

---

---

## Research Digest

# Complexity Theory, Action Research, and the Study of EFL Learner Motivation

Richard J. Sampson

*Gunma National University of Technology*

Action research has been widely used in educational settings for many years. However, recent interest in the application of complexity thinking to educational research, and conceptualizations of language learner motivation based on dynamic systems theory, may be argued to have a great deal in common with action research approaches to educational research. This paper first provides a brief overview of complexity thinking as it applies to learning environments. The paper then moves to express the ways complexity thinking is fundamentally intertwined with action research approaches to educational research. The paper examines in detail five priorities of complexity approaches to research in language learning—focus on change, focus on a specific level, attention to initial conditions, seeking out of attractor states, and research as a form of co-adaptation. Through this examination, the paper argues that action research might be used to provide valuable insights into the complex, situated motivational experiences of language learners and the classroom environments that they both form and are formed by.

アクションリサーチは数十年前から教育現場で広く利用されているが、近年教育に関する研究に応用されるようになったコンプレクシテイ・シンキング、そして力学系理論に基づいた言語学習者の動機づけの概念化は、教育研究におけるアクションリサーチに通じる点があるといえる。本論では、先ず、学習の環境で用いられるコンプレクシテイ・シンキングについて説明し、さらに、教育に関する研究で利用されているアクションリサーチとコンプレクシテイ・シンキングとの基本的な共通点について提案する。言語学習の研究で複雑

性理論 (complex approaches) を扱う際に意識すべき点、つまり、変化への着目・一つのレベルへの着目・初期状況への注意・アトラクター状態 (attractor state) の探索・共適応 (co-adaptation) としての研究の5つの点を考察する。この考察を通して、アクションリサーチを利用することで、言語学習者の複雑 (コンプレックス) だが状況に応じた動機づけ体験や言語学習者が形成し、また学習者自身が形成される教室環境に関して新たな洞察を得ることができると主張する。

Almost ten years ago, there was a call for diversification of foreign language learning motivation research design in Japan, involving more qualitative, longitudinal approaches (Irie, 2003). Furthermore, and in light of recent developments in L2 motivation research based upon socio-dynamic conceptions of the interaction between the self and the environment (Dörnyei, 2009; Ushioda, 2009), Dörnyei and Ushioda (2011) urged a re-thinking of language learner motivation research design to provide better fit with complexity thinking. This paper will review complexity theory with reference to learning environments, before looking at action research and what it may offer EFL learner motivation studies in the Japanese context from a complexity theory perspective.

## **Complexity Thinking and Learning Environments**

Learners and learning environments consist of, and are encompassed by, complex systems. As Somekh et al. (2005) write: “Human experience is characterized by complexity, and social science researchers need to resist the temptation to impose unwarranted order through the application of ‘one size fits all’ theories” (p. 3). In line with such complexity thinking, Dörnyei and Ushioda (2011) assert that in language learning motivation research, rather than “trying to isolate distinct motives and examine their operation in isolation, a more fruitful way forward would involve taking a *systemic* approach” (p. 92; emphasis in original). Motivation research that draws upon complexity

thinking recognizes that there is no division of the individual and the context, but that the two are interweaved such that individual motivation is the result of innumerable contextual and internal systems, whilst the context is equally the result of the emergent interactions of individuals within context (Ushioda, 2009; Volet, 2001).

Complexity theory has been defined by Larsen-Freeman and Cameron (2008a) as dealing with the study of systems that have the following characteristics (adapted from Larsen-Freeman & Cameron, 2008a, p. 4)

- complex (having many parts not all of which can be named, and not all processes can be tracked or described)
- dynamic (changing with time)
- non-linear (cause-effect relationships are not simplistic)
- self-organising
- open (allowing energy to enter from outside)
- adaptive (change in one area effects change throughout)
- emergent (self-organization may lead to something that is more than the sum of its parts)

To take an example from education, Figure 1 shows one possible representation of the numerous systems of which individual students are part and dynamically affect and are affected by. Spanning outward from the level of the individual, all of these different systems interact dynamically such that change at any level affects all of the other levels in some way—the systems are open and merged with each other. Although not shown in Figure 1, the individual is also composed of complex systems, such as motivational systems, identity systems, or neural systems, and any change to these systems affects change at higher levels, whilst change at higher levels also dynamically acts upon these (in theory) individual-internal systems. Moreover, this is but one simplified representation of the web of such systems—other representations might include, for example, student interest, family, significant other, socio-cultural, or global systems. The lines between

---

---

dots in Figure 1 represent communications (interactions) between systems, and whilst direct communication occurs most commonly between closer levels, any communication has effect throughout all levels of the systems, across different time scales (Davis & Sumara, 2006).

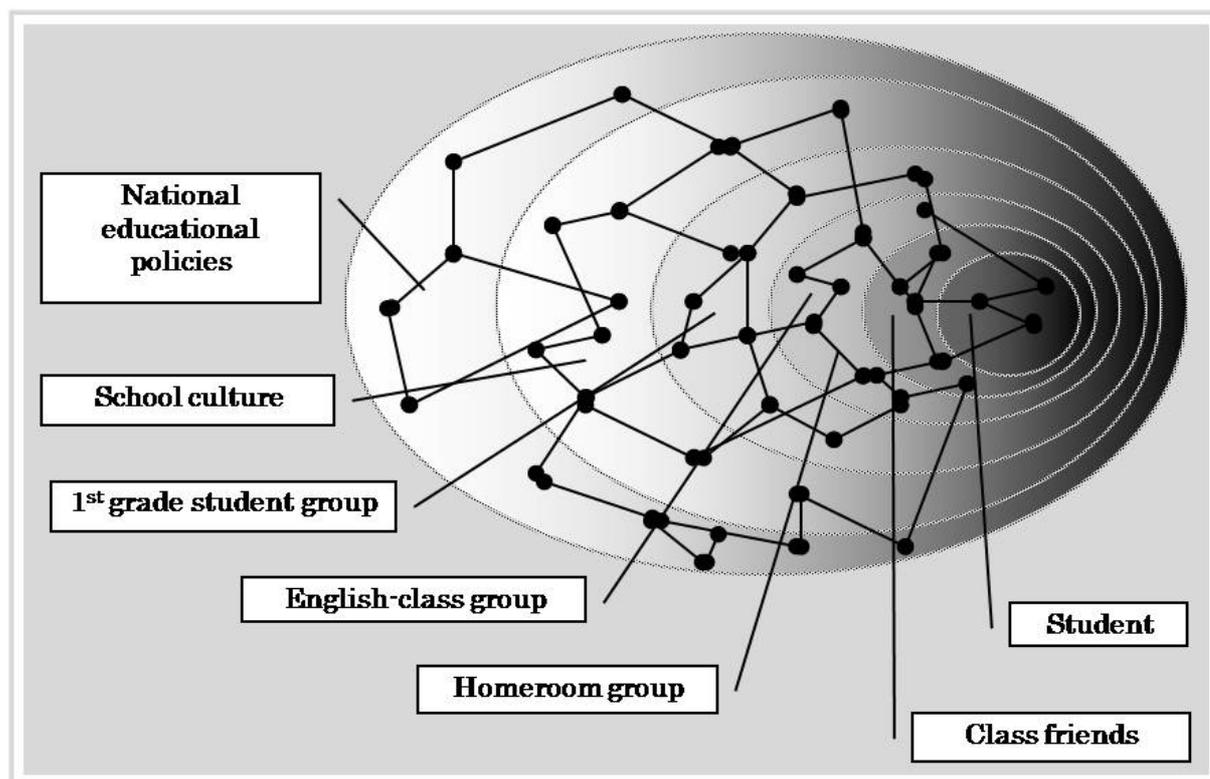


Figure 1. Partial abstraction of educational-institution related systems of a Japanese kosen (college of technology) student (adapted from Haggis, 2008, p. 171).

The form of interaction between systems at various levels, and indeed the scope and makeup of systems, is constantly changing and evolving across time, such that the conditions in place in a classroom on one day are never likely to be the same. This dynamic change might be represented as a set of all the possible configurations of the system at any point in time, known as the *state space* of a system (Spivey, 2007). System interactions may fall into more stable states known in complexity theory as *attractors* (Larsen-Freeman & Cameron, 2008a), visualized as basins into which the system, or systems, may settle,

representing states emergent from the dynamic interactions of these systems. Again, it must be noted that even within such attractor basins, systems are still in constant flux, and flux internally and across systems may cause movement from one more stable state to a different state (Spivey, 2007).

## **Action Research**

Action research is concerned with concrete issues and takes into account the complex reality of the human world and action therein. In education settings, classroom action research begins with the recognition of some problem or issue, at which point a change-action towards altering this situation is developed, followed by reflection upon the resulting outcomes. It may follow a cycle, with data from the effected change-action being used to create further change in a following cycle.

Action research is subjective, looking at a specific situation, and intervening “in a deliberate way ... in order to bring about changes” (Burns, 2010, p. 2). Consequently, the results are not intended to be generalizable, applying only to the particular situation in which they emerged. However, although action research is fundamentally subjective, Noffke and Somekh (2005) also argue that the process of deliberate data collection and analysis including triangulation provides a degree of objectivity that is different from mere reflection. As action research is “research conducted *with* people rather than *on* people” (Heron & Reason, 2006, p. 144; emphasis in original), whilst data collection and analysis may be conducted by certain of the participants, often participant-checking of analysis is used as one way to give a study democratic validity (Herr & Anderson, 2005).

## **What Does Action Research Offer?**

Action research designs mesh neatly with complexity theory

perspectives on research. Teacher-researchers attempt not only to capture the essence of the complexity of the learning environment, but also to describe its alteration through the perceptions of participants, whilst concurrently working cooperatively to produce more effective conditions for all participants. This may be one way to broaden research into motivation in Japanese EFL learning environments.

### **Focus on change**

Dörnyei and Ushioda (2011) urge that motivation research drawing on complexity theory ought to focus on change. In action research, teacher-researchers use longitudinal designs to “deliberately introduce ‘noise’ into the system” and this “investigation of the system’s response to a perturbation contributes to a deeper understanding of system dynamics” (Larsen-Freeman & Cameron, 2008b, p. 207). Whilst previous research may shed light on tendencies, we cannot hope to know the individual motivational states of learners due to the incredible array of particular system dynamics that make up learners and that learners make up at any point in time. However, complexity theory does offer the suggestion that energy applied at a variety of systemic levels may push systems out of stable states towards change (Mason, 2008), even if we cannot know which particular component effected the change. Horn (2008) asserts the following:

The study of learning communities as self-organizing systems offers an opportunity to understand the conditions that are in place when phase transitions occur. This, of course, does not allow us to predict the exact timing or consequences of particular transformations, but it does give us good clues about the appropriate parameters for the likelihood of subsequent phase transitions.

In action research motivation studies, data received from participants or from observation will have been influenced by the myriad different systems of which these individuals are part. This information is used

to effect change at the classroom level, and it is at this level that any further data, whilst potentially collected from individual students, must be analysed in a complexity sense. Consequently, rather than being able to say generally that students' motivation changed, from a complexity viewpoint, what is actually researched and analysed are the ways in which the classroom environmental change encourages students to note certain things, to become more aware of change to their self-views (Haggis, 2008). At the same time, cause and effect relationships cannot be drawn, as there are just too many different systems of which human individuals are part to make such simplistic linear claims. (p. 133)

### **Focus on a specific level**

As van Geert (2008) writes with reference to the study of complex systems, "it is strategically wise to conceptually reduce the complex system to a single dimension or very simple state space, in which the qualitative properties of the system dynamics can be observed" (p. 185). The majority of educational action research focuses on change at the classroom level and does not try to generalize beyond the conditions of the particular environment in which change is introduced. As such, action research into learner motivation might provide a detailed examination of the multiple influences between environmental and learner factors, and has the potential to provide insights into both emerging changes in the learner and the classroom environment linked to the introduced change (Dörnyei & Ushioda, 2011). Such study may provide glimpses of the conditions in place in the classroom environment at points of significant change, as well as detailing how change, such as perceived motivational change, occurs gradually over time in the system. In not attempting to generalize, action research recognizes that we cannot know all of the influences that make up the system(s) under study, as for example with human motivation, but that we can focus on one particular level and note how an introduced

change affects this level of the system.

### **Attention to initial conditions**

In complexity theory, the way the system is set up at the point at which study commences is of great importance (De Bot, Lowie, & Verspoor, 2007), as this composes the initial systemic landscape and influences the trajectory of change in the system. This is in direct parallel with action research, in which a detailed study of the initial problematic conditions leads to the introduction of some change-action attempting to address this feature, to collection of information about the change taking place, and to reflection upon this information with the potential for a further, revised change-action. This focus on exploring change based upon initial conditions might provide a valuable expansion to the current research into demotivating classroom elements for Japanese EFL learners (Agawa et al., 2011; Falout, Elwood & Hood, 2009; Kikuchi & Sakai, 2009).

### **Seeking out of attractor states**

In the action research process, change is introduced to the system with the intention of producing better outcomes or environments for participants (Nunan & Bailey, 2009). Action research aligns with complexity thinking in that it concerns “more the creation of *conditions* for change through self-organization rather than providing the exact blueprint or specific, detailed contents of the change” (Morrison, 2006, p. 4; emphasis in original). In this way, action research focusing on motivation might deliberately seek attractor states that parties experience as beneficial. Furthermore, as we are dealing with humans, action research describes the subjective process of change to perception of motivation and the conditions in place for emergence of patterns of stability in the classroom environment being studied.

### **Research as a form of co-adaptation**

Flood (2006) illustrates connections between action research and

complexity thinking in the form of a continuous process of unique methodological design taking into consideration the complexity and wholeness of that studied. From a complex systems perspective, the action research process itself might be seen as co-adaptation, as the various systems involved adapt dynamically with each other over the course of the project.

If we are interested in the complexity of which learners are part, qualitative methods, in providing a more detailed account of the learner's experiences and conceptualizations in the learner's own words, might give greater insights into the internal-external dynamic interaction that takes place in the language classroom. However, as action research involves an intentional change-action, various approaches to data collection may emerge over the course of the project in synthesis with the necessities of the environment. Mixed methods may be employed, for example, in the efficient design of participant checking of data analysis (Sampson, in press). In such a way, the processes of research co-adapt with participants involved in the particular context of study.

Action research is also conscious of itself as research. Most action research studies in educational settings involve a teacher-researcher diary (Burns, 2010) which is included as part of the analysed data. This meshes nicely with complexity thinking, as it recognizes that what is happening through the research changes systems at various levels—there can be no objectivity in a purely scientific sense, because human systems are too complex and co-adapt to each other (Davis & Sumara, 2006; Horn, 2008). In classroom action research looking at motivation, the teacher-researcher is part of the system under study and will affect different class members and processes in different ways across a study. Rather than ignoring or trying to minimize the impact of this, action research deliberately recognizes this co-adaptation.

## Conclusion

Through this exploration of the ways in which language learner motivation research might be informed by action research and complexity theory, both I, the writer, and you, the reader, have changed and will continue to change as the systems of which we are part interact with thinking brought about by this article (for better or worse). The discussion reflects the complexity of the world of which we are part, in turn giving rise to a complex range of different ways of understanding. The potential of action research for expanding the study of foreign language learner motivation in Japan to include complexity thinking was explored. The experience of this undertaking has, naturally, altered my ways of thinking and my own conceptions to this point, but has also influenced my notions of future possibility. These notions of future possibility will, in turn, influence my current behavior, such that there is a dynamic interplay temporally, across the person/researcher I was, am, and may be.

## References

- Agawa, T., Abe, E., Ishizuka, M., Ueda, M., Okuda, S., Carreira-Matsuzaki, J., Sano, F., & Shimizu, S. (2011). Preliminary study of demotivating factors in Japanese university English learning. *The Language Teacher*, 35(1), 11-16.
- Burns, A. (2010). *Doing action research in English language teaching*. New York: Routledge.
- Davis, B., & Sumara, D. (2006). *Complexity and education: Inquiries into learning, teaching, and research*. Mahwah: Lawrence Erlbaum Associates.
- De Bot, K., Lowie, W., & Verspoor, M. (2007). A dynamic systems theory approach to second language acquisition. *Bilingualism. Language and Cognition*, 10(1), 7-21.

- Dörnyei, Z. (2009). The L2 motivational self system. In Z. Dörnyei & E. Ushioda (Eds.), *Motivation, language identity and the L2 self* (pp. 9-42). Bristol: Multilingual Matters.
- Dörnyei, Z., & Ushioda, E. (2011). *Teaching and researching motivation* (2nd ed.). Harlow: Pearson Education Limited.
- Falout, J., Elwood, J., & Hood, M. (2009). Demotivation: Affective states and learning outcomes. *System*, 37(3), 403-417.
- Flood, R. L. (2006). The relationship of 'systems thinking' to action research. In P. Reason & H. Bradbury (Eds.), *The handbook of action research* (Concise paperback ed., pp. 117-128). London: Sage Publications.
- Haggis, T. (2008). 'Knowledge must be contextual': Some possible implications of complexity and dynamic systems theories for educational research. *Educational Philosophy and Theory*, 40(1), 158-176.
- Heron, J., & Reason, P. (2006). The practice of co-operative inquiry: Research 'with' rather than 'on' people. In P. Reason & H. Bradbury (Eds.), *The handbook of action research* (Concise Paperback ed., pp. 144-154). London: Sage Publications.
- Herr, K., & Anderson, G. L. (2005). *The action research dissertation*. Thousand Oaks: Sage Publications.
- Horn, J. (2008). Human research and complexity theory. *Educational Philosophy and Theory*, 40(1), 130-143.
- Irie, K. (2003). What do we know about the language learning motivation of university students in Japan? Some patterns in survey studies. *JALT Journal*, 25(1), 86-100.
- Kikuchi, K., & Sakai, H. (2009). Japanese learners' demotivation to study English: A survey study. *JALT Journal*, 31(2), 183-204.
- Larsen-Freeman, D., & Cameron, L. (2008a). *Complex systems and applied linguistics*. Oxford: Oxford University Press.
- Larsen-Freeman, D., & Cameron, L. (2008b). Research methodology on language development from a complex systems perspective.

- The Modern Language Journal*, 92(2), 200-213.
- Mason, M. (2008). What is complexity theory and what are its implications for educational change? *Educational Philosophy and Theory*, 40(1), 35-49.
- Morrison, K. (2006). *Complexity theory and education*. Paper presented at the Asia-Pacific Educational Research Association International Conference, Hong Kong.
- Noffke, S., & Somekh, B. (2005). Action research. In B. Somekh & C. Lewin (Eds.), *Research methods in the social sciences* (pp. 89-96). London: Sage Publications.
- Nunan, D., & Bailey, K. M. (2009). *Exploring second language classroom research: A comprehensive guide*. Boston: Heinle.
- Sampson, R. (in press). *The language-learning self, self-enhancement activities, and self perceptual change*. *Language Teaching Research*.
- Somekh, B., Burman, E., Delamont, S., Meyer, J., Payne, M., & Thorpe, R. (2005). Research communities in the social sciences. In B. Somekh & C. Lewin (Eds.), *Research methods in the social sciences* (pp. 1-13). London: Sage Publications.
- Spivey, M. (2007). *The continuity of mind*. Oxford: Oxford University Press.
- Ushioda, E. (2009). A person-in-context relational view of emergent motivation, self and identity. In Z. Dörnyei & E. Ushioda (Eds.), *Motivation, language identity and the L2 self* (pp. 215-228). Bristol: Multilingual Matters.
- van Geert, P. (2008). The dynamic systems approach in the study of L1 and L2 acquisition: An introduction. *The Modern Language Journal*, 92(2), 179-199.
- Volet, S. (2001). Emerging trends in recent research on motivation in learning contexts. In S. Volet & S. Jarvela (Eds.), *Motivation in learning contexts: Theoretical advances and methodological implications* (pp. 319-334). Oxford: Pergamon.

\* \* \*

**Richard Sampson** is a Lecturer at Gunma National College of Technology, Japan. He holds a Master of Applied Linguistics from the University of Southern Queensland and is a doctoral candidate at the same university. His research interests include learner motivation, possible-self theory, and complex systems theory applied to language learning. [sampson@gen.gunma-ct.ac.jp](mailto:sampson@gen.gunma-ct.ac.jp)