educational landscapes in the service of learning.

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