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Translator Education in the Light of Complexity Theory: A Case of Iran's Higher Education System

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Abstract

In the fast-growing world of translation studies, many students may not receive adequate training at universities. A new multi-facetted approach is therefore needed to be applied in translator educational programs to meet the students' needs and professional expectations. In order to describe the complex interrelations in translator education systems and propose a research framework that takes into account its dynamism, complexity theory is used as an analytical tool that proposes better ways of thinking about the world of education. This study attempts to bring new insights into translator education by showing how the main tenets of complexity thinking can be applied metaphorically in translator education and how the implications of this theory can be applied in translator educational programs at universities in the context of Iran's higher education system. According to this perspective, the competitive top-down approach, which is traditionally applied in Iran's educational system can no longer be effective and should be replaced by a participative bottom-up approach.

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1. Introduction

In line with the fact that in many research areas, multidisciplinary studies are gaining considerable importance and are vastly carried out, Translation Studies (TS) as a relatively new discipline has shown a great interest in applying findings of other disciplines to enrich and deepen itself. Concepts and frameworks from different disciplines such as sociology (e.g., Kafi, Khoshsaligheh, & Hashemi, 2015, 2018), psychology (e.g., Shaki & Khoshsaligheh, 2017; Shadman, Khoshsaligheh, & Pishghadam, 2019), and media (e.g., Abdi & Khoshsaligheh, 2018; Mehdizadkhani & Khoshsaligheh, 2019) have already been successfully applied in this developing field of study.

Training translators—as one of the main justifications which led to the establishment of the discipline of TS (Munday, 2012)—has attracted substantial attention and has been influenced by theories of education and psychology in the past two decades (Kiraly, 2000). Chaos/complexity theory, which is sometimes referred to as "complexity science perspective" (Tsai & Lai, 2010, p. 117) has shown an illuminating path in understanding different aspects of various disciplines, including translator education (Kiraly, 2006; Pishghadam & Ashrafi, 2013). This relatively new science, as well as its terms and concepts, have been applied analogically from physics into different disciplines within human sciences in an extended manner; including philosophy (Cilliers, 2005), psychology (Spivey, 2007), linguistics (Meara, 2004), cultural studies (Appadurai, 1990), first language acquisition and second language learning theories (Larsen-Freeman & Cameron, 2008). This study attempts to show how complex systems can be found throughout various realms of TS, in all its levels and subfields and how the application and implications taken from complexity theory can create changes and improvements in these areas. Therefore, the complexity approach is used to describe different topics of concern related to translator education by deducing the strategic implications of viewing the translation classroom and Iran's translator education system as complex dynamic systems.

This study is divided into three main parts. The first part explores origins of complexity theory, the key features of complex dynamic systems and the significance of the theory in TS and translator education, drawing upon the previous works in the area. The second part attempts to make theoretical and metaphorical analogies in the conceptualization of Iran's translator education system and translation classrooms in the light of complexity framework. The last part of the article is dedicated to final discussions and concluding remarks. It is hoped that this study can bring fresh insights to the realm of translator education and become the starting point for future investigations in this area.

2. Complexity Theory and its Origins

In various fields of study, there has been a radical shift from deterministic and static theories to more dynamic ones. Complexity theory, which is inspired by ideas of Prigogine and Stengers (1984) and originated mainly from physical and biological sciences, focuses on relativity, nonlinearity, unpredictability, feedback sensitivity, and co-evolution. This theory tries to show that how different parts of a complex system can interact with each other in order to manifest a collective behavior which leads to the emergence of a complex system, and how this system, at the same time, can interact with its environment. This theory reveals that not all the phenomena are orderly, reducible, predictable, and determined (Prigogine & Stengers, 1984).

3. Characteristics of Complex Systems

The central focus of a complexity approach is the study of the behavior of complex systems, which are, based on Larsen-Freeman and Cameron (2008), characterized by six main features, the most important of which are dynamism, openness, non-linearity, and unpredictability. The other ones include complexity, adaptability and feedback sensitivity, self-organization and emergence, and strange attractors. These features are briefly described in this section.

3.1. Openness and Dynamism

In open systems, unlike closed ones, there is an interaction between the system and its

surrounding environment which causes an ongoing change, making the system dynamic. The major features of closed systems, which are static, fixed, and *being*, are replaced in open systems by dynamic, flexible, and *becoming* (Pishghadam & Ashrafi, 2013).

A concrete example of an open dynamic system is a language, which is open to all kinds of influences and changes continuously; and at the same time, maintains its identity as the same language (Larsen-Freeman & Cameron, 2008).

3.2. Complexity

A complex system consists of multiple diverse and heterogeneous elements from which complexity is induced. In such a system (e.g., a forest), there are a large number of independent and heterogeneous components (agents and elements) constantly interacting with one another, and there are various ways for the evolution of the system (Whitesides & Ismagilov, 1999). Complex systems are constantly in the process of unfolding and evolution (Arthur et al., 1997).

One important characteristic of a complex system is that the whole is not the sum of its parts; in other words, it transcends them. Water, as an example, is composed of oxygen and hydrogen. If these elements are added to fire separately, they can build and sustain it. However, if they are mingled to create water and then added to fire, they can extinguish it.

3.3. Adaptability and Feedback Sensitivity

Feedback is defined as a "circular process of influence where action and actor affect each other" (Pishghadam & Ashrafi, 2010, p. 55). Feedback sensitivity of a complex system means that feedback −positive or negative, internal or external− during the mutual interaction of the agents and elements, can play an important role in the subsequent actions of the agents and finally in the system as a whole. In order to ensure its survival, the system adapts itself according to the new situation caused by the received feedbacks. In other words, in order to maintain its stability, the system, which is flexible enough, goes through continuous adaptation. If we take first language acquisition as an example, feedback, from parents or peers, can cause changes in learning.

3.4. Self-Organization and Emergence

In order to meet their needs, agents within a complex system, form new structures, networks, and connections. In this way, they self-organize themselves which is possible through the system's adaptation in response to changes. Self-organization sometimes can lead to a new phenomenon at a larger scale, called *emergence*. Emergence, generally, refers to how the detailed structures, behaviors, and relationships at a smaller scale, can lead to some other behaviors at a larger scale (Larsen-Freeman & Cameron, 2008). Self-organization is the full, final and positive exploitation of emergence; in other words, even when the environment is changing the system self-sustains and aligns itself to the problems (Müller -Schloer & Sick, 2008). Therefore, self-organization can be referred to as a special kind of emergence.

Bourdieu's (1989) *habitus*, which refers to an individuals' social and mental structure that emerges from and affects their actions, can be considered as a concrete example of emergence through self-organization in a complex system. Habitus is considered as the product of internalizing the social world's structures that emerge from the action, reaction, and adaptation in the social world.

3.5. Nonlinearity and Unpredictability

The main properties of Newtonian mechanics which are determinism, predictability, and linearity, are challenged by complexity theory, which is rooted in relativism, unpredictability, and non-linearity. Lorenz's *butterfly effect* (Gleick, 1987) is an illuminating example of unpredictability and nonlinearity of complex systems. Weather systems, according to Lorenz, are complex systems which are likely to be influenced by small changes. That is, a huge consequence (a tornado) can be caused by a small change (a butterfly's flapping wings) in the initial condition of a complex system (e.g., the weather system). Lorenz believes that the behavior of a chaotic complex system can be predicted only if one can account for all the small changes influencing the system. In short, nonlinearity proposes that

not only there is no proportionality between cause and effect in these systems, but also there may be no exact cause for a particular phenomenon.

3.6. Strange Attractors

Strange attractors are defined as 'magnetic' forces that draw complex adaptive systems towards specific trajectories which are considered as the focus of energies in the system (Wheatley, 1994; Pascale et al., 2000). A complex dynamic system tends to move towards strange attractors. These attractors can provide structure and coherence in the system by restricting it into a small region of its state; and in this way, they can create order in such a dynamic system (Wheatley, 1994; Stacey, 2003).

4. Significance of Complexity Theory in TS

The most significant shift that complexity theory can bring to TS may be the view that the world is not comprised of stable and unchangeable entities; rather, it is composed of changeable and adaptable phenomena, and it is the dynamics of the system that may create any perceived stability. Viewing translation from chaos/complexity theory perspective may disclose some interesting shared grounds both at macro and micro levels. At the micro-level, translation itself as a complex phenomenon, the process of translation including the translator's mind and socio-cognitive system such as his background, culture, habitus (Bourdieu, 1989), values and beliefs (Hatim & Munday, 2004), the translation classroom and the interactions of teachers and learners, all can be considered as complex, dynamic, emergent and continually evolving systems. At the macro-level, the translation industry including human agents (publishers, translators, receivers) and non-human elements (translation aids such as dictionaries and electronic tools, sociocultural features of a literary system, or multimodality of the text in question can be regarded as complex dynamic systems (Pishghadam & Ashrafi, 2013).

Pishghadam and Ashrafi (2013) are among the few who have applied concepts of complexity theory in TS. Using chaos/complexity theory as an analytical tool, they have taken a new look at the process of translation and conceptualized Iran's translation industry as a chaotic complex system with its various elements and agents. Despite this pioneering application of complexity theory into translation industry, there are still many gaps to be filled in other areas of TS such as translator's socio-cognitive issues, translator education (See Kiraly, 2000; Pym, 2009), translator competence (See PACTE, 2009; Khoshsaligheh, 2015), among others. This study is an attempt to fill one of these gaps by introducing this new evolutionary approach to the realm of translator education.

4.1. Complexity Theory in Translator Education

Literary and non-literary translation is changing rapidly both as a field of study and as a profession. The considerable increase in the volumes of translations commissioned by many translation markets and the large-scale translation projects, all indicate this exponential change in the translation field and market place. Yet several studies indicate that the educational practices for training translators do not meet the needs and expectations of the market; and innovations which can keep pace with the changes in the market are not employed in translation pedagogy (Kiraly, 2006).

Furthermore, most translators have difficulty organizing themselves autonomously or working together in teams, solving problems or establishing and managing interpersonal relations effectively on the job. According to the considerable anecdotal evidence from translation teachers around the world, the deficiencies in professional translation skills are universal problems faced with most translators and translator trainers, as these competencies are still undeveloped in many academic contexts. This study attempts to introduce a multi-faceted view of translation pedagogy and show how a *complexisivist* (Kiraly, 2006) perspective can offer an ideal theoretical basis which can lead to modifications required in many translation classrooms today.

By viewing translator education from the lenses of complexity theory, learning translation can be considered as a matter of innovation and creation rather than

reproduction. Furthermore, all teachers know that teaching does not necessarily lead to learning, meaning that there is a non-linear relationship between the two. Translation tasks can be viewed not as static frames, but rather as evolving by individuals through use (Coughlan & Duff, 1994). The tasks can also be seen not as input providers for learners' heads, but as providing affordances (van Lier, 2000) in which learning is defined as "development of effective ways of dealing with the world and its meanings" (p. 246).

In this way, all absolutist prescriptions and proscriptions about translation and translation teaching are doomed to fail, since they do not take into account the nature of change and the fact that the value of pedagogic interventions lies in their adaptability rather than sustain standardization. Instead, we can see translation trainers and trainees as continually adapting themselves to what happens in the classroom, and what others do. This gives us the power to understand the reasons behind the failure and development of various teaching interventions and introduction of new and better ones. Complexity theory also offers new methods of research, opens new fields of inquiry that we would not have noticed otherwise, and new ways of intervening in TS's problematic areas.

Translator competence, another important concept both in translation pedagogy and market, is also regarded as a complex system (Kiraly, 2006). After years of applying social constructivism in his translation workshops, Kiraly (2006) tested and raised his awareness of the complexity of translator competence and the need for new innovative approaches in translator education by coming up with a list of translation abilities and skills and a list of available recourses for educators to meet the students' needs and to help them fulfill the overall educational objective which can lead to an adequate level of translation competence.

Risku (2002) is another scholar who has addressed the potential link between complexity theory and translator education. From a cognitive scientific perspective, she argues that professional translators, rather than merely applying their learned strategies and rules to their translations, adopt the role of creative problem solvers and immerse themselves in each translational situation complexity, where strategies are constructed dynamically on the spot to handle the new problems as they unfold.

By adopting a *complexivist* (Kiraly, 2006) perspective, translator education can include acquisition of skills through teacher-based instructions and exposure to the existing theories on translation-related activities, as well as learning through authentic actions (e.g., Moghaddas & Khoshsaligheh, 2019). In this way, students do not let the knowledge they have learned remain inert and focus more on the *emergence* of translation competence, rather than its acquisition.

Hence, the complexity approach to translator education can propose an evolutionary, rather than revolutionary model, where new approaches can be seen to evolve from the earlier ones. From this point of view, different aspects of translator education can be addressed by different types of educational activities in which the teacher takes different roles from being a knowledge transmitter to merely a commenter in a student-centered classroom.

5. Conceptualization of the Translation Classroom in the Light of Complexity Theory

In this part, complexity theory is applied to the translation classroom by discussing each of its main features in relation to different aspects of translator education.

5.1. Openness, Dynamism, and Complexity

Translator education in general and translation classrooms, in particular, are not static systems which are unaffected by their environments. Translation products in translation classrooms are produced by different factors, including human agents such as the teacher, students, and presupposed readers (of authentic translation projects); and even non-human elements such as translation aids (dictionaries, grammar books, etc.), IT applications (translation machines, corpora, CAT tools, online databases, internet searches, etc.) (Munday, 2012). In the classroom system, translation is not done in isolation; these elements all affect the whole translation production process as well as the translation teaching and learning

process: the texts selected to be translated, the translation brief, teaching methods, testing techniques, teaching translation strategies and techniques and learning how to use them for problem solving, seeking suitable translation aids and technologies, group-work as well as individual translation projects, translation revision and evaluation, etc.

In fact, the translation process in the classroom as well as its teaching and learning processes as *dialogic events* (Holquist, 1994) are open processes in which the teacher, the students, the text, the author of the original text, the readers of the target text and linguistic and cultural factors in both languages are involved in an open-ended dialogue. It is teaching the necessary strategies, and techniques to improve students' translation competencies and the students' learning and application of those techniques to produce the final translation products.

Furthermore, at the classroom level, the process of translator education is a complex network of inter- and intra-relations in which the whole can be claimed to exceed the sum of its parts; i.e. the teacher, students, translation tools, etc. work synergistically to finish a translation task which is the product of translation learning process.

Complexity theory is also known as dynamic systems theory (Cilliers, 1998; Byrne, 2005; Haggis 2008). Dynamic complexity is another important feature of complex networks which happens in situations such as translation classrooms where there are subtle causes and effects which are not completely obvious, and when different effects may have the same cause or vice versa in short and long runs (Senge, 1990). The dynamic complexity of translation classroom system can be analyzed in two distinct levels: the dynamic complexity which is the result of multiple interactions between different (human and non-human) agents and elements and the dynamic complexity of the emergent behavior (the translation products) in the system.

5.2. Feedback Sensitivity, Self-Organization, and Adaptation

Ontologically, complexity theory insists on the feedback sensitivity of dynamic systems. As Stacey (1992) states, organizational life needs positive feedbacks as its fundamental properties. In the translation classroom system, translation students can receive feedback, either positive or negative from different sources, the main of which is their teacher/trainer.

As mentioned earlier, new different forms of behavior emerge from the existing forms through feedback mechanisms. Thus, the translation classroom, as a complex feedback-sensitive system may produce emergent phenomena (students' learning and its manifestation in their translation products).

Robinson's (1997) cognitive concept of collaborative decision making can help us understand feedback sensitivity in complex systems. Weick (1979) also mentioned a cognitive cycle for the translation process which entails the process of act-response-adjustment in which a shift (adjustment) occurs in translators' actions and their translation products (the translation tasks students fulfill in the classroom) when they receive feedback from people on whom their actions and translations have effects on their teachers, peers, and their presupposed clients.

Another key feature of complex dynamic systems is the concept of self-organization. Complex systems are in constant contact with their environment. This contact between the system and its environment is regulated by the system's self-organization process, since it is the system which determines the nature of the contact; what is exchanged, when and through what channels. Of course, the role of external forces cannot be ignored, but, despite their influences, it is the system that makes the final decision as what to be emerged. Therefore, students organize themselves and their translations based on the feedback they receive from their environment and the other agents and elements within the classroom system.

5.3. Nonlinearity and Unpredictability

The notion of causality in complex systems is *multifactorial* (Pishghadam & Ashrafi, 2013); that is, one cannot determine the *key* factors causing a problem since all the factors interact and work together to create a specific effect and it is difficult to talk about the priority of one factor over the others. In dynamic

complex systems, the notion of causality is *decentered* which means that a particular effect cannot be attributed to a particular cause in these systems. Causation in complex systems is too fast, too unpredictable and too multidimensional to be a feasible focus of attention (Haggis, 2008). In the field of TS, Chesterman (2007), with the intention of showing causal relations, proposes causal models in which translators are affected by multiple conditions and causes such as the translation clients' and readers' quality judgments.

In translation classrooms, in which the ultimate aim is to learn how to translate and to be able to apply it in practice, no one cause can be attributed to the final result. In this context, various factors interact to fulfill this aim, e.g., the teacher's instructions, materials (the books teachers propose for specific subjects), lesson contents (including translation theories and practical translation notes), translation aids (dictionaries, translation technology, software, internet, etc.), students' personalities and characteristics (their motivations, aptitudes, etc.), the physical features of the place in which they study (the classroom and university facilities), the teacher's ability to transfer the required knowledge to students and to involve them in authentic translation projects, etc. One cannot determine exactly which of these contributing factors has more influence on the students' learning process and its manifestation in practice. Therefore, there is a nonlinear relationship between the causes (different factors interacting in the classroom context) and the effect (learning). Learning might not happen if one factor, among the multiple influential factors, is missing. We can neither attribute learning to just one of these factors.

As mentioned before, *disproportionality* between causes and effects is one of the core features of complex systems which is closely related to *unpredictability*. As Urry (2003, p. 7) puts it "Causation can indeed flow from contingent minor events to huge powerful general processes". This notion suggests that even minor, apparently accidental or insignificant causes may have significant influences on the system's developmental process such as the students' learning.

Pragmatically speaking, as Levy (1967/2000) also mentions, the translation process is a decision-making process. In a translation classroom, dynamic interactions between the teacher and the students, the students with their peers and with their translation aids and the theories they have learned affect the students' learning process, their decision-making process, and their final translation products quality. Accordingly, translational *choices* and decisions are context-bound rather than linear and sequential. These choices are not predictable; they are complex and dynamic since they are motivated by dynamic interactions and factors. Among the dynamic factors involved in the translation process, knowledge (both general knowledge and the knowledge of the ST and TT), cognition, aesthetics, commission, and textual pragmatics can be mentioned which are generally subjective and depend on the translators' idiosyncratic characteristics.

Based on Peirce's pragmatic view (1903), students apply the theories and rules they have learned in the classroom (deduction), use various lexical and grammatical sources or other translation aids (induction) and finally select the solution for the translational problems they encounter intuitively. Based on this view, this solution finding for the translational problems is not predictable even for the translator himself. Since this solution comes abductively, it is always a "mixture of conviction and doubt" (Robinson, 1997, p. 260).

5.4. Strange Attractors

Strange attractors act as magnetic forces which have a kind of unifying role that draws complex adaptive systems towards certain trajectories (Wheatly, 1994; Pascale et al., 2000). As Murphy (1996) and Ströh (1998) believe, the ethical rules, culture, and values can be regarded as strange attractors that constitute the deep structure of any complex system and provide boundaries and limitations for the system's activities and transformations (Leonard, 2005).

In the classroom context, strange attractors are defined by the teacher, the university and the entire academic system in the country. All these agents determine boundaries and

limitations with regard to the course syllabi, the materials used in the classroom, etc. In other words, these strange attractors affect the classroom, the materials teachers use, their methods of teaching, the students' learning, etc.

6. Complexity Theory and a Systemic Approach to Translator Education

There is a consensus among translation scholars that translation either as an action (translation product) or as an event (the sociological aspects of translation production and educational aspects of translation teaching and learning) is a complex phenomenon (Chesterman, 2008; Hermans, 2007; Kiraly, 2006; Pishghadam & Ashrafi, 2013). In order to describe the complex interrelations in the complex system of translator education and propose a research framework that takes into account the dynamism of these inter- and intra-relations among multiple agents and elements involved, a proper analytical tool is required; a tool that proposes better ways of thinking about the world of education and simultaneously fosters thoughtfulness and reflection.

Many studies have shown that the current system of translator education in Iran does not meet the needs of the present-day translation market and the expectations of translation students as future professional translators in this market (Razmjou 2001; Riazi and Razmjoo 2004; Ghazizadeh and Jamalimanesh 2010; Rahimi 2010; Khoshsaligheh, 2012, Rabbani Yekta 2014, Moghadas & Khoshsaligheh, 2019) and requires substantive changes with respect to teaching strategies and classroom management policies on the part of the teacher as well as the whole educational system. Although several studies have so far attempted to propose new teaching methods and curricula for translator educational programs in Iran (Rahimi, 2010), this system still has many flaws and needs new approaches to overcome its shortcomings.

The aim of this study is not to present a thorough analysis of the entire educational system at the national and international levels. Since the structures of translator education systems are not the same all over the world, generalizations should be avoided. Initially introduced to TS by Tymoczko (1999), *localism*, which means focusing on each case's local contingent conditions, is Agorni's (2007) proposed a solution for such generalizations. In localism, cultural, political, and social discrepancies between different translational and educational systems around the world are articulated, negotiated, contested and defended at the local level (Tymoczko, 1999).

In this section, translator education in the context of Iran's educational system is studied qualitatively at the national and local level in the light of complexity science which focuses on the interactions within translator education system as a complex dynamic system.

6.1. Iran's Translator Education System as a Complex System

Iran's educational system might be different from that of other countries, since it is not an *autopoiesis* (self-organizing) system (Pishghadam and Ashrafi, 2013), meaning that it is a centralized system (Nasrollahi Shahri & Barzakhi Farimani, 2016) which is governed and controlled by external forces (all the universities and higher education institutes are under the supervision of the Ministry of Sciences, Research, and Technology). This ministry specifies the educational terms, concepts, and course descriptions applied in different courses of various university fields of study (Rahimi, 2010; Nasrollahi Shahri and Barzakhi Farimani, 2016). A self-organizing system should not be controlled by top-down rules. Despite these regulations for the entire educational system in Iran on the part of the ministry, teachers sometimes manage their classrooms based on their own preferences and the needs of the class and students. The teachers and head of the English department usually negotiate the course requirements, the materials, the teaching methods, etc. for better results; however, it is the teacher who makes the final classroom management decisions as what and how to teach in the classroom. Thus, the choice of the materials to be translated in the classroom is greatly affected by the teacher's preferences which are in turn influenced by the department and the ministry's educational policies.

The teacher's choices are also affected by the dominant narrative in the country (usually the

political and religious tendencies), which means that the teacher does not have complete authority for selecting the type of texts to be translated in the classroom. The study of translated literature in Iran reveals that there are determining forces which try to remove certain issues (such as traces of foreign, postcolonial, ideological, or cultural issues) from the dominant narrative of the day and in turn from the educational system.

Accordingly, one of the concepts that students must learn in translation classrooms in Iran is that all the translated texts are censored for localization by the Ministry of Culture and Islamic Guidance. As a result, translation teachers in Iran are not completely free to select any topic for translation. Although there is no definite agenda for the material selection, there are hidden and unwritten rules for translation teachers to follow. The teachers must teach their students that their future translations will be controlled by authorities and if they do not meet the prescribed criteria their translations will be censored or in some cases rejected altogether. Therefore, the teachers, as well as the students as future translators, should be adaptive to the situation by employing certain strategies such as a meticulous selection of titles and techniques for lexical gaps in their translations. This act of censorship is an external factor which controls the classroom system and influences the teaching and learning materials and the translation methods and techniques and makes the agents (the teacher and students) adapt themselves to the environment by self-organizing (in this case self-censoring) themselves.

Taking a look at different agents and elements and their roles in a translation classroom and the process of teaching and learning, we see that translator education is influenced by different intra- and extra-system factors. The ministry of sciences, research and technology provides certain rules and regulations (external factors in the environment which affect the classroom system). These rules, when applied by the teachers in the classroom become strange attractors and work as magnetic powers that determine the material selection and teaching methods. These rules, as mentioned earlier, are in accordance with the cultural, political and religious preferences of the dominant narrative in the country. However, although some teachers act as centripetal forces by moving towards and following the dominant policies, some others act as center-fleeing or centrifugal (Pishghadam & Ashrafi, 2013) forces and decide on their own.

If the system is analyzed in terms of the dynamic processes at work and the emergent phenomenon, formal organizational hierarchy provides the starting point for identifying different levels within the core classroom system: the ministry, the university, the department, the teacher, students as translators, their presupposed readers or clients, their critics or reviewers (the teacher in this context) and so on.

As Figure 1 shows, translation classrooms in Iran are not completely autonomous and independent. The role of power relations (as external forces) in the determination of classroom management policies (ranging from material selection to teaching methods) can be seen from the very first step. The institutional and governmental macro policies influence the subsystems such as universities, institutes and as a result the classroom system and the ideological orientations in these systems as well as the emergent behavior of the system meaning that, the students' learning and its manifestation in their translation products. Considering the hierarchical nature of Iran's translator education system which influences the classroom system as depicted in this figure, all the involved system's agents are influenced by the dominant national narratives and ideologies which are not necessarily the same as the common teaching norms, but are more connected to the social, cultural, religious and political orientations.

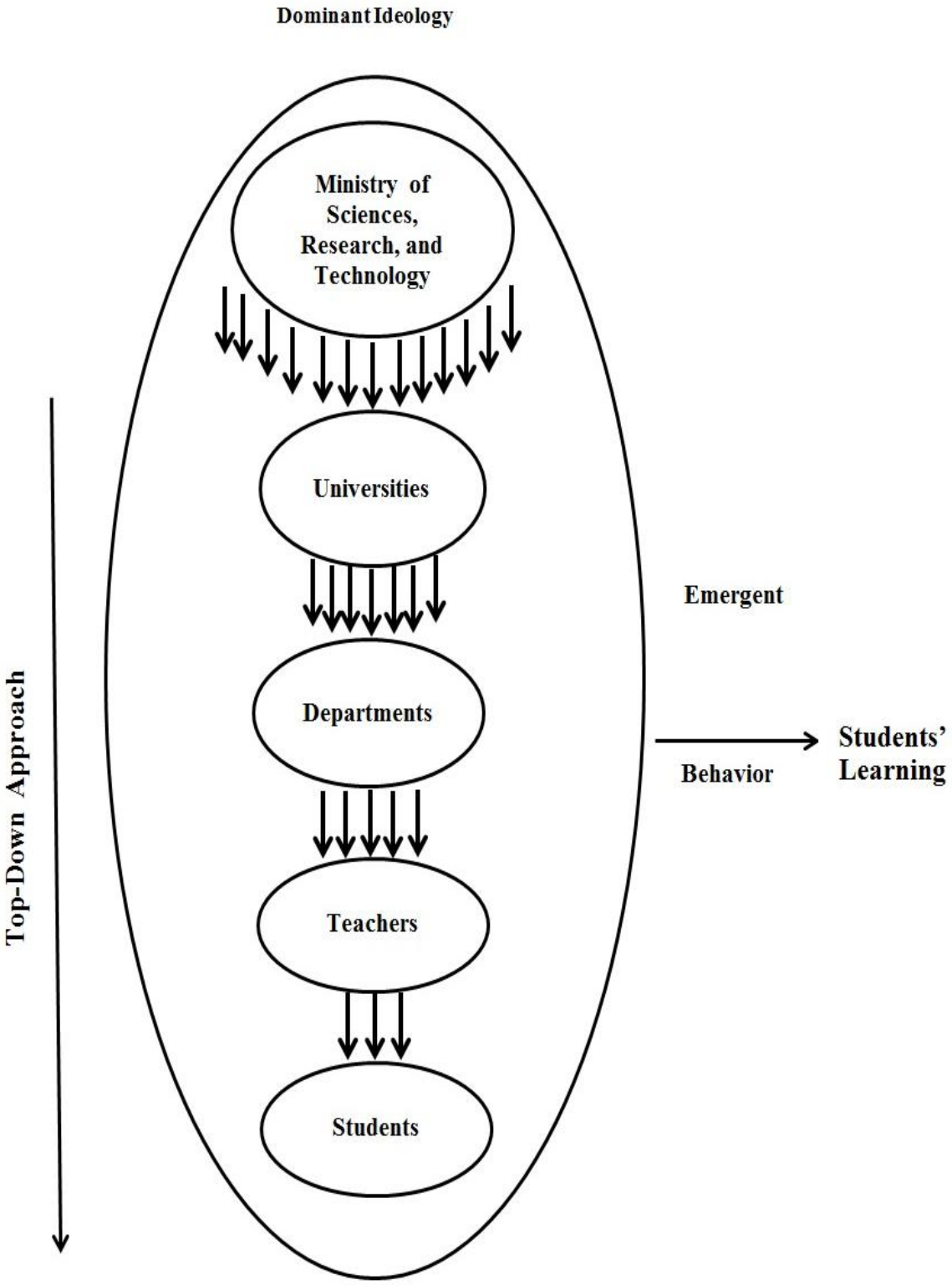


Figure 1
Iran's Hierarchical Educational Network

As mentioned earlier, in the translation training process the teacher's own preferences and idiosyncrasies interact with those of the ministry and university as well as those of the students in an open process. Even in the process of translating itself, this open process of interaction is present between the translators (in this case translation students) and their presupposed readers and clients. In the interaction between the ministry, university, teacher, and students, the ministry of sciences, research, and technology dictates its preferences to universities, universities do the same with their instructors, and the instructors impose the final decisions to their students.

This hierarchy is a one-directional process that follows a top-down approach (all the directions and regulations come from the top) in which authorities in the macro-systems make decisions and provide guidelines for their subsystems (micro-systems). This top-down network, in which power is centralized in the hands of the state policymakers, is a traditional management style. However, this scheme seems to be naïve for such a complex dynamic system. Despite all these forces, the role of internal agents in the system, such as the teacher and students and their preferences as determining forces, cannot be ignored. It is, for instance, the teacher's preferences which determine what and how to teach in the classroom.

Contrary to the top-down approach, complexity science prefers a participative bottom-up perspective. The reason behind this is that in complex dynamic systems interaction has a great significance; through collaboration, in which the members work together as a team, the system works more efficiently and productively. In such a system, the self-organizing, bottom-up activities of various decentralized organisms lead to the emergence of order (Bundy, 2007). As Morrison puts it,

> Complexity theory can be, and has been, used prospectively, to prescribe actions and situations that promote change and development, e.g., one can promote the climate or conditions for emergence through self-organization by fostering creativity, openness, diversity, networking, relationships, order without control, co-evolution, feedback, bottom-up developments and distributed power. (Morrison, 2006, p. 7)

Since complex dynamic systems are always in a state of disequilibrium, they have the potential to change. A translation classroom, in order to break away from the limitations of the existing structures and settle new organized ones, must be far from equilibrium and stability (Prigogine & Stengers, 1984). By this disequilibrium that can create disorder among the agents, the system can lead into a higher degree of freedom and order by achieving self-organization and evolution. As already mentioned, the political power in Iran controls the educational system. This leads to a state of equilibrium in the whole educational system, since change and evolution become far-fetched ideas. In this condition, the challenge between the ministry of sciences, research and technology and universities/ instructors that try to impose their own educational preferences (as centripetal forces) is very beneficial to Iran's translator education system. If this challenge can decrease the external control and imposing power, it would be beneficial to the system.

Furthermore, university students in Iran are not passive agents in the educational system. For instance, when their teachers are under the pressure of the limitations dictated by universities or the ministry, students may not be willing to accept, welcome and appreciate the imposed teaching methods and materials applied to their training environments. In fact, the ministry, universities, and teachers cannot make influential decisions on their own, without paying attention to students' tastes and preferences. Students usually provide their teachers with either constructive and encouraging or destructive and discouraging feedbacks (feedback sensitivity). These feedbacks are sometimes displayed directly in the classroom, e.g., students negotiate their preferred methods of learning and materials with their teachers, and sometimes indirectly in the final teacher evaluation tests applied by the university at the end of the semester. Quite often, they even take their complaints to the head of the department as well. If the teacher does not take their tastes into account, they will rate the teacher low in the final evaluation test, or simply drop the course and not take

other courses with the same teacher in the following semesters.

Teachers also use students' opinions, remarks, encouragements and denials positively to improve the quality of their teaching and classrooms. Complex feedback sensitive systems are in a more horizontal rather than a hierarchical order. Complexity thinking is not in line with hierarchical organizations, it rather prefers the dynamic systems' co-evolutionary framework.

In the same vein, in the classroom context, considering that authentic materials are used, clients' and readers' preferences, tastes and feedbacks which are usually stated in translation briefs must be taken into account as well. Students should know about the importance of clients' and readers' satisfaction in the reception of their translations. If their translations do not match their clients' tastes, they would not receive future translation projects by the same clients. Moreover, they should know that they can enhance the quality of their translations by the positive and negative feedback they receive. Therefore, according to complexity theory, the scheme (see figure 1) should be changed into the model shown in figure 2.

In this newly proposed model, the complex adaptive system of translation classroom, encompasses a variety of agents and elements, such as teachers, students, translation aids (such as dictionaries, encyclopedias, CAT tools, internet, etc.), authentic/non-authentic translation tasks, their (presupposed) clients and readers, translation ethics and values as well as other related elements such as economic, cultural and political factors which work as strange attractors. The double arrows in the figure show the existing interaction between different elements and their feedback sensitivity.

When teachers receive feedback from their students, they try to enhance their teaching methods, the materials they bring into the class, the translation aids they provide for their students in the class, the way they correct and review students' translation and the feedback they themselves provide for their students so that they can do their best to improve students' translation competencies in the limited time they have. The final product of these mutual feedbacks is the emergent behavior of the whole classroom system including students' learning, their enhanced translation competencies, and its manifestation in their translation products accordingly.

These emergent behaviors are not the consequences of a specific causal factor such as the teacher's teaching alone. They result from multiple factors such as students' mutual interactions with their peers and the teacher and the feedback they give and receive, the translation aids, the classroom atmosphere, their motivations and attitudes towards their major, their teacher, and their course, their self-efficacies, self-confidence, cognitive styles, intelligences, aptitudes, and other things. These emergent behaviors also act as causes themselves. They both influence and are influenced by these factors. Therefore, complexity theory proposes a radical shift from the habitual focus of attention on causes to a focus on effects (Byrne, 2005). Figure 2 does not only show the translation classroom, but also the effects that these small-scale systems might have on the whole educational system.

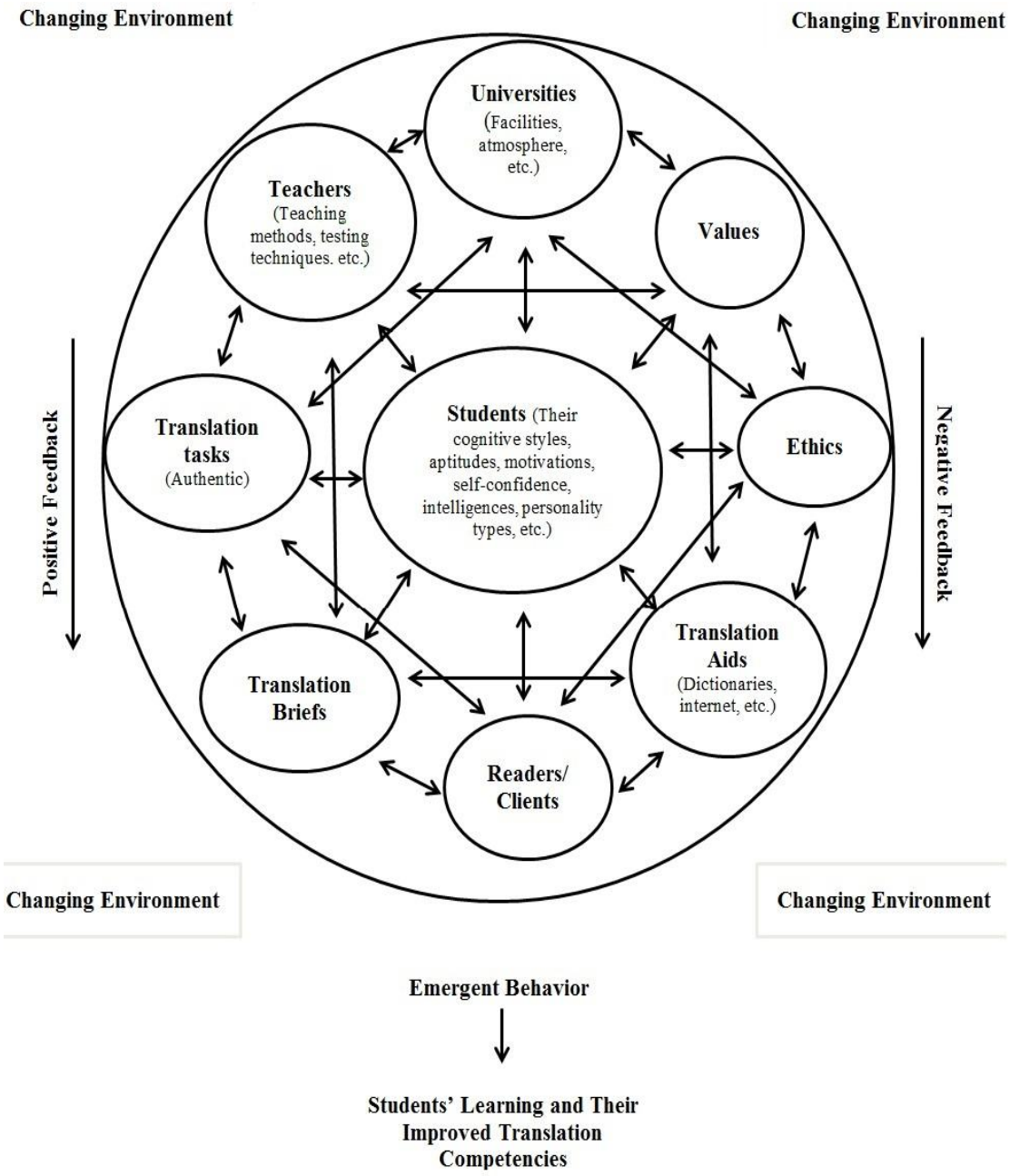


Figure 2
Iran's Educational Network Based on Complexity Theory

6.2. Translation Classrooms in Iran's Culture

Vygotsky (1978) believes that it is the society that shapes people's mindset and cognition. People around the world act based on their culture and the dominant norms in their society (the attractors). This leads to the formation of habitus which shapes their behavior (Bourdieu, 1989). Certainly, it is in the places where the necessary infrastructure is present and well-prepared that complex systems appear; i.e. it is the culture, which acts as an overarching system that allows other sub-systems to be open and dynamic, or closed and static. For example, in a society where there is little room for uncertainty and people cannot tolerate it easily, most systems become closed, static and monologic.

As already mentioned, complex systems have certain elements among which ambiguities and uncertainties are indispensable ones. Therefore, any complex system needs to have certain mechanisms to deal with these

elements. In Iranian culture, ambiguities and uncertainties are not welcomed and tolerated (Hofstede, 1980; Pishghadam & Ashrafi, 2013). That is the reason why in translation classrooms, the teacher, as the authority, provides the absolute and the only exact translation and imposes it on the students. In Iranian translation classrooms most teachers, who hope to produce perfect and absolutely exact translations for their students, favor literal or word-for-word translation to avoid any likely misunderstandings. Since Iranian teachers mainly seek the exact and absolute meaning and translation of a text, most translation classrooms are boring, and many translation students easily become bored and demotivated, when they are faced with obstacles in decoding the meaning of the text, feeling that they can never be as good translators as their teachers.

Moreover, in this type of culture, linear thinking would arise, which influences the way translation teachers and students as future translators deal with the crafts of teaching, learning, and translating at the text level. Iranian translators and even teachers tend to work on the text in a linear manner, i.e. from the very beginning of the text to its end. This type of translation may distort the ultimate message of the text and impede its full understanding. This implies that they usually avoid using more creative, non-linear strategies in their translations (e.g., sporadic translation) which are sometimes more influential and illuminating.

A point which is worth mentioning is that open systems cannot be always dynamic and influential in all circumstances. For example, open and interactive systems may not operate effectively in a context such as Iran in which the culture is collective, and the educational system is still in the modern era. In such a context, in the educational system which accustoms its students to didactic teaching and learning, features such as centralization, transmission, and behaviorism are dominant from the very beginning years of education through its upper levels and even higher education. In Iran, the modern educational system looks for uniformity to find the best ideals (Pishghadam & Mirzaee, 2008). This absolutism which is prevalent in the Iranian culture prevents interaction that should exist between its different agents and elements.

In such a context which is closed, centripetal, and collective, translation teachers and students do not see themselves as individual entities. They rather view themselves as members of a larger group that should be loyal to the upper-level powers. This is what impedes creativity in education. Therefore, the required infrastructure seems not to be ready to create an open, dynamic educational system or translation classroom. Even if the educational system becomes open for teachers and gives them more freedom, they might not be able to adapt themselves with the new situation, at least for a while, which is interactive, dynamic and autonomous in nature. As a result, this type of closed system should modify and improve itself to be more dynamic and interactive. It is only in that case that it can get full use of the principles of complexity theory.

7. Concluding Remarks

Complexity theory involves the study of systems with large numbers of constantly interacting components. In a complex system, a tiny change in the system's initial conditions can have a large effect (non-linearity and unpredictability) on the system's trajectory (strange attractors); and during this changing condition, all the components interact and affect each other (feedback and self-organization) which ultimately leads to an emergent behavior.

There is a general consensus among the scholars that translation is a complex phenomenon (Hermans, 2007; Chesterman 2008, Kiraly, 2006, Pishghadam & Ashrafi, 2013), either as an action (the translation product) or as an event (the sociological aspects of translation production or the educational aspects of translator education) (Pishghadam & Ashrafi, 2013). We can use complexity theory to both describe and explain the inter- and intra-relations in these complex systems by proposing a theoretical and research framework that emphasizes the dynamism involved in the process.

Due to the plurality of agents and elements in complex systems such as translation education

system and translation classrooms, as well as the growing significance of translator educational programs at universities, a more holistic analytical framework such as complexity theory is required. By using complexity theory as an analytical tool, this study views translator education from a different perspective and attempts to propose a framework for further research with this new perspective.

In this study, Iran's educational network and translation classrooms are conceptualized as complex systems in which the authorities in charge play the role of policymaking. Regarding the number of practical translation courses students pass in undergraduate programs on translation, translator education is of great importance in Iran's educational system.

In Iran, political and educational policymakers impose certain rules and regulations on universities and higher education institutes. However, they deny the fact that nowadays students' preferences influence higher agents such as teachers and universities. In fact, if we view translation classrooms and the educational system from complexity theory perspectives, there is more emphasis on the role of students and their interactions with their teachers. According to this viewpoint, the competitive top-down approach which is traditionally applied in the educational system in Iran can no longer be effective and should be replaced by a participative bottom-up approach. It is hoped that this study and its proposed perspective can bring fresh insights to the realm of translator education and become the starting point for future investigations in this area.

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