The missing piece of the integrative studies puzzle

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ABSTRACT

Within Interdisciplinary Studies (IS), the effectiveness of Integrative Studies has been hampered by the difficulty of effectively integrating/synthesizing theories among multiple disciplines. Without effective integration, we cannot generate theories that will enable highly effective action. This paper presents Integrative Propositional Analysis (IPA) – a tool based on an emerging stream of research on the structure of theories. Using a few simple rules, IPA provides a concrete visual-mapping approach to integrating theories. And, of equal or greater importance, IPA provides an effective method for measuring ‘how integrated’ or ‘how coherent’ theories are as a new way to predict how useful the theory will be for representing our understanding of complex situations and improving the ability of individuals, organizations, and coalitions to take effective action based on those theories. This is expected to be particularly useful for students and interdisciplinary teams for integrating theoretical perspectives in an initial assessment of problems and situations.

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Introduction

Interdisciplinary Studies (IS) has proven useful in helping scholars and practitioners to gain a greater understanding of complex issues. Among the many approaches (cf. Klein and Newell 1997; Menken and Keestra 2016), the IS approach may be neatly described in ten steps of an Interdisciplinary Research Process: Define the problem; Justify the use of an interdisciplinary approach; Identify relevant disciplines; Conduct a literature review; Develop an adequate understanding of each discipline; Analyse the problem to evaluate each theoretical perspective; Identify conflicts among the insights and their source theories; Create common ground among insights; Construct a more comprehensive understanding; Reflect on, test, and communicate the understanding (Repko and Szostak 2017).

For the IS puzzle, most of those pieces are clear and supported by good and rigorous academic methods and techniques. However, there is also good consensus that there is a piece missing. Repko and Szostak also recognize that the most difficult steps in that
process are those around integration. Indeed, those integrative steps seem to be the steps most commonly left out of IS for research and teaching.

Perhaps the most common complaint regarding interdisciplinary programs, by supporters and detractors alike, is the lack of synthesis—that is, students are provided with multiple disciplinary perspectives, but are not given effective guidance in resolving the conflicts and achieving a coherent view of the subject. [https://en.wikipedia.org/wiki/Interdisciplinarity](https://en.wikipedia.org/wiki/Interdisciplinarity) (accessed October 25, 2019).

In short, the integration or synthesis of multiple disciplinary perspectives (and/or insights) is a critical feature of IS but one that is also ‘elusive’ (Newell 2001) and whose very meaning ‘has always been something of a mystery’ (Newell 2001, 18). Thus, when attempting to integrate multiple perspectives, ‘In the absence of comprehensive guidance, newcomers to this type of research still rely largely on intuition’ (Bammer 2013, 3). In this paper, we will briefly explore that mystery and present a solution that has recently emerged from another discipline – the science of conceptual systems.

Improving our collective ability to integrate theories will be especially beneficial for students, as well as for teams of researchers from differing disciplines who are integrating their theoretical perspectives as they begin to address a situation or problem.

For this paper, theory will be defined as a set of interrelated propositions (Weick 1989) much like a set of interrelated hypotheses. Where, ‘A proposition is a declarative sentence expressing a relationship among some terms’ (Van de Ven 2007, 117). Within each proposition, there are one or more concepts representing things in the real world. Each proposition may also describe relationships between those concepts (Figure 1). For example the proposition, ‘When workers are more motivated they are more productive’ includes concepts of workers, motivation, and productivity. That proposition also describes a relationship between those concepts. Using that proposition to understand and enable desired

![Figure 1](image-url)
change in a practical situation, we would expect to see an increase in productivity if we were able to increase the motivation of the workers.

Each theory may be understood as a conceptual construct, or conceptual system, that is in some way useful for understanding and engaging the world to cause desired change. In that way, a theory may be considered similar to a model, mental model, policy theory, or policy model. We will use those terms interchangeably here, as they all refer to conceptual systems of some usefulness. Similarly, we will use the term theory to refer generally to theories of many if not all forms (middle range, large-scale, etc.) because they are all constructed of propositions and all are useful for understanding the world, making decisions for taking action toward desired goals.

Generally, theory may be understood as useful in application to the extent that it is effective for supporting decision-making that leads to anticipated results. Understanding how and why we are able to improve our theories, ‘is important not only to education but also to developmental psychology, epistemology, and the history and philosophy of science’ (DiSessa 2006, 265).

In general, if we wish to advance or improve our theories, we must evaluate a range of theories to choose which one is preferable for some situation. A common approach to evaluating theory is to ask if it is ‘necessary and sufficient’ to adequately explain the situation in question (Repko and Szostak 2017, 327, etc.). However, that approach is not reliable because (at least in part) what appears to be a sufficient explanation to one person may not be sufficient to another. For example, a manager inclined to follow one body of research and practice might believe that workers are motivated only extrinsically and so would accept as valid only theories that support the idea of extrinsic motivation. On the other hand, another manager might follow research and practice of both extrinsic and intrinsic motivation and so accept as valid that more complicated theory. Because of those differing assumptions and theories, confusion and arguments may arise which may not be productive.

Evaluating theories based on that kind of ‘intuitive’ approach generates controversy in the academic world much as it does in the world of practice. While such controversy has (arguably) led to some advance in theory and/or practice, the intuitive approach has not led to a revolution in the development of successful theory in IS, the social/behavioural sciences or the humanities.

For example, organizational theory (Burrell 1997; Lewis and Kelemen 2002) and social theory (Appelbaum 1970) have been called failures. Policies (supported by policy models or policy theories) seem to reach their stated goals only about 20% of the time (Wallis 2011, 2016a; Light 2016) and those interventions often lead to ‘worse outcomes than the previous status quo’ (Beaulieu-B and Dufort 2017, 1).

Rather than developing better theories, we seem to be developing more theories; the proliferation of which may be understood as a kind of fragmentation as found in philosophy (Ledoux 2012), sociology (Bakker 2011), systems theory and interdisciplinary studies (Newell 2007) along with most or all other disciplines. Fragmentation may be understood as a lack of connection or systemic study among an increasingly large number of fields and sub-fields within a discipline as scholars conduct their research with an increasingly narrow focus without the awareness of other potentially related research. Or, from a theory-centric perspective, scholars are becoming increasingly preoccupied with their individual theories and so are less able to see the interdisciplinary forest.
By reversing that trend, by providing better integration of our theories, we might reasonably expect to significantly improve the effectiveness of those theories for understanding and enabling effective change (Wallis 2014c, 2014d). The question we set out to answer in the present paper is how we might more easily and successfully ‘pull together what is known about the problem from both academic research and practical experience’ (Bammer 2013, 6). That is, how more effectively to integrate our theories.

While some see that as a difficult situation (because any significant problem may have thousands of papers on the subject) those many perspectives are expected to be beneficial if we can integrate them effectively (Houston, Wright, and Wallis 2017). To do that, we need a more rigorous and objective approach to integrating theoretical models than the ad-hoc or intuitive approaches often used by scholars. This paper presents an emerging approach for visually organizing theories from different disciplines, and (importantly) for measuring that level of organization so we can see when we are making progress toward more useful/effective interdisciplinary theories.

Current approaches to integration/synthesis

When combining theories and/or perspectives, it is generally accepted that ‘Better integration produces more accurate or complete understanding and makes more effective action possible’ (Newell 2001, 22) rather than drawing ‘indiscriminately from the various literatures’ (Newell 2001, 7), which results in ad-hoc integration and even more fragmentation.

For an abstract example of ad-hoc integration, consider one scholar who develops a theory (Theory X) containing ten concepts. A second scholar writes a paper drawing on Theory X but uses only three of the concepts from the original Theory X while adding two concepts from Theory Y thus creating a new hybrid theory. While that hybrid theory might be referred to as theory Z, the second scholar instead refers to that hybrid theory as Theory X thus increasing the number of theories by that name, the confusion of students and scholars and the fragmentation of the field. In one comparison of theories, Wallis (2014d) found more variation than stability between concepts presented in theories – even when they were presented by the same authors in differing publications.

Wallis (2014c) has also investigated the process of integrating two theories from different disciplines using three ‘soft’ methods (ad-hoc, intuitive, and cherry picking) and three ‘rigorous’ methods (formal grounded theory, reflexive dimensional analysis, and integrative propositional analysis). While soft methods are easier for scholars to use, those methods were also shown to support fragmentation of fields. The rigorous methods, in contrast, served to reduce fragmentation through integration.

Other scholars also use more structured approaches to integration. Mansilla (2010), for example, talks about focusing efforts at integration by developing ‘more comprehensive explanations,’ engaging in ‘informative contextualization,’ and focusing on ‘practical problem solving.’ While using multiple foci seems likely to support integration, that approach may also make the process more difficult for scholars (not that we expect the process to be easy!). Also, within each of those foci, there are opportunities for intuitive (and so, seemingly ad-hoc) integration that may actually support fragmentation.

In short, advancing theory in the social sciences has been a primarily intuitive endeavour (Meehl 2002). While those kinds of efforts at integration may be based on careful
thinking and deep understanding by experts, they often end up seemingly eclectic (Clark et al. 2011), producing perspectives that are more multidisciplinary instead of being fully interdisciplinary, highlighting the difficulty of building useful theory when using non-systematic methods (Shaw and Allen 2012). With a more formal, more structured approach to integration we might expect to accelerate and improve the process of integration to develop better theories to resolve the highly complex problems we face more effectively.

The problem of increasing fragmentation, impeding our collective progress has not been sufficiently addressed or resolved largely because we have not had a way to measure ‘how integrated’ our theories are. Such an approach has been found in the emerging science of conceptual systems.

**Foundations**

Generally, the impetus for developing a new approach for evaluating and integrating theories was inspired on one hand by existing and emerging perspectives on building theories (e.g. Disessa 2002; Shoemaker, Tankard, and Lasorsa 2004; Özdemir and Clark 2007; Wallis 2008b, 2010b; Edwards 2010); and, on the other hand, by the difficulty of building useful theory when using non-systematic methods (e.g. Shaw and Allen 2012).

Due to limitations of space, it is briefly noted that the background (including ontology, epistemology, knowledge, mapping, systems, and more) has been synthesized through deep reflection and discussion via a long stream of exploration and scholarship (cf. Wallis 2006, 2008a, 2008b, 2010a, 2010c, 2010d, 2011, 2012, 2013, 2014a, 2014b, 2014c, 2014d, 2015a, 2015b, 2016a, 2016b; Wallis and Wright 2015, 2016; Wallis, Wright, and Nash 2016; Wallis and Valentinov 2016a, 2016b, 2017; Houston, Wright, and Wallis 2017; Panetti et al. 2018).

The present paper, however, will focus more on themes that are generally known and accepted by the IS community: foundational aspects of mapping (Szostak 2002) and systems thinking (Newell 2001).

**Mapping**

Generally, mapping involves the diagrammatic representation of systems including organizations, situations, and theories. This is done using nodes and connections, often times, as boxes and arrows. Mapping helps to visualize systems, making those insights more accessible.

Because of the great number of approaches to mapping, and the paucity of agreement as to how they should be defined, this section will only attempt to provide a few exemplars to identify some of their strengths and weaknesses as may be applied to integration of theories between disciplines.

For understanding of complex nonlinear systems, mapping is an approach that has generally proved useful (cf. Bateson 1985; Forrester 1994; Brown and Eisenhardt 1998; Maturana and Varela 1998; Daneke 1999; Axelrod and Cohen 2000; Stacey, Griffin, and Shaw 2000; Hammond 2003; Trochim and Cabrera 2005; Dennard, Richardson, and Morçöl 2008; Minati 2008; Müller 2011; Checkland 2012). Mapping has also proved useful for understanding mental models (Johnson-Laird 1980), their structure and their relationship to understanding (Craik 1943), especially when supported by bibliometric
and scientometric approaches for studying the content of theory (Knorr-Cetina 1981; Fiske and Shweder 1986; Flower 1989; Calas and Smircich 1999; Jean-Pierre and Edward 2000; Hood and Wilson 2002).

Indeed, Mapping is ‘a primary analytical tool of systems thinking’ (Repko and Szostak 2017, 107) as it helps to visualize the system under study. Mapping can also be useful for creating computer models (Johnson 2016) and in the classroom to support and evaluate student learning (Goltz 2017).

While simple maps may be made with paper and pencil, or cards and sticky notes, larger maps may be easier to create using one of the many online mapping tools (cf. Hoffmann 2011). Some of the present author’s favourites include Plectica (https://www.plectica.com, intuitive and easy to use for online collaboration), Kumu, (https://kumu.io, great for presentations and uploading/download maps from spreadsheets, but not so intuitive), Insight Maker (https://insightmaker.com/, useful for developing simulations). Miro (https://miro.com/) may be accessed by multiple users in real time.

Whatever the technique for creating the visual diagram, it is of greater importance that we consider the form of the map. For example, mind mapping (cf. Bryson et al. 2004), and concept mapping (cf. George-Walker and Tyler 2014), are easy to use and very flexible. However, the lines or arrows between the boxes may not present a clear understanding of their relationship. Showing, for example, that one concept is ‘related’ to another without showing how they might be related. Such fuzzy or indeterminate relationships may lead some to cast legitimate aspersions on less rigorous or fuzzy ‘boxology.’ While mapping (of any kind) may support learning and decision making, superficial mapping may interfere by supporting misconceptions (Reese 2009).

A more focused approach involves using ‘pre-set’ boxes and their relationships. For example, SWOT analysis asks participants to identify (and place in boxes) their firm’s strengths, weaknesses, opportunities, and threats. An example includes the online Reflect! Platform for consensus building around wicked problems (http://reflect.gatech.edu/). Such approaches may be easier for users because they can focus on ‘filling in the boxes.’ On the other hand, there is no guarantee that they are using the ‘right’ boxes for their mapping, SWOT analysis, for example, has been shown to have very limited usefulness (Hill and Westbrook 1997).

The relative fuzziness of concept maps may be compared with the greater clarity of causal maps. ‘While a concept map only indicates that ideas or concepts are related in some way, a causal map illustrates the cause and effect relationships among concepts’ (Goodier et al. 2010, 220). That approach, of causal knowledge mapping, is useful for simplifying, coordinating, and focusing on important information (Wexler 2001); and, more specifically, causal mapping has been used with great benefit for many years to support effective decision making (Axelrod 1976), helping to identify tradeoffs between strategic options (Porter 1996) to support more effective decision making for reaching goals.

Understanding causal relationships helps to reduce the fuzziness of maps (Ackermann and Eden 2004) to maximize their usefulness for understanding, planning, and decision making. Additional clarity is provided when the concepts in the boxes are (in some way) measurable. Together, the clarity provided by causality and measurability supports testing and falsifiability (Popper 2002). Without that clarity, decision makers need to fall back on unreliable intuition (Bryson et al. 2004); making inferential leaps that lead to problems down the road. While there may be a steep learning curve, causal mapping
is good for surfacing tacit knowledge and integrating it into explicit knowledge across silos (Goodier et al. 2010).

It is worth noting that there are limits to mapping. Mappers should recall that while they are creating a map of some ‘real’ system, situation, or organization, that the map is only their understanding or knowledge. And, as such, may be unexpectedly inaccurate; whatever method of mapping is used. Therefore, we need a method for evaluating the maps.

Generally, maps may be evaluated on their underlying data, their relevance to the stakeholders, and their structure (Wright and Wallis 2019) all of which relate to the effectiveness of those maps in practical application. The need for good data is generally known and accepted, so it will not be covered here. Similarly, it is becoming increasingly accepted that theories should be developed with input from as many relevant stakeholders and experts as possible so, that aspect will also be set aside here. Less known is the opportunity to evaluate structure.

**Structure**

There is a rich literature in the related fields of systems thinking and cybernetics (cf. Senge 1990; Umpleby 1997; Dent and Umpleby 1998) suggesting that the world may be understood as being made of systems (physical, biological, social, etc.). And, that those systems may be understood as having a kind of structure.

Generally, the idea of structure may be understood in terms of elements and connections (von Bertalanffy 1972). A pile of bricks has many elements, but they will not serve as a house until they are effectively connected.

When elements are disconnected, systems break down and cease to function as systems. They cease to be systemic. For example, consider a simple ecological system consisting primarily of vegetation, rabbits, and foxes. We know that removing one of those elements will cause a collapse of the ecosystem. The same insight may be applied, from a different perspective, if we understand the relationships between those elements. Those relationships or connections are seen in how each of the elements effects, impacts, or changes another (rabbits eat vegetation, foxes eat rabbits). So, if we were to remove one of those relational interactions, the ecosystem would collapse.

That key insight (of elements and connections) that is applied to help us understand ecological systems may also be applied to help us understand conceptual systems (theories, models, etc.). There, the elements are known as concepts (each representing something in the real world) and the connections are relationships between them (representing how each causes change in others). With more elements and more connections a theory has more structure.

The idea that theories (as knowledge) are more useful when they have some level of structure has been generally accepted for some time (Kaplan 1964; Dubin 1978; Stinchcombe 1987), with Quine suggesting the importance of developing better theories by focusing on the interrelationships between the concepts of a theory (Quine 1969, 1980), in support of more coherence (Sosa 2003; Šešelja and Straßer 2014).

From the field of education, concepts may also be understood as existing in a kind of ‘conceptual ecology’ (Disessa 2002). In that ecology, located in our minds, many forms of knowledge (including theories) exist. Where concepts are not well connected or structured, the knowledge is considered to be fragmented or incoherent (as in a collection of
independent facts or set of bullet-point ideas) reflecting a poor understanding of a situation and so more likely to support poor decisions and limited ability to achieve desired results.

While there are many ways that elements may be related (for example, rabbits may be linked to vegetation in terms of geographic proximity, by the way that they sense vegetation, by their use of vegetation for concealment from predators, etc.), causal relationships are of particular interest. For a comparative example, if we were to say that ‘rabbits are often found in close proximity to vegetation’, this does not tell us much, while (in contrast), a statement such as ‘having more rabbits will cause more vegetation to be eaten’ provides a more explicit understanding of the situation.

The same distinction applies to conceptual systems (reflecting their real world counterparts) in that we may better understand concepts when we understand their causal connections. That idea is widely supported. For example, in policy science, the interdisciplinary perspective suggests using a combination of methods to study situations and generate testable hypotheses (Clark et al. 2011).

Importantly, it is the causal relationships between concepts that are most useful for providing the most effective and scientific understanding of a subject or situation under study (Pearl 2000) because they are more testable (Popper 2002). Because causal links are an indicator of coherence (Szostak 2002, 2007b) we may generally state that theories containing more causal links will be more coherent or have more structure. However, without a formal measure of structure (coherence) it is more difficult to be certain that our theories are becoming more structured.

In the study of psychology (for example) theories have been slow to improve because, in part, efforts to improve them have been based on unreliably intuitive approaches (Meehl 2002) rather than on the measurement of structure. Again, this is a problem because something that is intuitive to one scholar may not be to another; so, the path may be paved with unproductive conflict rather than leading directly through the forest of fragmentation toward improved theories.

A more rigorous and systematic approach is suggested epistemologically because belief systems have a kind of structure (Sosa 2003; Šešelja and Straßer 2014) that can be useful for determining truth or validity. Ontologically, that structure derives from a coherentist perspective (focused on the relationship between concepts) that is distinct from, yet related to, the correspondence perspective which is focused on the relationships between reality and the concepts we use to represent that reality (Umpleby 2010; Müller and TOŠ 2012).

A growing stream of research suggests we can bring to the surface and evaluate knowledge based on its structure. In the field of political psychology, studies in Integrative Complexity (IC) were developed from the 1960s onward using a kind of paragraph analysis to measure the ‘structure’ of texts from such sources as speeches and correspondence (cf. Suedfeld, Tetlock, and Streufert 1992). Each paragraph is scored on a scale of one to seven. A paragraph that is highly complex, shows the author’s deep understanding of a topic could score a seven, while, in contrast, a statement such as ‘war is bad’ (or, equally, ‘war is good’) would score only a one because of its structural simplicity. In addition to providing a reasonably objective metric, studies in IC are important because they link the structure of knowledge with the ability of the knowledge holders to reach their goals – to be successful. That idea has been supported by research
in the fields of business (Wong, Ormiston, and Tetlock 2011), politics (Suedfeld and Rank 1976), and others.

Concurrent with the development of IC in political psychology, the field of education has been using a measure of ‘systematicity.’ There, it is understood that as people learn and grow, they develop and acquire knowledge with greater coherence or systematicity, which ‘refers to the mapping of systems of mutually constraining relationship, such as causal chains or chains of implications’ (Gentner and Toupin 1986, 277). To contrast the incoherence of independent facts or concepts, the laws of physics have a high level of systematicity and are highly useful in practical application.

Like Integrative Complexity, the study of systematicity is based on the assumption that more useful knowledge is more highly structured. Indeed, that as learners move from ‘novice’ to ‘expert’ the concept maps that they create show the structure and organization of concepts within their knowledge on a topic (Novak 2002; Novak 2010). The structure of those maps is scored by assigning a point value for features found on the maps, such as the number of concepts, the number of connections, and number of levels of hierarchy.

Although this is a rich field of research, it is not without its concerns. In a careful critique, Ruiz-Primo and Shavelson (1996) noted multiple issues. First, there is a need for expert knowledge when scoring maps (Cañas et al. 2003). Only an expert can see if a student has an effectively structured understanding of the topic. That limitation relates to another issue, that systematicity can only be used to measure the structure of knowledge that is well known or generally accepted as valid. This is a problem for interdisciplinary studies because there is no generally accepted answer to resolving our many wicked problems.

Additionally, there are many approaches to scoring maps for systematicity (cf. Wallace and Mintzes 1990; Cañas et al. 2003) which may cause confusion when comparing maps and their scores. Among those many scoring systems, scoring for systematicity allows for a wide variety of relationships between concepts on its maps that may be accepted as valid. For example, the statement, ‘flowers are larger than their seeds’ relates the size of the two things they represent by their concepts. Consider that proposition in comparison with a causal proposition stating, ‘planting more seeds will cause the growth of more flowers.’ In that, somewhat simplistic, comparison both propositions have much the same structure, so may be judged as equally valid, having the same systematicity score. However, the proposition about planting seeds is more immediately useful in practical application. The proposition about the size of seeds may also be useful – but only with an additional reason for the sorting process. The same general idea would apply to more complex conceptual systems where knowledge that is relatively trivial might have the same systematicity score as knowledge that is more profound and useful.

To summarize some insights from this section, theories are more useful in practical application for reaching goals when they are more structured. Two established methods for evaluating structure are Integrative Complexity and Systematicity. Both methods agree on the benefit of structure. Integrative Complexity is useful for surfacing and evaluating the tacit knowledge in mental models. And, research in IC shows the relationship between structure of knowledge and the performance of individuals and teams. This includes the evaluation of indeterminate or emerging knowledge – how individuals and teams perform ‘in the wild.’ On the downside, IC is difficult to learn, and the relationship between concepts is not clearly defined. Similarly, measuring systematicity is difficult to
learn and requires subject matter expertise and is focused more on learning of existing knowledge rather than evaluating usefulness of knowledge in the wild (although there is expected to be some overlap between the two).

Integrative Complexity and Systematicity have their strengths and weaknesses. Notably, neither of those were developed to evaluate the structure of academic theories and their potential for effective application. Therefore, a new approach is needed.

**Integrative propositional analysis**

Integrative Propositional Analysis (IPA) is an emerging method for rigorously evaluating the structure of academic theories with some level of objectivity. IPA avoids the assumptions of pre-determined categories of boxes and the confusion of a wide variety of relationships between concepts. IPA is focused on evaluating formal/written conceptual systems where concepts are linked by causal relationships.

**IPA Process**

Briefly, IPA is a six-step process for ‘deconstructing’ theories found in academic texts into their constituent causal propositions, mapping the relationships of those propositions, and then evaluating the structure or internal coherence of the resulting map. Recall that a theory may have one or more propositions and each proposition may include one or more concepts (and, possibly, a description of the relationship(s) between the concepts). Each concept may be understood as a variable representing something measurable in the real world.

Similar to studies of systematicity, IPA relies on the use of maps that include concepts and connections. However, where systematicity allows for many types of connections (e.g. size, hierarchy) between concepts, IPA allows only causal relationships between concepts; other types of connections would not be counted or scored as valid. Additionally, IPA enables the integration of knowledge from a wide range of academic theories and expert knowledge. Finally, IPA is relatively easy to learn and does not require subject matter expertise for evaluating theories.

As a brief overview, those steps are presented here, from Wallis (2016a, 585) the terms will be defined below:

1. Identify propositions within one or more conceptual systems (models, etc.).
2. Diagram those propositions with one box for each concept and arrows indicating directions of causal effects.
3. Find linkages between causal concepts and resultant concepts between all propositions (integrate propositions where concepts overlap).
4. Identify the total number of concepts (to find the Complexity).
5. Identify concatenated concepts.
6. Divide the number of concatenated concepts by the total number of concepts in the model (to find the Systemicity).

The first three steps are commonly used for knowledge mapping. For a simple, abstract example, the text of a theory might say, ‘Increasing B causes decreasing C while increasing A causes increasing C.’ That text is presented as a knowledge map in Figure 2.
Using Figure 2, we now follow steps 4–6. Here, we can see that there are three concepts (A, B, C). Therefore, using IPA, it has a Complexity of three. For systems thinkers, this might be thought of as a measure of the ‘simple complexity’ (simply the number of components in the system) of the theory in much the same way that one might evaluate the complexity of an ecosystem. An ecosystem with more species is more complex than an ecosystem with fewer species (we have not yet addressed their interactions). Simple complexity may be thought of as a general measure of the conceptual ‘breadth’ of a theory because by having more concepts in a theory the theory will relate to more things in the non-theoretical (real) world.

However, breadth does not guarantee depth. A theory containing many concepts is like a dictionary – all the pieces are there, but their arrangement might not be very useful for understanding the problems of the world. A better measure for the usefulness of a theory, for supporting understanding and action, is Systemicity.

Here, I feel the need to clarify the difference between terms that have a somewhat or seemingly coincidental similarity. Systematicity is used primarily in the field of education as a measure of student’s knowledge based on structure, whereas Systemicity is a measure of the structure of academic theories and related expert knowledge. While there can certainly be some overlap between the two (e.g. students progressing in their learning of academic theories) the two use different scoring mechanisms.

With IPA, Systemicity is a measure of how systematic a theory is, how the interconnectedness or coherence among the concepts within a theory. It is found by dividing the number of ‘concatenated’ concepts by the total number of concept in the theory. Simply put, a concatenated concept is a box with more than one causal arrow pointing towards it. In Figure 2, there is one concatenated concept (C – because it has two causal arrows pointing at it) and three total concepts (A, B, C). Therefore, the Systemicity of that theory is 0.33 (the result of one divided by three).

From a systems thinking perspective, it is worth noting that the idea of Systemicity helps us to avoid the trap of ‘simple causality’ by encouraging the development of a

![Figure 2. Simple abstract example of a causal knowledge map.](image-url)
more complex web of interconnections. We will explain more about the importance of Systemicity below.

**Integration**

IPA is also used to integrate theories and quantify the improvement of theory based on that structural integration. A simple example is provided in Figure 3. Please note here that abstract examples are useful for making the point with greater clarity about structure and to avoid quibbles over details (a more concrete example will be provided later). Or, to put it another way, for structure we are looking more between the boxes than within the boxes.

On the left side of Figure 3, there are two theories from different disciplines. Here, arrows represent the direction of causality (e.g. increases in A cause increases in B) while solid arrows represent ‘causes more’ and dashed arrows represent ‘causes less.’

Readers may note that theory #1 and theory #2 contain the concept C so the two theories may be said to overlap at C. Therefore, they may be integrated with some level of rigour and objectivity to form theory #3. While this leaves out some kinds of relationships (e.g. differences in size) as discussed above in conceptual maps, this process supports and facilitates the ability of interdisciplinarians for ‘utilizing and then transcending’ (Newell 2007, 263) the theoretical perspectives drawn from fragmented disciplines. Indeed, the measure of Systemicity may be thought of as a measure of ‘how much’ transcendence has occurred because the process of integration (often) results in more structured theory.

Evaluating the advancement of this hypothetical theory with IPA, the reader may note in Figure 3, that Theory #1 has a Complexity of three, and Theory #2 has a Complexity of two. Both have a Systemicity of zero (lowest possible) because there are no concatenated concepts (more than one causal arrow pointing at a concept). Theory #3 (in contrast) has a Complexity of 4 and a Systemicity of 0.25; an improvement on both dimensions suggesting that theory #3 will be more useful in practical application than #1 or #2.

Of course, the real world of analysing and integrating theories is a bit messier. Figure 4 provides an example of the creating a visual map from a theory found in an academic text. Although the text may be difficult to read, Figure 4 provides a rough overview of visual mapping in action. Starting with a Deming’s theory of power within organizations, we identify propositions, including concept and their causal relationships. For a better view, please access the original text here: [http://curiouscat.com/management/dictionary/demings14points](http://curiouscat.com/management/dictionary/demings14points) and the resulting map here: [https://kumu.io/Steve/draft-fink-power-demming](https://kumu.io/Steve/draft-fink-power-demming)

**Figure 3.** Integrating/Synthesizing two theories into one.
When applied to theories found in textbooks and the academic literature, this approach to integration can be quite useful for students considering multiple theoretical perspectives (Wright and Wallis 2019). It can also be useful for interdisciplinary research teams in the early stage of a project as they integrate theoretical perspectives to support an inventory or initial diagnosis for a situation or research problem. With an integrated theory, they will be able to identify knowledge gaps and specific needs for additional research and/or expertise (more on this below).

**The relevance of complexity and systemicity**

This section presents background research on the measures of Systemicity and Complexity to support the idea that interdisciplinary scholars will benefit by using IPA to more easily improve their theories and so improve our collective ability to take effective action on complex problems of the world.

Using IPA measures of Complexity and Systemicity, it is possible to compare theories more rigorously and objectively than before. We can also track the development of theories over time. That kind of tracking has been done in a classroom setting to evaluate and support student progress by visualizing and evaluating how the understanding of course material has changed during the semester (Goltz 2017). It has also been done to evaluate the progress of theories of sociology (Wallis 2015a) and psychology (Wallis 2015b). That kind of tracking could be easily accomplished by an interdisciplinary team collaborating to understand and resolve a real world problem. If the team’s integrated theory is not an improvement over their individual theories, they should continue to
investigate and integrate until they generate a significantly better theory before using that theory to support recommendations for action.

Here, for example, is a study of electrostatic attraction theory (a theory from physics, later labelled as Coulomb’s Law) showing its evolution from ancient times through the scientific revolution (see Figure 5). Note that the theory starts at a lower level of Systemicity in ancient time (corresponding with its limited usefulness in practical application); then, increases through the scientific revolution to a high level of Systemicity (corresponding with a high level of usefulness). We have not yet seen this kind of improvement in theories of the social sciences or humanities.

As scholars and practitioners, we may be able to achieve such improvement (or, at least, make a significant improvement to the usefulness of our theories) by integrating theories from multiple disciplines. When theories are integrated, the resulting theory has a higher IPA score (in Complexity and/or Systemicity) which reflects the theory’s greater usefulness in understanding and resolving the problem under study (Wallis 2014c).

For example, in ‘Response to a Challenge: Using Integrative Propositional Analysis to Understand and Integrate Four Theories of Social Power Systems’ (Wallis and Johnson 2018), the authors integrate theories from organizational studies (bureaucratic systems), business (Deming), and political studies (totalitarian governmental systems) drawn from an analysis by Fink (2017). Table 1 shows the IPA scores for each theory and for the integrated version of the theories.

The integrated version of the theory has a greater Complexity than any of the component theories. The resulting Systemicity is greater than the average of the component theories but roughly equivalent to two of them. Recall here that Systemicity is a measure of integration where integration ‘produces more accurate or complete understanding and makes more effective action possible’ (Newell 2001, 22).

The relationships among existing and integrated theories may be seen more easily in Figure 6 which shows the theories from Table 1.

The reader may note how the process of integration in that paper improved the Complexity of the theory (essentially the sum of all concepts from all theories, less the duplicates/overlaps between them). Also, the process of integration has improved the average level of Systemicity. However, we have the potential to greatly improve the Systemicity

Figure 5. Evolution of a theory over centuries (Wallis 2010a).
of the theory and significantly improve its usefulness for solving real world problems. To do that, we would need to integrate more theories into this one (drawing those theories from primary and/or secondary research). Those additions would be expected to include propositions showing causal relationships that provide the missing pieces of the puzzle (perhaps based on new research).

It is important to recall, or at least reinforce, the notion that this new ability to measure the structure of theories with some level of objectivity lets us see a new path to improving our theories through subsequent iterations of integration.

To better understand the usefulness of Figure 6 for mapping the potential usefulness of theories, it is worth noting that the measures of Complexity and Systemicity may be applied to conceptual systems of many kinds. Recall that a conceptual system is something which helps us to understand and engage the world. Therefore, in addition to theories of the social sciences, it is also possible to use IPA to analyse laws of physics, policy models, and other theory-like texts because they all contain propositions about how the world works. That ability to compare and integrate theories from multiple disciplines represents a significant advance for IS and the relevance of IS scholars and practitioners.

**Table 1.** IPA scores from five theories (Wallis and Johnson 2018).

<table>
<thead>
<tr>
<th>Number</th>
<th>Theory</th>
<th>Complexity</th>
<th>Systemicity</th>
<th>Discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Totalitarianism</td>
<td>31</td>
<td>0.07</td>
<td>Political Science</td>
</tr>
<tr>
<td>2</td>
<td>Bureaucracy</td>
<td>48</td>
<td>0.17</td>
<td>Organizational/Sociology</td>
</tr>
<tr>
<td>3</td>
<td>Command/Control</td>
<td>29</td>
<td>0.10</td>
<td>Business/Management</td>
</tr>
<tr>
<td>4</td>
<td>Deming</td>
<td>19</td>
<td>0.16</td>
<td>Business/Management</td>
</tr>
<tr>
<td>5</td>
<td>Integrated</td>
<td>109</td>
<td>0.17</td>
<td>Interdisciplinary</td>
</tr>
</tbody>
</table>

**Figure 6.** Complexity and Systemicity of individual and integrated theories showing directions of current (improving Complexity) and future (improving Systemicity) improvement.
Each law of physics has a Systemicity of 1.0, but each tends to have few concepts. Those would be placed at the top, left hand corner of Figure 6. In contrast, theories of the social sciences tend to be clustered in the lower left quadrant of Figure 6.

As theories are integrated it is relatively easy to create theories of greater Complexity. Then, as scholars integrate additional theories and conduct more primary research (more on this in the following section), the newly integrated theories will move toward the upper right quadrant – representing their greater usefulness for understanding, engaging, and solving the wicked problems of our times.

Before we solve the problems of the world, the short-term goal is to identify the Complexity (as shown above) and Systemicity of our theories – and improve them through integration. While the science of conceptual systems is still in an early stage, it seems that doubling the Systemicity of our theories is likely to double our ability to understand complex situations and enact effective change, based on the evolution of theories shown in Figure 5 and studies of mental models (cf. Suedfeld, Tetlock, and Streufert 1992; Wong, Ormiston, and Tetlock 2011).

**What to do and what to look for**

In general, IPA suggests that we should strive to improve the Complexity and Systemicity of our theories; those serve as a ‘compass’ pointing the way to structural improvement. That perspective also means that we will be creating theories with more Complexity (containing more concepts). The inherent difficulties in such an arrangement (due to the limits of our individual minds for grasping a large number of concepts) suggests the benefit of collaboration between scholars. A very useful tool for supporting collaboration is the use of online mapping platforms (noted above in the section on mapping).

The following sub-sections provide additional techniques for improving theories using visual mapping and IPA for IS academics striving to understand relatively abstract situations, scholars and practitioners investigating real world phenomena, and students seeking to master classroom material.

**Investigations to find the missing links**

Because most theories are fragmented (having few causal connections, so low Systemicity) scholars will have many opportunities to improve those theories by identifying additional causal links between concept to improve the Systemicity. IPA is agnostic as to the type of research that should be used to find those links so scholars may find links by integrating additional existing theories, conducting original qualitative/quantitative research, and/or adding insights from experts obtained through interviews or action research. Here, I caution readers to avoid speculation except as a starting point for developing hypotheses; and, only then, leading to more rigorous research.

**Abstraction**

While every theory is an abstraction of the world, each concept within that theory may exist at a different level of abstraction. For example, let us look at three concepts, ‘apple’, ‘orange,’ and ‘fruit.’ Apples and oranges are relatively concrete while fruit is a
more abstract concept. It may be difficult (as they say) to compare apples and oranges, but that is easier than comparing either with fruit because the terms (apple and fruit) are each at a different level of abstraction.

It is worth mentioning, that each concept may be understood as an attribute variable. And, that each person has different models. Thus, by better understanding the interrelationships between those concepts, we gain new insights into how to support multidisciplinary integration research. Indeed, this kind of approach opens a new door for integrating theories within and between disciplines to impel the sciences toward an interdisciplinary direction. Following this approach, a hypothetical group of scholars should first seek to shift their individual theories toward the same level of abstraction before striving to link them. The resulting, more effectively integrated theories, would pave the way for more effective interdisciplinary collaboration and greater effectiveness in practical application. (Wallis 2014a, 195)

Applying that insight to support easier integration of theories, we might imagine one researcher who has developed a theory relating to ‘emotion’ (more abstract) while another researcher has developed a theory relating to ‘anger’ (more concrete). Before striving to integrate their theories, those researchers should consider shifting the more concrete concepts to the more abstract level – or visa-versa.

**Core and belt**

Figure 7 shows the integrated (theory #5) from Table 1. Unfortunately, limitations of space means that the text is not legible here. Still, an important idea here may be communicated because readers may see that there are many concepts and causal connections between

![Figure 7](image-url)
them. Please also note that the larger bubbles represent concatenated concepts (recall that concatenations represent concepts that are better understood so are more useful for enacting desired change).

In Figure 7, readers may see a ‘core’ of concepts at the centre of the map that are more connected and a surrounding belt of less-connected concepts. If we were to remove the belt, the Complexity would be reduced to 58 while the Systemicity would be increased to 0.36 (because a higher percentage of the remaining concepts will be concatenated). It is worth noting that the level of Systemicity is more than double the Systemicity of any component theory in Table 1. The resulting theory then will be more useful for making successful decisions. However, the scope of those decisions will have been reduced. That is, the decisions will apply to a reduced range of concepts.

**Tradeoffs**

The above example serves to highlight an important point about integrating theories. While the goal is to create a theory of greater Systemicity, we often find ourselves with a theory of greater Complexity. That Complexity provides two paths for increased Systemicity. First, having more concepts available makes it easier to see where additional research might find causal connections among them. Second, it is possible to focus on the core of the theory by purposefully ignoring concepts that may be irrelevant to the problem (Wallis 2009).

Having more concepts is generally better than having fewer and reflects some level of improved understanding. For one example, it is generally considered preferable to have a dictionary with more words than fewer. For another example, a constitution, or charter may be understood as a kind of theory about how an organization works in the world to achieve its goals. We might expect that an organization with a more complex charter will be more successful than an organization with a simpler charter to the extent that the charter represents the organizational understanding of the world.

One measure of success might be the longevity of the organization. In comparing the two, the UN is much longer lived than the League of Nations. And, it is interesting to note that the charter for the UN is much more complex than the charter for the League of Nations (Wallis 2011). That is not to claim that the complexity of the charter is the only factor affecting the longevity. It is also worth noting that the UN also receives about ten times the level of funding (in constant dollars) than did the League.

The same general idea applies for research projects where one might be tracking data from multiple concepts. The more concepts, the more difficulty and expense in tracking them. These examples serve to show that having a more complex theory is good – but it is also expensive.

**Seeing the invisible**

The mapping process also supports a related, and more visually oriented, approach toward theoretical completeness, through a technique known as ‘seeing the invisible’ or ‘looking for the blank spaces.’ As shown in Figure 8, those missing concepts and arrows represent knowledge gaps which may be (and should be) filled with primary and/or secondary research, and/or bringing additional expertise to the research team. While no specific
numbers are available, we can generally say that there will be fewer knowledge gaps as theories move toward greater Complexity and Systemicity.

Here, the scholar begins with a knowledge map from a theory showing the concepts and their causal connections which serves as a guide. Looking at such a map, it is relatively easy to see where more research and/or more theory is needed by simply identifying those concepts which have one or no causal arrow pointing towards them. That place where an arrow is not found is a white space, or blank spot on the map. There, in ancient times, the cartographer might write on the map, ‘here be dragons.’ Today, instead, we may write, ‘here is the need for more propositions.’ It becomes a relatively straightforward task to search an academic database for the concept, and find existing research to indicate causal arrows between the concepts. Or, if no theory exists, there is an opportunity for primary research to identify those causal connections.

If researchers find themselves with theories from different disciplines, where there are no overlapping concepts, there are a number of approaches. The first is to continue the review of the literature – specifically searching for the concepts within those theories. The goal is to find a theory that will provide a causal bridge between the concepts. Second, there is always the opportunity for original research to find that hidden bridge. A third approach to developing theory maps that are more Complex and Systemic is to engage stakeholders in a mapping session. This is best done ‘live,’ although online mapping is certainly possible or creating maps from one-on-one interviews. Such maps may be used to support organizational decision-making and support classroom learning.

**Live applications – consulting and classroom**

That focus on causal mapping is increasingly finding its way into practice.

Based on the precepts of IPA, and an award winning paper (Wallis and Wright 2015), ASK MATT is a game-like process of collaborative causal knowledge mapping to help clients bring to the surface, identify, and link their theoretical perspectives. Process participants choose a topic of collective interest, then take turns creating and placing self-identified concepts and the causal connections among them. With each piece added to the map, the group makes a critical judgment as to the acceptability of the piece. The ‘scoring’ process encourages participants to create a map with greater Complexity and Systemicity. Although systems terminology is not used, clients presenting their maps begin using systems thinking – simply because they have been following systems-based rules to create causal connections and feedback loops. This approach has been used with clients in a variety of industries – primarily for strategic planning but also for team building and theory development.
Teaching IS in the classroom requires some special considerations (Szostak 2007a). This is particularly so where students are learning and integrating theory. According to Bloom’s taxonomy (Krathwohl 2002) education may include objectives of knowledge, comprehension, application, analysis, synthesis, and evaluation. Students in the classroom often have difficulty synthesizing theories. Teachers and students would benefit by using IPA (reflected in the rules of the ASK MATT process) to support the synthesis of knowledge (Goltz 2017). For teachers, see the teacher’s guide here: https://practicalmapping.com/

**Loops and leverage points**

Systems thinkers know to look for feedback loops (cf. Senge 1990; Senge et al. 1994) where changes in one concept will lead through changes in other concepts and eventually back to cause changes to the first. The same idea applies to developing better theories. We anticipate that the better theories will have more loops although, as yet, we do not have research indicating ‘how many’ loops might be optimal.

As theories improve in Systemicity, they will tend to naturally evolve in the direction of having more loops (as they will have more connections). Of course, it is certainly possible (and probably desirable) to purposefully seek to develop more loops in those theories.

For followers of Senge (and some other systems thinkers), it may be worth noting here that the phrase ‘positive reinforcing loop’ (and its contrary, the negative loop) do not apply to IPA because those terms essentially relate to people’s preferences; their view on what they want to gain or a direction they want to change the system. One person’s ‘positive’ might be another person’s ‘negative’ depending on their personal desires. Instead, IPA is focused on a relatively objective structural evaluation of the situation.

Once the multiple loops have been identified, it is possible to identify the points where two or more loops intersect (at an overlapping concept). We call that concept a ‘leverage point.’ Action taken at that one point will affect both loops and so indicate a more useful point of intervention than any other point in either loop.

This is a different perspective than understanding a leverage point as a ‘silver bullet … miracle cure’ (Meadows 1999, 1) which is more intuitive or ad-hoc compared with the structural perspective of seeing a leverage point as the overlap between two loops. In one of Meadows’ examples, the leverage point for successful organizational change was obvious to the consultant, but invisible to the corporate managers despite their familiarity with the system. A more objective perspective on structure seeks to shift our field from intuitive art to rigorous science.

Relying on intuition is likely to lead to disagreements over what point of the system might give the most leverage – leading to argument, conflict, and confusion. In contrast, having a clearly defined point on a map suggest a more rigorous and objective understanding that will provide a common language so people can work together more effectively.

**Universal language for integrating theories**

For some, the generalist perspective of IS suggests that disciplinary integration is not possible because each discipline is fragmented into sub-disciplines – each having its own language (Repko and Szostak 2017, 222). Certainly, every discipline has its theories.
And, for each discipline, those theories serve as a framework for understanding and engaging our world. Importantly, the IPA perspective shows that there is something similar across all theories from all disciplines. Each theory includes concepts (relating to things in the real world), and indicates causal relationships among those concepts (relating to relationships in the real world). That commonality among theories of many disciplines (along with the ability to measure their structure with rigour and some level of objectivity) suggests a ‘common language’ among disciplines.

We see those commonalities in theories across the sciences and the humanities – from psychology to physics and everywhere in-between. A climatologist studying global warming might use a causal proposition to say ‘more use of fossil fuels causes increased temperature of the Earth.’ Similarly, a psychologist might use a causal proposition such as, ‘the more we become friendly with individuals who don’t accept the idea of global warming, the more they will believe us when we talk to them about the dangers of using fossil fuels.’ The similarity is not in the topic or the concepts. The similarities are at a deeper level – that there are concepts and there are causal relationships between them (and, we may measure their structure to evaluate them and point the way toward improvement).

Let me emphasize here the importance of causal relationships because without them, theories lack any significant power for explanation or effective application. Indeed, ‘concepts that cannot be identified with some precision in terms of phenomena, causal links, theories, or methods are therefore so vague as to be of questionable scholarly utility’ (Szostak 2002, 114).

Without that common language, we are likely to have only weak integration that (so far) does not seem to have been highly useful in advancing the field. For an example of weak integration, consider a simplistic theory of two concepts. One is ‘changes in global mean temperature’ (part of climate science), the other is ‘communicating the importance of global warming to everyone’ (perhaps from communication science and/or psychology). While both concepts may be very important, the lack of causal connections between those concepts, and the very low number of concepts mean that the theory will not provide a reliable guide to understanding and addressing the problem of global climate change. Indeed, such simplistic theories cause even well-intentioned individuals to be ‘impervious’ to evidence, reasonable arguments, and deeper learning (Wallis and Valentinov 2016a).

We can avoid weak integration by having and using a common language of measurable concepts and causal connections to find and improve the structure of our theories. That will improve our ability as IS scholars and practitioners to study and understand complex problems; and, to support collaboration among disciplinary experts. It also provides a rigorous and reasonably objective path to integrate or synthesize theories within and among disciplines. Finally, in our consulting experience, this approach encourages clients to think in terms of systems, causality, and measurable concepts which pushes their thinking towards new and deeper understandings.

Limitations

As with any methodology, IPA has its limitations. More so, perhaps, because it is a method in its early stage of development. Doubtless, as it develops, interdisciplinary scholars and practitioners will identify additional limitations and opportunities.
IPA was originally developed to evaluate and integrate academic theories. Since then, it has shown great promise for evaluating policy models (Shackelford 2014) because those models are explicitly set in the literature. It is not so useful for evaluating unsurfaced assumptions, or evaluating hidden mental models. Within that classification of formal theories, IPA is better for integrating and evaluating theories containing causal propositions. Because, synthesizing a set of bullet points merely adds to the complexity of a theory; which, in turn, may add as much to confusion as it does to the usefulness of the theory. Similarly, propositions are not useful for IPA when they do not present a clear and causal relationship. For example, ‘A may cause B’ would better serve as an invitation to study the relationship between A and B, rather than an indication that we should include such a fuzzy statement in a theory.

Because IPA is narrowly focused on the structure of theories, it can be ‘fooled’ by ‘fictional theories’ that have a high level of structure, but no grounding in reality, or otherwise unsupported by meaningful data.

Also, IPA is not useful for ‘aesthetic synthesis’ (Mansilla 2010), where that approach to integration is understood as a more artistic way to developing a more effective explanation of a situation or phenomena which may involve the use of metaphor. IPA, instead, is more focused on integration to improve useful knowledge.

In the process of education, Bloom’s taxonomy (Krathwohl 2002) notes the importance of having objectives of knowledge, developing student comprehension, application, analysis, synthesis, and evaluation. IPA is designed to be used only for synthesis, and one form of evaluation directed mainly at academic texts.

In short, while IPA provides a new and useful approach to integrating theories and evaluating the potential usefulness of theory based on its structure, IPA should not be used in a vacuum. Theories should also be evaluated (at a minimum) based on the adequacy of their underlying data as well as the relevance of the theory to the specific situation or problem being researched (Wright and Wallis 2019). IPA should always be combined with other methods to maximize the researchers’ efficacy; all of those others, being equally important pieces of the integrative studies puzzle.

Conclusion

While previously, the idea that theories should have a high level of structure has been well established in the literature, we have lacked a method for quantifying the structure of theories. That lack has impeded our collective ability to evaluate and integrate theories within and between disciplines.

This is an important piece of the interdisciplinary puzzle because, for interdisciplinary researchers, the process of integrating disciplinary theories or even insights has been problematic (Bammer 2013, 11). The field faces great difficulties in supporting communication among those trained in different disciplines with some suggesting that such communication may not be possible (Holbrook 2013). Based on empirical research, and successful application within and between disciplines, IPA seems to provide the missing piece to support integration by providing a common language and a deeper understanding of structure.

IPA is particularly useful for students and interdisciplinary teams for integrating their theoretical perspectives when they start to investigate a situation or problem. Additionally, this approach may be useful for the interdisciplinary researcher who, as a generalist, is
interested in facilitating the integration of perspectives of experts from many fields and/or synthesizing perspectives of people from very different communities and organizations. With these new metrics for pointing the way toward increasing Systemicity (improved integration for greater understanding and ability to take effective action), it is possible to advance our understanding more rapidly to develop more actionable theories to achieve our collective goals rather than ‘churning as theories are created, revised, appear and disappear’ (Wallis and Valentinov 2017, 743).

Integrative Studies also has the opportunity to serve as an accelerator for the sciences and the humanities. By using the common language of measurability, causality, and structure, we can help scholars within each discipline communicate more effectively with others to meet mutual goals.

Of course, IPA is not the be-all, end-all for the evaluation and integration of theory. As more scholars apply and test IPA, doubtless weaknesses will emerge. And, in time, a new generation of metatheoretical researchers will develop an improved approach to evaluating and integrating theories. However, we won’t know that something is missing from IPA until we go there and see.

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