Cybersystemic education: enabling society for a better future

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Abstract

Purpose – This study aims to explore an exemplar of the design and application of a systemic framework for higher education. The field of application is in the social sciences and the perspective long-term, covering three generations of faculty and many generations of students.

Design/methodology/approach – This study is exploratory. It contains a conceptual component and an empirical component with a long-term case study from a European university.

Findings – A cybersystemic approach to higher education has been shown, at the focal university, to be a powerful amplifier of individual and institutional capabilities, and it still has great potential. The crucial prerequisite is that the approach is virtuously designed and implemented.

Originality/value – A case study ranging over 50 years is presented. The respective university has been a role model for other educational institutions for many years. Its influence in the German-speaking countries, and more recently also internationally, has become significant.

Keywords Design, Cybernetics, Systemic thinking, Management, Education, Systems science

Paper type Research paper

1. Introduction

A guiding question for this special edition is: “What are the most suitable learning methodologies?” The present article will tie in with this question, by examining a claim raised by adherents of the systems approach: that systemic methodologies furnish some of the most appropriate devices for shaping higher education, in terms of content and method[1].

In certain institutions of higher education, these methodologies have the role of preparing learners for dealing effectively with the complexities of the environments they are facing. Systems theory and cybernetics (often summarized in the terms “systems science” or “cybersystemics”) have bred frameworks and methodologies, which are specialized in coping with complexity.

The environments are showing increased uncertainty, interconnectedness and dynamics. Humanity is subject to multiple crises from the local to the global. Issues are often intransparent due to their complexity. Problems abound at all levels of organizations and society.

The arguments for using cybersystemics have been frequent and massive. Advocates argue that the systems approach delivers problem-solving methodologies that excel the other (“non-systemic”) approaches, in contexts of complexity (Ulrich, 1968; Beer, 1985; Bleicher, 2004). Among the major advantages, attributed to systemic methodologies, is that they provide holistic, integrative perspectives and combine analysis with synthesis and supply vehicles for transdisciplinary inquiry[2].

One must add that the theoretical basis underlying cybersystemic methodologies is substantial. For example, the eminent systems scientist Mike Jackson attributes “enormous explanatory power compared with the usual analyses carried out in organizational theory” to the Viable System Model (VSM), a much-used instrument of organizational diagnosis and design, which rests upon the science of cybernetics (Jackson, 2000, p. 174). Also, the

principles encapsulated in the VSM fit with the most advanced findings of modern organizational science (Jackson, 1988). Further examples are Checkland's Soft Systems Methodology, which relies on a set of intellectual breakthroughs (Checkland, 1981) and Critical Systems Heuristics, which is an emancipatory systems methodology based on Habermas' theory of communication (Ulrich and Reynolds, 2010).

Systems sciences at this stage provide valuable solutions in multiple domains of reality. Our contribution concentrates on the level of social systems, such as organizations and societies. This way, the focus of our article is on issues of management, leadership and governance. Our aim is to contribute to the design of education systems or programs that enable learners to cope with the issues, challenges and problems they (will) face in their environments – social, ecological and economic. In this context, we would like to examine if the common approaches to higher education are excelled by the systemic ones – approaches that use systems science as their epistemological and methodological basis.

We premise that it is impossible, at this stage, to corroborate such claims on “hard” empirical grounds. To our knowledge, no scientific experiments have been realized, which examine if a systemic approach to education is, in fact, superior to non-systemic approaches. In this situation, we modestly formulate the purpose of this study: “[...] to explore an exemplar of the design and application of a systemic framework in an institution of higher education.”

We have accumulated some empirical evidence at the case-study level, as well as testimonials from alumni of a systems-oriented institution of higher education. A case study will be used to answer the main research question: “how was the best-known systemic framework for higher education in the field of management built and how has it evolved over several generations?” We are limiting our observation to the field of the social sciences, management in particular. Geographically, we center on Europe[3]. The focal institution is the University of St. Gallen (UNISG), Switzerland, with its Schools of Management, Economics and Political Science, Finance, Humanities and Social Sciences, Law. In the *Financial Times Ranking of European Business Schools*, UNISG has ranked high, earning the fifth place in 2016 and fourth in 2015 and 2017 (see also Section 3.6). In the *Financial Times* ranking for one of its master programs, UNISG has reached the top position (first place) worldwide for the past seven years.

Related to the main research question, several substantive issues will be raised:

- RQ1. What is the impact of systemic approaches in higher education, relative to conventional approaches?
- RQ2. What can be learned from institutions of higher education that base their teaching practice on systemic approaches?
- RQ3. Are approaches to higher education based on systems science superior to mainstream approaches?
- RQ4. Are the graduates of a school better equipped for the future, if they learn systemic thinking and action?

Such issues cannot be answered definitely in the sense of “proofs.” Proofs are not possible, in principle, in the social sciences (Popper, 1959/2002). However, patterns can be discerned that support conjectures or corroborate working hypotheses.

For the purpose of our study, a distinction must be introduced here: “systemic” versus “mainstream” education. To obtain good selectivity, we define “mainstream” as those efforts or institutions of higher education, which do not orientate their activities on the systems

approach. We admit that it is not easy to make this distinction operational, bearing in mind that certain institutions are essentially grounded in systemic, namely, holistic and integrative concepts, without using systems language. Experts claim that, for the mainstream, education is teaching-centered ([Learn.org, 2018](#))[4], while systemic education is learner-centered ([Forrester, 2016](#)).

Under “systemic approach” we will subsume systemic concepts, tentatively defined as follows:

- *Systemic thinking* – “holistic versus reductionist thinking, synthetic versus analytic” ([Ackoff, 2004](#), p. 4)[5].
- *Systems philosophies* – the study of general and fundamental problems of humanity, from a systems perspective.
- *Systemic frameworks* – frames to guide inquiry, opening a systems perspective and developing a systemic methodological repertory.
- *Systems methodologies* – principles for the choice of methods; also: a set of methods for an inquiry grounded in systems theory and cybernetics.
- *Systemic methods* – proven procedures and tools for learning, based on systems theory and cybernetics.

Early on, the attribute “systemic” was used in medicine, psychotherapy, counseling and family therapy. Today, it is a common term in the organizational sphere, e.g. team dynamics, organizational diagnosis and development. “Systemic” usually denotes something that is spread throughout, pervasive, system-wide, affecting a system as a whole. “Systemic” also refers to a perspective that focuses on dynamic patterns of relationships prior to the elements of the system or issue under study. A systems approach tends to center around wholes, but incorporates the parts and the interaction of wholes and parts, in its repertoire. Hence, it embraces complexity.

That complexity manifests itself in the multidimensionality, uncertainty, ambiguity, dynamics and network or multilevel structure of the issues in focus. In dealing with these issues, a systemic approach is required. Students should learn the theory and practice of (applying) cybersystemic concepts, methodologies and methods. Concerning concepts, learning to think is more important than merely following directions ([Wojcicki and Izumi, 2015](#), p. 253). To name a few concepts of interest, candidates for study might be, among others: complexity, variety, control, regulation, governance, information, communication, adaptation and learning, self-organization, self-reference, emergence and *autopoiesis*. Regarding methodology, both analysis and synthesis have to be included and a transdisciplinary mode is indicated. Transdisciplinarity adopts a principle of cooperation that requires more than the mere collaboration of people coming from different disciplines. In addition, such cooperation takes place on a platform that provides a common, cybersystemic code, which is embedded in a systemic framework providing a mental coordination. Some candidate methodologies for study and practice would be, among others: Systems Analysis, Soft Systems Methodology, Cybernetic Modeling, System Dynamics, Interactive Planning. One should also consider including selected methodologies of, e.g. Operations Research, Game Theory and Machine Learning. Finally, the study of methods should concentrate on proven systemic approaches, e.g. Variety Engineering, the Viable System Method, Qualitative System Dynamics Modeling (e.g. with Causal Loop Diagrams), Quantitative System Dynamics Modeling and Simulation (e.g. Stock-and-Flow Diagrams).

After this introduction, we will examine if and why a systemic education is needed. Thereupon, we will document a longitudinal case study of a university that has built its

education in the management field rigorously on a systems approach. The case is presented in three stages covering a timeline of 50 years. We will furthermore discuss and reflect some of the results that have been achieved. The article will be finalized with conclusions and an outlook.

2. The call for systemic education

Is there any empirical evidence, which supports the argument that (more) systemic education is needed? A survey among faculty members from 63 graduate schools in the USA ($n = 297$) indicates that systemic education at a higher level is something important (Atwater *et al.*, 2008). The vast majority of respondents (74 per cent) agreed or strongly agreed that systemic thinking is an essential component of a graduate management education. However, roughly half (48 per cent) of those who considered it essential, were unsure or felt systemic thinking was not being covered. This number may be an underestimate, if systemic thinking is defined as incorporating the impact of interaction, feedback, time delays and closed loops.

We cannot provide an inventory of mainstream institutions or activities of higher education; they are too numerous and diverse. Also, it is more fruitful to look at the critiques of that mainstream. Hence, we will focus on such critiques rather than merely register “what the mainstream does.”

Some of the criticisms of education systems, such as the allegation that schools jeopardize learning instead of fostering it (Illich, 1970), are already classical. More recent critiques assert that academic programs do not adequately prepare students for dealing with the complexity of the “real world” (Livingston, 1971; Mintzberg, 2004; Ghoshal, 2005). Teaching programs flow over, but the learning performance declines because the education program drives out curiosity and students are not properly motivated (Risch, 1992). Also, the development of critical thinking gets little attention (Skúlason, 2015). A main point of critique is the *omnipresent* and ongoing trend toward increased specialization, which the mainstream of higher education in the Western Hemisphere continues to enforce.

The consequence of progressive specialization is that discipline-oriented units are separated from each other, with minimal or no interaction at all. Nowadays, many decision-makers are trying to counter this drift, but with little success (Alt, 2018)[6]. In many places, attempts of transdisciplinary cooperation have been made, but the general trend of increasing specialization continues. Effective education is transdisciplinary and often provided by programs that operate from outside the disciplinary units (Wakeland, 2018).

A prominent voice deplores that “few organizations adopt systemic thinking” (Ackoff, 2006). Emanating from such criticisms is a growing wave of pleas for the use of systemic thinking: for “finding new ways of looking at things” (Emery, 1969, p. 11), for reframing a model and reinventing a system (Eckert *et al.*, 2017 ; Senge *et al.*, 1994), to improve management (Barile *et al.*, 2017; Eckert *et al.*, 2017; OECD, 2017) and in a vision of educating responsible leaders to provide a “systemic and holistic approach to human, organizational and societal development” (Muff *et al.*, 2013, p. 82). The question of what management schools should be teaching “if they took mess management seriously” is asked by Roe and Mitroff (2009, p. 9), who advise “they would be teaching systems thinking.” In a similar vein, Post (2009, p. 11) postulates that “leaders should press faculty to shape the new systems thinking that is essential for tomorrow’s businesses.”

It is now widely accepted that a transdisciplinary, systemic approach to higher education has a higher potential, to contend with the challenges posed by complex dynamic issues, than merely disciplinary or additive interdisciplinary modes of looking at the world (Goorhuis, 1998; Schwarz and Duplain, 1998). We have asserted this previously on the grounds of some, albeit limited, empirical evidence (Schwaninger, 2001). Part of the earlier

literature provides compelling arguments for the effectiveness of educational approaches grounded in systems science:

In the Anglo-Saxon hemisphere, Russell [Ackoff \(1999 p.150, 2004\)](#), one of the foremost systems thinkers argued authoritatively for a systemic education. His suggestions outline concrete paths to superior teaching, by which he pleaded for an education focused on learning rather than teaching and anticipated innovations attributed to contemporary pedagogy, such as the “flipped classroom.”

In the German-speaking region, Hans [Ulrich \(1968\)](#), the doyen of “systems-oriented management,” developed a full-fledged philosophy and framework for a systemic research and education. In regard of management education, he pleaded for focusing on issues faced by the people acting in praxis and on treating these issues properly in terms of pedagogical and scientific standards (*Ibidem*: 28). Ulrich introduced the core concepts of the systems approach, such as whole/parts, openness, dynamics, control, adaptation, etc., as elements of an education program (*Ibidem*). He also presented a frame for a systemic education, intended to help practitioners and students in learning: the “St. Gallen Management Model” (SGMM) ([Ulrich and Krieg, 1972](#)). That will be the topic of the following case study.

Learning the concepts and methods based on systems science and apprehending its underlying philosophy pays off. Formal sciences (mathematics, logic) are more exact than systems science. Systems science is more effective in dealing with complexity. Its specialty, coping with complexity, is needed in the face of the ubiquitous complex dynamics and uncertainties of the world in our day. Systemic methodologies and methods are designed specifically for dealing with the complex effectively. They are applicable to any kind of issue or problem facing organizations or society. Systemic methodologies lend themselves to both diagnosis and design. They not only help to solve current problems but also prepare us to deal with the future ones. Their effectiveness lies in that they help us respond to complexity with requisite variety[7].

Albeit the complaints raised above, about too weak an extent of systemic education, some signs of change are appearing on the horizon: Recently, the United Nations , the Organization for Economic Co-operation and Development and the World Health Organization , publicly declared to adopt systems thinking as a key skill in their concepts of leadership ([Chief Executives Board for Coordination, 2017](#); [OECD, 2017](#); [de Savigny and Adam, 2009](#)). These declarations are grounded in the wisdom that is necessary for dealing with the fundamental interconnectedness of complex, local-to-global economic, social and ecological issues. Another sign of change is the sharp increase in the publication of books on cybernetics, since 2010 ([Umpleby et al., 2017](#)).

3. Case study

Our next issue is gathering evidence from an institutional initiative for systemic higher education, its long-term evolution, successes and limitations. The following case study covers half a century (about 1968-2018). We will study the evolution of the systems approach as used in teaching and research at the UNISG[8], which was chosen as the focal example for several reasons. First, that institution has a reputation of high quality, which is reflected in the public rankings (Section 3.6), and in its excellent fame throughout the German-speaking countries[9]. Second, it is known for its pioneering role in grounding its framework for education in systems science[10]. Third, the author was involved in the case for about 40 years, first as a student of the first generation of the SGMM, then as a consultant-practitioner, who applied the model in firms, then as the coordinator of the task force that developed the second generation of the SGMM, and finally, as a member of the faculty team that elaborated the foundations for the third and fourth generations of the

model. He edited the works of [Hans Ulrich \(2001a, 2001b\)](#), supervised roughly 90 PhD theses and has taught many generations of students cybersystemic methodologies and methods.

3.1 Methodology

The method we have chosen is that of a single case study. The rationale for choosing the case study method is in the nature of our study: it is not a hypothesis-testing venture. Therefore, the alternative designs, which are mainly survey and experiment, are not applicable. In contrast, case-studies are indicated for the study of exploratory, qualitative aspects, and where multiple data have to be used, as here.

The case-study design could use multiple cases or one case only. The authoritative handbook of case study research by [Yin \(2018, p. 49\)](#) indicates five single-case rationales, which are “eminently justifiable”: critical, unusual, common, revelatory and longitudinal cases. In our study, the effectiveness of systems-theory-based frameworks for higher education should be examined, in comparison with conventional frameworks. For the time being such an assessment can only be achieved by analyzing a paragon, which deviates from the mainstream education systems in the social sciences. Hence, the case under examination is unusual. It also provides a unique opportunity for studying a complex phenomenon: it is revelatory. Finally, this object of studies has adopt with a long-term perspective. We are fortunately in a position to direct our inquiry to a time span of 50 years: the case is longitudinal. Herewith, our choice of the method relies on three criteria for the use of single-case-study designs. Hence, our argument for using such a design is strong.

3.2 Background: the “St. Gallen Management Model” (first generation)

Back in the mid-1960s, business schools were organized along disciplinary lines (i.e. the chairs, research groups and institutes specialized in certain functions such as production, marketing, personnel, etc.) or methodological compounds (e.g. decision-making, organizing and accounting). By and large, the domain of general management tended to be underdeveloped in business schools. At the UNISG, Hans Ulrich, then the President of the Institute of Management (Institut für Betriebswirtschaft an der Universität St. Gallen[11]) was convinced, that a generalist outlook on management was extremely important. He established the integrative, generalist effort as a research and education issue in its own right and of high priority. This way, a tradition of a systemic, transdisciplinary management education and research was established, which was distinct from the mainstream approaches, which were dominant at the time.

Ulrich put complex problems or issues at the center of his perspective on management research and education. For him, a management science, conceived only as a discipline of microeconomics, had to be insufficient to deal with such issues. Also, and very much in line with Peter Drucker’s argumentation, management was not seen as the task of a small elite of heads of large organizations, but as a role to be practiced by many people across all levels of organizations. In the mid-1960s, a task force of professors was formed at the Institute of Management, who studied the works of early writers on systems science (e.g. Wiener, Bertalanffy, Beer, Pask, Churchman, Buckley, etc.). They learned that these sciences provide the theoretical foundation for a holistic, integrative management education and research. In 1968, the basics for a systems-oriented education in general management were outlined in [Ulrich’s \(1968\)](#) book *Die Unternehmung als produktives soziales System (The Corporation as a Productive Social System)*, published in German), a manifesto for a systems-oriented approach to management. On the basis of this book, the “SGMM”[12] ([Ulrich and Krieg, 1972](#)) was elaborated, which was conceived as a framework for the description and the structuring of managerial issues. It defined systems thinking as holistic-integrative, process-oriented,

transdisciplinary, analytic and synthetic at the same time, as well as pragmatic (i.e. issue- or problem-focused, not discipline-focused). This publication contained some highly abstract and general schemes, namely a corporate model, a leadership model and an organisation design model. These schemes are meant to be “empty scaffolds for the meaningful” (“Leerstellengerüste für Sinnvolles”), to guide the location and structuring of problems. Only one of them shall be reproduced here, the diagram, which is part of the corporate model and shows the inter-relationships between the firm and its environment (Figure 1).

This diagram visualizes two aspects of the environment:

- (1) the stakeholder perspective, which today is generally known, but at the time was relatively new; and
- (2) the dimensional structuring of the environment highlighting not only the economic, the technological and the social spheres but also the ecological domain.

To address the natural environment as part of the managerial concern was at that time not only innovative but even revolutionary[13]. The model’s incorporation of environmental concerns showed great foresight and far-reaching consequences emanated from it.

Figure 1.
The firm in its
environment

Source: After Ulrich and Krieg, 1972, p. 20

The SGMM was required reading for generations of students at the UNISG[14]. Stimulated by the framework, in the respective courses, systemic methods were already used back in the 1970s, that would become common knowledge only decades later (e.g. causal loop diagrams, models of systemic control). Not only were the categories of the model adopted and internalized by many firms in the German-speaking countries but also the UNISG became the cradle of highly innovative initiatives, which revolutionized the attitude of businesses towards environmental concerns[15]. This example demonstrates the power of models in shaping reality. We maintain, that these advancements would not have been possible without the underlying model based on the systems approach, which explicitly included the ecological dimension as a matter of concern. This claim is underpinned by the Conant and Ashby (1970, 1981) theorem: “Every good regulator of a system must be a model of that system.” In other words, the result of any management process cannot be better than the model underlying it. Hence the quality of the model used is the bottleneck.

The SGMM was meant to be a shared framework. It succeeded in fostering coherence in the activity of the Management Department of the University. Also, a number of consulting and training companies have grown out of the Institute of Management. These adhere to a systemic orientation and have based their activities on the SGMM (Malik, 2016). In addition, the Model has been taught in many German universities.

In both 1970s and 1980s, new issues emerged in management, for example, strategy, culture and management philosophy[16]. The original publication of the SGMM (Ulrich and Krieg, 1972) did not contradict these developments, but some of them had not been addressed by it explicitly. This led to a new research initiative. In 1988, under the direction of Knut Bleicher, the successor on Hans Ulrich’s chair, a team was formed to develop the management approach of UNISG further.

3.3 The “St. Gallen Management Concept” (second generation)

In view of the new challenges, the team led by Knut Bleicher and coordinated by this author took on the task of developing the management framework of the UNISG (at the time “Hochschule St. Gallen”) further. This effort was aimed at accumulating a more concrete body of knowledge, based on the systems approach, as a basis for management education at the advanced levels of studies for students and practitioners. The task force came up with a three-dimensional scheme to complement the original SGMM. The label used to distinguish it was “St. Galler Management-Konzept” to be translated into “St. Gallen Management Concept” or “St. Gallen Management Framework.” The diagram in Figure 2 is the master-scheme as used since the first edition (Bleicher, 1991, 2004), with some minimal extensions. From the first publication on, the concept has been used very much in executive education, and it has been re-edited many times.

The first dimension, made up by the aspects of activities, structures and behavior, represents fundamental categories for describing organizational phenomena[17]. The second dimension comprises the three logical levels of management. These are based on a crucial distinction for structuring managerial issues and decisions, and they provide distinct orientators for steering and regulation at each one of these logical levels: e.g. efficiency indices for the operative level, effectiveness indicators for the strategic level and indicators of viability and development for the normative level (Schwaninger, 2000, 2009). The third dimension is time, involving time constants and distinct phases of corporate development.

On the basis of these powerful lead distinctions, a series of books, which document and detail the St. Gallen Management Concept (Bleicher, 1991; Pümpin and Prange, 1992; Gomez and Zimmermann, 1992; Schwaninger, 1994; Müller-Stewens and Lechner, 2001) have come out. These have been used as readings in the second half of studies (third and fourth years).

Figure 2.
The St. Gallen
Management
Concept – overview

Source: In extension of Bleicher, 1991

3.4 A new model (third and fourth generation)

At the UNISG and beyond, the quest for transdisciplinary models and frameworks goes on. In 1998, a task force of faculty members, of which the author was a member, was formed, which aimed to create an updated version of the St. Gallen Management Framework. This was directed to the needs of the first two years of studies at the University, and therefore, focused on a Corporate Model, which depicts the corporation in its environment and the value chain with its inputs, outputs and the components of the transformation processes (business, management and support processes). The resulting publication was titled “The New St. Gallen Management Model” (Rüegg-Stürm, 2002, 2005b).

This “third generation” built clearly on the earlier generations. The lead diagram (Figure 3) was a useful update of the respective scheme in the “first generation” Model (Figure 1). Furthermore, the tripartite arrangement “activities, structures, behavior” of the

Source: Rüeegg-Stürm, 2002, 2005a, 2005b

Figure 3.
The New St. Gallen
Management Model –
lead-diagram

“second generation” (Figure 2) was loosely transferred to the “third generation,” with the division “strategy, structures, culture” (Figure 3).

This way, a new version of the integrative framework for management education was made available to large numbers of students, early on in their studies. As a larger amount of faculty members, also from outside the general management core was collaborating in this venture, it could be expected that the systems approach would diffuse into the culture of the institution more broadly than it had used to.

To give an accurate account, it must be added, that in cases like the one at hand there are always countervailing forces as well, such as ignorance of and indifference toward the systems approach to management, on the part of faculty members and the managements of universities. It is also difficult to pass on the concepts underlying a rigorous systemic thinking. Certain facts and signals[18] indicate that, even at the university in focus, the systems movement is potentially vulnerable and that the valuable tradition outlined colorfully above, could as well become unstable or dissipate over time. The third generation version of the SGMM was in use, from 2002 onward, and used as the base text for the first semester of bachelor studies in management at UNISG, for more than 10 years. It was well-accepted in the market, among the reasons being the slim format (less than 100 pages) and the clarity of the lead diagram. Again, certain consulting and training firms have built their activities on the new model.

But then again, the author of the “third generation” model felt an increasing need for anchoring the content of the model in modern systems science. He focused particularly on Luhmann’s sociological systems theory, which had become a standard among sociologists in the German-speaking countries. Together with Simon Grand, several versions of the “fourth generation” model were published within a few years (Rüeegg-Stürm and Grand, 2014, 2015, 2017).

The model in this latest version shows strengths and limitations. On the one hand, the body of knowledge condensed in the fourth generation model is impressive. Hence, from a

substantive aspect, the model is a remarkable achievement. On the other hand, this is a brain food hard to digest. For the faculty, it is very challenging to build lively lectures on that basis and students have shown difficulty in understanding the model. We have to add, that several important strands of the systems approach, namely, cybernetics, system dynamics and general systems theory would offer fundamental and helpful concepts of authors such as Ashby, Beer, Bertalanffy, etc. To date, none of these have been incorporated or at least pinpointed in this latest generation of the model. To finalize, it is still difficult at this stage, to draw the balance. Anyway, the effort continues and an evolution of the model can be expected. The adoption by future generations of the SGMM is in question, so far.

A sign of progress is in that the SGMM is now introduced to all students in a grand lecture during the first year of studies and later on connected to topics such as “practising management” and “systemic change management.” Also, specialized courses in management cybernetics as well as in modeling and simulation have been offered.

3.5 Comparing systemic studies at UNISG and other universities

Several universities in the USA have developed systems-oriented activities or programs of higher education. At Portland State University, a Graduate Program in Systems Science, launched in 1970, later extended to the undergraduate level, has been flourishing ever since (Wakeland, 2018). The social systems sciences (“S-Cube”) program at the University of Pennsylvania, founded in 1973, became the largest doctoral program in the University (Ackoff and Gharajedaghi, 1985). It was closed in 1986 over differences of opinion between the Program Directors and the University. In the Sloan School of Management at MIT, there has been a system dynamics group active since the 1950s, which became a worldwide hub of systemic thinking, modeling and simulation. More recently, a full academic master program on system design, has been realized in cooperation of MIT’s School of Engineering and the MIT Sloan School of Management. Wakeland (2018, p. 86) reports that “many systems science programs merged over time with a specific disciplinary department, and this has tended to lead to a significant narrowing of their focus.”

In the UK, the University of Hull has a Centre for Systems Studies with international radiance, which defines itself as an “international centre of excellence for groundbreaking applied research on systems thinking and practice.” (Homepage CSS, 2018). The University of Lancaster had a systems department and the University of Lincoln a Centre of Systems Research; both are not in operation anymore.

Comparing the Anglo-Saxon examples with the UNISG, a clear distinction emerges. The cases from the USA and UK have in common that their systemic higher education is contained in one program of studies or a research center. St. Gallen is different in that it has a systemic management framework, which is taught to all students in main lectures, during the first and second semesters[19]: not only to the students of the School of Management, which counts about two-thirds of the 8,500 students of the University but also to the students of the other schools – economics, law, etc. Later, it is also taught in selected courses at the master and doctoral levels. At UNISG, there is no studies program in systems science, but in principle, all students are exposed to lectures on systemic thinking[20]. This is in line with the vision statement of the university: it aims to set “standards for research and teaching by promoting integrative thought, responsible action and an entrepreneurial spirit of innovation in business and society.” (Homepage UNISG, 2018). The School of Management declares, in its mission statement, that it “stands for an integrated and holistic education” (Homepage SoM, 2018). Since the beginning, the SGMM has normally been written and taught, over several generations, by a team of champions, whose academic

home is an institute (a kind of research center) of UNISG, currently, the Institute of Systemic Management and Public Governance.

This comparison indicates that the systemic studies programs, in the Anglo-Saxon schools listed above, target subsets of the student population. In return, the systemic education at UNISG addresses the whole student population of the university. Hence, after their studies, many UNISG students may not put the systemic ideas and concepts into practice. Similarly, many faculty members of UNISG will probably not assimilate the systems concepts and ideas.

3.6 Impact

The UNISG has enjoyed a reputation of excellent teaching for decades. In the past three decades, the institution has also established itself as a strong player in research, mainly in the fields of economics, law, finance, business and public management. While the university had generally been considered the number one University of Economics and the Social Sciences in the German-speaking countries, it used to be little known internationally. Early in the new millennium, UNISG became also present in the international rankings. Between 2010 and 2017, its position among the comparable universities in Europe has improved from Rank 12 to Rank 4 (Figure 4).

Among the different schools of the University – Management, Economics, Law, Finance, Humanities and Social Sciences – the School of Management has shown the greatest momentum in terms of quality, growth and international reputation. One of the master programs – Strategy and International Management - has even been ranked number one worldwide in the Financial Times Index, uninterruptedly since 2011, while ranking fourth when the index started in 2010.

There has been a long-standing consensus among the faculty of UNISG that the systemic framework has been a major factor of the astonishing development of the university, in the School of Management in particular. This view is widely shared among insiders such as the alumni of UNISG.

Figure 4.
Ranking of UNISG
among the European
Business Schools

We get many feedback signals from ex-students, who are practitioners at all levels of organizations of any kind. Some of them are CEOs or entrepreneurs, others are managers or holders of expert positions. We have received many quotations from them, in our contacts. The systems approach, which these alumni came to know during their studies, is often emphasized in these statements, as something very useful and as the most durable component of the body of knowledge they acquired.

We take a few examples for many to demonstrate how certain graduates have made use of the systems approach in their professional lives.

Given the purpose and research question of this study, we are not in a position to build evidence on hard data. We decided to complement the case study with testimonials from graduates of UNISG. We wrote to a selection of potential informants, confronting them with one question: “which are the effects the systems-oriented education at UNISG has had for you?”[21].

Here is a subset of the answers we received:

Mark Schneider, Dr.oec.HSG, chief executive officer, nestlé S.A.:

Understanding and respecting system-wide implications of our decisions – this is what I learned from day one during my education in St. Gallen. When focused action gets combined with holistic thinking you have the necessary ingredients for impactful and sustainable management choices.

Peter Wuffli, Dr.oec.HSG, Founder and Chairman of the Board of Trustees, elea Foundation; former CEO of UBS:

The holistic, systems-oriented studies at the University of St. Gallen have marked my life professionally and beyond. Systemic thinking opens perspectives and hones the sense for interrelationships. These are crucial prerequisites for ‘Inclusive Leadership’ – a managerial behavior which, in a complex, dynamic, globalized world, is more important than ever.

Alex Henschel, Dr. oec.HSG, managing director, goetzpartners, Munich:

Personally, I am fully confident of the systemic approach. My conviction is that the systems-oriented education is a crucial factor in my professional career and success as a manager and consultant. I received the possibility, to understand the connections underlying the phenomena we are perceiving. This way, I have also gained a long-term perspective in analyzing economic issues.

Kristjan Ambroz, Dr.oec.HSG, CEO continental Austria:

Inexhaustible Toolbox:

[...] my systems thinking education (up to and including a PhD at the University of St. Gallen) has been of paramount importance. Exploring structures driving observable behavior is much more likely to provide timelier and deeper insight, leading to better management decisions than a more common symptom treatment we too frequently see nowadays.

In addition, the education has provided me with a vast toolbox of approaches to tackle the variety of problems faced in business life, from operational challenges, strategy development or consulting.

[...] Using these methods is intellectually more challenging, and it leads to far better results.

The full set of answers submitted will be published shortly in a Discussion Paper of the Institute of Management at the UNISG. To our surprise, we did not receive any negative responses in the sense that all statements advocate a systemic education, because we had at

least expected some “neutral” answers (such as: “not better, not worse than other approaches to higher education”).

The statements we have cited are not from a large sample, but even so, they are indicative. They demonstrate: the systemic thinking conveyed to the students at the university in focus has widened their horizons and changed their personal and professional lives.

Based on the testimonials and on the data about the position of UNISG, we can formulate two propositions:

- P1.* The graduates of a university are better equipped for the future, if they learn systemic thinking and action than if they are educated in conventional ways only.
- P2.* The effectiveness of cybersystemics-based educational frameworks for higher education is superior to the effectiveness of conventional frameworks.

4. Discussion and reflection

It is difficult to assess the impact of an endeavor as complex as the use of system theory and cybernetics as a scientific basis for the education and research in general management in a management school. In the social sciences, there are no provable certainties. Decisions can only rely on likelihoods and good arguments. The case-based evidence of this contribution suggests that the systems approach furnishes methodologies that are highly or even most appropriate for designing systems of higher education. This conclusion, which *emanates* from the case, has been underpinned indirectly, through the calls for systemic education coming from both practitioners and academics.

Under “systems approach” we have subsumed Systems Theory and Cybernetics – the transdisciplinary branches of science, which are specialized in coping with complexity, by providing pertinent frameworks and methodologies, often titled as “cybersystemic.”

The aim of systemic education is to enable actors in responding to the complexity, which they face, with requisite variety. That variety – in practical terms the repertoire of behaviors – of these actors must be equivalent with the complexity of their environment. Independent of the problem or issue, for both present and future.

The main research question formulated at the outset asked, how the best-known systemic framework for higher education in the field of management was built and how it evolved over several generations. We trust that this article makes that evolution transparent. Several related issues were raised, e.g. if approaches to higher education that use cybersystemics as their epistemological and methodological basis are superior to those of the mainstream.

We cannot answer this question apodictically. We could not disconfirm the claims summarized in both *P1* and *P2*. The case-based evidence and the testimonials of ex-students support it. What we may conclude is that the systemic approach taken at the UNISG has been very beneficial for that institution and its alumni. A thought experiment might be helpful: what would have happened, if the management school of UNISG had never shaped its education system on the basis of system theory and cybernetics? Several indicators suggest that neither the rise of the University’s status in Switzerland would have occurred nor would the reputation at an international level have materialized the fulminant way it did. In addition, the testimonials we have printed suggest that the stature achieved in systems-oriented management education has given the management school of UNISG a distinctive position, which it would not have achieved without that systemic orientation.

Notably, the alumni who uttered these statements expressed that the systems-oriented education enhanced their repertory for coping with complexity and achieving better results. We surmise that these enabling prerequisites and better results also have a strong impact on the larger systems, economic, social and ecological, due to the integrative approach.

If the knowledge of systems theories and methodologies enables managing complexity, then a cybersystemics-based education is an important step for society to understanding better its problems and bringing about solutions for a better future. It goes without saying that knowledge must be developed toward understanding and mastery, leading to a virtuous application of systemic approaches. We propose that education, knowledge, understanding and reflexive practice are four components of a self-reinforcing loop (Figure 5). In the literature, knowledge and understanding are considered as the primary goals of education (Smith and Siegel, 2004). According to Ackoff (1999, p. 171), knowledge is conveyed by answers to “how-to” questions, while understanding is conveyed by answers to “why” questions. In other words, understanding implies the ability to explain, which is a deeper form of knowledge. Ackoff (*Ibidem*) criticizes that “schooling does little or nothing about the generation of understanding” and maintains that people acquire most of the understanding on their own. We assume that understanding *emanates* from reflective practice, i.e. from applying knowledge (doing), reflecting the results, doing again, etc. Reflective practice is a missing link in many theories of education and learning. Even the distinction of knowing and understanding is often not made (Kim, 1993). A tenet of systemic education is that the two concepts need to be coupled, with reflective practice or “reflection-in-action” (Schön, 1983) as an intervening variable. Finally, we maintain that systemic education is not only triggered by resources made available but also the understanding of the need of such education, in the first place.

Another issue raised at the beginning was, what can be learned from institutions of higher education that adhere to a systems approach. We cannot speak for all respective institutions. However, we can convey two observations about possible teachings from the St. Gallen case.

The first and foremost teaching is in the mere fact that the systemic framework was introduced and evolved for such a long time, spanning three generations of faculty and multiple generations of students. This should encourage other institutions toward a systemic orientation. One recent example inspired by the SGMM[22] is the Leipzig Leadership Model developed at HHL Leipzig Graduate School of Management (2017). This concept is meant to be a scientifically founded orientation toward effective leadership in the face of big challenges, such as political instabilities, societal change and the ecological crisis.

Figure 5.
Education
dynamics – a self-
reinforcing loop

The second teaching is in the multiple results triggered by the initiative of the SGMM, which in fact transcend what a simplistic analysis would gather. The existence and application of the framework have significant implications. It has borne plenty of fruits, from the development of more in-depth courses at the university, new methodological ways of research, and the learnings for alumni, as already shown. All of these direct consequences have catalytic potential entailing rich secondary effects.

In finalizing our reflection, we have to limit ourselves: only two aspects will be discussed. Firstly, a reflexive view on this case study suggests that the successes reported therein must not be taken for granted. To take an example, [Beyes \(2005\)](#) diagnoses a mechanistic worldview among protagonists of the SGMM. He deplores that technocratic tendency and assumes that it is a seed of decay. Finally, the author concedes that he observes some signs of a renewal, in a few individuals within the UNISG faculty, who represent a new world view, coined by a sense of constructivism and second order cybernetics, as propagated by [von Foerster \(1984\)](#) and [Luhmann, \(1995\)](#). In fact, since [Beyes' \(2005\)](#) argument was published, the St. Gall Management Model has evolved toward a more constructivistic stance in the paradigm of the new cybernetics. Secondly, adopting a systemic approach to an institution of higher education is not necessarily a success. The effort might as well founder. We know of several systems departments or programs that were closed down, for example, the program at the University of Pennsylvania. The reasons for these closings vary, but a thorough inquiry into these cases has not occurred until now and it cannot be undertaken in this small contribution.

The second question then is about the continuity of systemic education within the focal institution, in the future. We envision at least three kinds of provisions. One is a continuous improvement of the SGMM, by its champions and of the respective lectures toward better understanding on the part of students and practitioners. This is a matter of substance and language. The other provision is political in nature: the model should be communicated to all faculty members. These should be involved in the discussion about the model's future development and have the opportunity to contribute to that development. Such cross-sectorial co-work would match the cross-disciplinary nature of the systems approach and would foster the unity of doctrine across the institution. Finally, the support of a power promotor from the top management, preferably the president of the university, is crucial. In that role, momentum can be created and institutional identity can be shaped. A systemic orientation should be expressed not only in curricula and publications but also in the pervasive mental models and the appearance of the institution, e.g. in architecture, language and symbols ([Kleimann, 2016](#) p. 238). To give an example, even before the systems approach was promulgated by its pioneers back in the 1960s and 1970s, the design of the new campus, inaugurated in 1963, visibly and explicitly abided by holistic-systemic principles ([Boller, 1998](#); [Burmeister, 1998](#), p. 129)[23].

5. Conclusion

To summarize, the evidence gathered in our case study speaks for an extraordinary strength of a systemic approach to higher education. The cybersystemic approach of the UNISG has become a powerful amplifier of individual and institutional capabilities. This allows a modest generalization to other comparable universities pursuing a systemic approach, insofar as that approach is well designed and implemented.

The systemic frameworks developed, over the years, at the focal university of our study, became well-known and esteemed in the German-speaking countries. The SGMM has strengthened the image of the School of Management, and probably of the University as a

whole, which has always had the image of being a “management school.” An achievement during recent years has been the translation of the SGMM into English, which contributes to that reputation in new geographic domains. In fact, the institution has reached high scores on international rankings, recently. Internally, the model has had an effect of strengthening the identity and corporate spirit, at least in the School of Management.

However, these successes are no guarantee for the future. If the systemic orientation can be maintained, that will be beneficial to the University. In case it dissipates, a big loss is programmed.

Finally, we sketch an outlook on the limitations and opportunities of our investigation: This study pursues an exploratory approach. In the future, the case-study-based methodology used herein should be complemented by more specific hypothesis-testing, reverting to surveys of larger samples and making use of experiments. From there, more concrete recommendations for the design and practice of higher education systems could be mapped.

To conclude, we have described in some detail the systems approach pursued in one educational institution. We are not going to give any recommendations for the future on such details. However, we insistently plead for taking care of systemic education. The systems approach is a powerful lever for our society’s coping with the challenges ahead.

Notes

1. Here, “content” refers to what is being taught, and “method” to how it is taught.
2. Critics interject that the systems approach is too abstract, too general, and does not provide any handles for triggering change in the real world (e.g., [Berlinski, 1976](#); [Hanssmann, 1985](#)). These arguments have been superseded. Systemic methodologies have shown their potential to analyze problems and to influence the dynamics of social systems (e.g., [Ackoff, 1984](#); [Schwaninger, 2012](#)). Other criticisms maintain that managerial cybernetics is mechanistic and reductionist (e.g., [Ulrich, 1983](#)). That view ignores the fact that a Cybernetics of organizations exists, which addresses social systems with their self-organizing, self-conscious properties ([von Foerster, 1984](#); [Espejo et al., 1996](#)).
3. The situation in the United States is studied elsewhere ([Umpleby, 2005](#)).
4. «Education science is considered to be the study of improving the teaching process» ([Learn.org, 2018](#)).
5. Alternative definitions of “systemic thinking” have been proposed ([Atwater et al., 2008](#), p. 15): a) “eliciting multiple perspectives to understand a situation” (highlights the idea of taking a holistic approach to decision-making, by using multiple inputs); b) focus on optimization (classical view of optimization, used in dealing with mechanical systems); c) discussion of interactions between systems parts (key aspect of systemic thinking, but needs to be complemented, as it fails to address concepts of feedback and time delays); d) reflects a more holistic perspective of processes (facilitates recognition of interactions between parts within and external to the system of interest, but, it again fails to address the time dimension); and this dimension is the most complete (incorporates both feedback loops and behavior over time. One weakness, however, is its omission of interactions with and feedback from, external forces).
6. Other fundamental critiques that address institutional and ideological issues (e.g., [Treadgold, 2018](#); [Meyer, 2018](#); [Muller, 2018](#); [Skúlason, 2015](#)), reach beyond the boundaries of this article.
7. Ross Ashby’s Law of Requisite Variety says: “Only variety can absorb variety» ([Ashby, 1956](#); the verb “absorb” is a substitute, suggested by Stafford Beer, for the original “destroy”).

8. We will use parts of an earlier study about the evolution of the management model of the University of St. Gallen ([Schwaninger, 2001](#)).
9. The Germans and Austrians make up the largest factions of foreign students.
10. An overview of several initiatives and programs of systemic education is compiled in [Bosch and Cavana \(2018\)](#). Even though not being exhaustive, that compendium documents a continual and growing presence of educational systems approaches.
11. Former name: „Hochschule St. Gallen (HSG).“
12. “St. Galler Management-Modell” in German.
13. Being a pupil of Hans Ulrich, it was natural for the author to put ecological issues on the agenda when discussing corporate strategies with client firms, as a consultant of Management Zentrum St. Gallen, as early as in 1980. The author was aware, that orthodox minds would have classified him as “red”; the complementary color green had not yet been invented, as a symbol of the environmentally concerned parties.
14. Ulrich’s work embodies the management-related complement to research and education accomplished in the macro-economic domain of UNISG. The natural foundations of economics became a required component of studies in the early 1970s ([Binswanger, 1972, 2013](#)).
15. OIKOS, a students’ initiative at USG has developed several activities dedicated to uniting economy and ecology again. The first OIKOS conference was realized in 1987. At the conference in 1988, the Swiss Association for Environment-conscious Management was founded. This forum has triggered a stream of ecological renewal among Swiss firms; the organization counts over 300 members today. Soon thereafter, a Foundation for Ecology was established, which became a major factor for the realization of the Institute for Economy and Ecology at UNISG (Institut für Wirtschaft und Ökologie), the first institute of its kind at a European university.
16. An initiative to study management philosophy scientifically, was spearheaded by Hans Ulrich himself ([Ulrich, 1981, 2001](#)).
17. These categories are based on Ralph Gerard’s original scheme, with the dimensions of structure, function and behavior as essential characteristics of all kinds of living systems ([Rapoport, 1986](#)).
18. Details shall not be elaborated here.
19. Besides the main lectures for all students, just mentioned, a number of courses and seminars with systemic content exist that pertain to the School of Management, in the higher semesters: e.g., “Holistic Thinking – Interdisciplinary Problem Solving,” as part of an “Integration Week” (compulsory course in several master programs) and “Business Dynamics” (elective at undergraduate level).
20. Some students who have not carried out their undergraduate studies at UNISG may be an exception, because not all graduate programs are covered with systems courses.
21. We asked for statements of one to three sentences length or longer, if wished. The sample of testimonials is small and the choice of subject depended rather on accessibility than on randomness, given the limitations of this small publication.
22. Personal communication 2018 of the first two co-authors of the Leipzig model. The co-authors are: professors Manfred Kirchgeorg, Timo Meynhardt, Andreas Pinkwart, Andreas Suchanek, Henning Zülch.
23. The plan designed by the architects Förderer, Otto and Zwimpfer was focused on a dialogue and ultimately a synthesis of architecture and other art forms. This was a statement for a holistic concept of higher education in which a generalist framework would counterbalance and integrate the specialist disciplines.

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