Conceptualizing Electronic Governance Education

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Abstract

Responding to the issues of complexity, relevance, cost and risk of Electronic Governance (EGOV), we witness a specialization of the roles responsible for EGOV development and operation, professionalization of the personnel playing such roles, and utilization of the EGOV services and information to fulfill citizen needs. In order to build competencies required by such (managerial, professional, technician and user) roles, education becomes a key success factor, and a growing variety of EGOV learning opportunities emerges. However, lacking conceptual underpinnings for EGOV education, the discovery, analysis and integration of such opportunities is difficult. To address this need, the paper develops a theoretical construct for EGOV education; applies six measures to this construct: who – learners, why – roles, what – competencies, how – programs, where – schools, and when – prerequisites; and validates it through a landscaping exercise focusing on EGOV university programs.

1. Introduction

As the acceptance and maturity of EGOV increase, so do the expectations that public investment in EGOV produces concrete benefits [1]. Given this goal, a view that EGOV is essentially an innovation and technology effort to improve the working of government, and thus should be left to technology, organizational or domain experts, is too narrow. As EGOV is increasingly called to contribute to addressing policy challenges, political leaders have a role to play in determining EGOV goals. The role of government leaders is to translate such goals into strategies and creating conditions for their implementation. In turn, the implementation is carried out by project managers working with business partners. Once ready, the implementation is deployed within and across agencies and operated by service, technical and management personnel in collaboration with business partners. In the operation, EGOV success rest on the actual usage by citizens, thus mandating early engagement of citizens in EGOV design.

From the discussion above, value-driven EGOV efforts are characterized by the separation of tasks and role specialization on the one hand, and by alignment and collaboration between roles on the other. As a result, three key concerns for value-driven EGOV are:

1. *Capacity* - Individuals assigned to play certain EGOV roles understand their responsibilities and have the capacity to discharge them; the critical nature of EGOV skills is now widely accepted [48].
2. *Collaboration* - The individuals understand and have the capacity to collaborate with related roles.
3. *Institutionalization* - Institutions support their staff in acquiring and maintaining the competencies [2] required for different roles, and in effectively discharging the responsibilities assigned to them.

To address these concerns, this paper recommends an integrated approach to EGOV education, catering to different types of individual and organizational needs and paying due attention to localization and dynamic nature of "value" pursued through the EGOV efforts.

EGOV is a young domain characterized by: deep engagement with government practice [3]; wide range of enquiries at the intersection of administrative and political systems and civil society [4]; competing influences from public administration, information systems, political science and other disciplines [5]; and ongoing efforts to establish foundations. Therefore, the paper also recommends that curricular decisions [6] should consider current thinking and research about: the meaning [7], history [4], evolution [8] and limitations [9] of the EGOV concept; the nature [10] and conceptual foundations [11][12] of the EGOV domain; the state of EGOV research [10]; questions [5] and methods [13] driving EGOV research agenda; relationships between research and practice [14] and between EGOV and related disciplines [15]; and prospects for further developments in the area [16][17].

What is the landscape of EGOV education? EGOV learning opportunities including academic, professional and continuing education steadily increase [18]. While on-the-job training is most common, for qualifications at the intersection of technology and organization,

education programs are more appropriate [19]. Such programs are reported at the professional level e.g. in Italy [20], Lithuania [21], Sweden [22] and UK [23], at vocational level in Sweden [22] and China [1], and as part of public administration master programs in the US [25]. The question whether EGOV is a profession or occupation is addressed in [26], part of discussion about the future of the computing profession [27]. EGOV education is hosted by universities [28], by ministries or technical institutions [20] by: government centers [19], universities working with federal [29] or local government [22], or international organizations working with national governments [30]. However, an agreement on what should be taught is lacking [31], except for citizens where information and strategic skills should be taught [32] or government technology leaders where project and program management, process and change management, and design and planning competencies should be taught [33].

From the discussion above, the EGOV education landscape features a growing number and variety of teaching and learning opportunities, many modes and locations of delivery, lack of standards on curricular and pedagogical issues, lack of clarity on the nature of the EGOV profession, and conceptual uncertainty. Research and analysis are also scarce, especially at the international level. One of the key reasons, according to the authors, is lack of conceptual and theoretical underpinnings for EGOV education. This is in contrast to e-commerce education where comparative studies [34], curriculum research [35], theory-based research [36], and research agenda proposals [34] exist; and to information systems where extensive studies of skills and knowledge requirements exists [37]. In the absence of conceptual and theoretical underpinnings for EGOV education, the discovery, analysis and integration of EGOV education opportunities is difficult.

To address this need, the paper offers a theoretical construct for the EGOV education concept. The concept is explicated through a conceptual model which closely reflects its meaning [38]. Following the earlier analysis on the nature of value-driven EGOV, its participants and their roles, the model applies six simple questions to any instance of EGOV education:

1. Who should receive EGOV education?
2. Why should they receive EGOV education?
3. What EGOV competencies should they receive?
4. How should EGOV competencies be developed?
5. Where should EGOV education be carried out?
6. When should EGOV education be delivered?

The corresponding answers are: who – learners, why – roles, what – competencies, how – programs, where – schools, and when – prerequisites. The model also prescribes conditions to ensure that the answers are consistent. For instance, that the learning objectives (what) reflect job requirements of a given role (why), that programs (how) fulfill competency requirements (what), that schools (where) can execute programs (how), that learners (who) are ready to learn (when).

According to role specialization, the first question returns eight roles described earlier, resulting in an eight by six matrix depicted in Table 1. The table also depicts the application of consistency requirements between the columns (questions) and integration requirements between rows (roles) where the latter reflects decisions to introduce overlaps in the curricula, to co-locate training and to apply other measures to make sure that the roles are able to work together.

Table 1. Conceptual Model for EGOV Education – Abstract View

		Consistency				
	Who	Why	What	How	Where	When
Political Leaders						
Government Leaders						
Project Managers						
Management Staff						
Technical Staff						
Service Staff						
Businesses						
Citizens						

(Integration)

A detailed model will be elaborated in Table 3, and applied to a landscaping scenario focusing on EGOV university programs. The scenario will demonstrate how to obtain uniform representations of EGOV education programs in order to compare, analyze and eventually integrate them. It will aim to demonstrate how the conceptual model for EGOV education can be operationalized in a practical scenario. Of course, other operationalizations are also possible.

The rest of this paper is structured as follows. Section 2 presents related work. Section 3 describes the research methodology adopted to guide this research. Section 4 proposes a conceptual model for EGOV education. Section 5 applies this model to carry out the landscaping exercise in EGOV university programs. Section 6 contains a discussion and lessons learnt while developing and applying the model. The final Section 7 presents some conclusions.

2. Related Work

This section presents three types of related work: 1) on the foundations of the EGOV concept and domain, 2) on the emerging practice in EGOV education, and 3) on education research in EGOV and related domains.

2.1. EGOV Foundations

The EGOV concept is defined in socio-technical terms using technology, organizational change and skills, and depending on the definition used, it lies at various intersections of the political system, administrative system and civil society [4]. One of the most influential definitions [3] is "the use of Information and Communication Technologies (ICT), particularly the Internet, as a tool to achieve better government". The difference between e-government and e-governance is studied in [4] where the latter applies ICT to transform the relationships between citizens, civil society, private sector and the state [8]. EGOV is also defined in [7] considering the impact of ICT, if any, on the normative or structural governance. The vagueness and limitations of the EGOV concept are pointed out in [9], which suggests tying EGOV to the mainstream public administration research.

The EGOV domain does not qualify as a traditional discipline as it lacks unifying theories, vision, methods, procedures and schools and has few graduate programs and students [5]. However, EGOV does possess central research questions: integration, transformation, participation and preservation. The more central is a question to EGOV, the more it needs contributions from multiple disciplines, making a better case for an integrative interdisciplinary science than a traditional discipline [5]. This, however requires a wider and deeper discussion on the foundations [10] including conceptualization [11] and operationalization [12] of the EGOV concept, better use of theory and methods in EGOV research [13], seeking more formal connections between EGOV and related disciplines [15], and better utilization of EGOV research in EGOV strategies and guidelines provided to practitioners [14].

EGOV has made the greatest progress in enhancing government services and improving government operations, in policy development, and in citizen engagement and institutional reform [8]. Among foresight studies, [16] shows the results of scenario-building workshops to develop alternative futures for EGOV in 2020, while [17] proposes to think about the future of EGOV as an open and dynamic socio-technical system, subject to ongoing interactions between: societal trends, human elements, changing technologies, information management, interaction and complexity, and the purpose and role of government.

2.2. EGOV Education Landscape

The EGOV education landscape includes all forms of delivery, from on-the-job training, to professional and continuing education, to formal degree programs.

The latter are well suited for building qualifications in both public administration and technology issues [19]. However, both university-level [20][21][22][23] and vocation-level [22][24] programs exist. The choice is partly due to the status of EGOV as a profession or occupation. According to the study carried out in India [26], EGOV computing workforce is an occupation, not a profession – it enjoys public esteem but it does not control its work or training, and is evaluated by members of other occupations. However, according to [27], all learned professions need professionals to carry out investigation, design, planning and supervision, and technicians to carry out the groundwork and implementation. Professionals learn through academic education, while technicians through technical training.

EGOV education is delivered by different types of institutions: universities working alone [28] or with federal [29] or local governments [22], ministries and technical institutions [20], government competence centers [19][2], or international organizations working with national governments [30]. In a university, such programs can be hosted by public administration and policy [25][3], law [21], technology [4][22] or other schools. For example, [22] outlines an innovative design of a master and vocational EGOV program in Sweden, based on feedback from municipalities, government agencies, trade unions and IT companies.

There is no standard EGOV curriculum [31] and proposals vary depending on the target. In [3], four sets of skills are identified for various groups of public employees – information technology, management and society skills, and updated management skills. Various institutional approaches to assessing and maintaining skill levels exist – hiring of professionals, in-house training and partnering with education providers [3]. For citizens, information and strategic skills should be taught [32]. For government GCIOs, project/program management, process/change management, and design and planning competencies are needed [33]. According to [39], top three EGOV skills for public servants are: project staff – IT literacy, information processing and IT specialist skills; project managers – project management, process management and organizational design; and senior managers – strategy, organizational design and project management. The largest gaps between required and current skills concerns: IT literacy for project staff, risk management for project managers, and strategic skills for senior managers [39].

Efforts aimed at EGOV education infrastructure include an online repository of learning resources [18].

2.3. EGOV-Related Education Research

Research and analysis of EGOV education are scarce, especially at the international level.

In the e-commerce area, [34] reviews five programs including dedicated master programs in e-commerce and e-commerce concentrations in master in business administration programs. It considers career orientation – specialist, generalist or both, and curricular focus – business, technology or business-technology balance; identifies challenges – faculty resources, new market dynamics, curricular innovation and new pedagogies; and proposes a research agenda focused on them. The requirements for e-commerce curriculum confirm that academia and industry have different views on 53% of the courses, and academia and government on 33% of the courses [35]; in order to fulfill the education needs of industry and government this gap should be reduced. [36] adopts an organizational change view and applies Pettigrew's contextualist framework [40] to identify challenges in developing e-commerce education – program planning and design, communication among actors, university-level strategic planning, IT industry development, and design of the teaching systems.

For information systems profession in general, [37] carries out a study of knowledge requirements and critical skills. Instead of generic curriculum to meet all needs of the profession, curricula must be tailored to the needs of different careers, adopting multiple disciplines – technology, business, management and interpersonal skills, and educational innovation [37].

3. Methodology

This research was guided by the methodology which consists of the following five steps:

1. *Literature review* – It was documented in Section 2, covering EGOV foundations, EGOV education practice and EGOV-related education research.
2. *Problem identification* – Following Section 1, EGOV education features a growing variety of teaching and learning opportunities, many modes and locations of delivery, lack of standards on curricular and didactic issues, lack of clarity on the nature of the EGOV profession, and conceptual uncertainty. A key challenge is lack of theoretical underpinnings for EGOV education.
3. *Solution development* – The conceptual framework for EGOV education is documented in Section 4.
4. *Solution validation* – The framework is applied in a practical scenario, documented in Section 5.
5. *Lessons learnt* – Section 6 shares the lessons learnt while building and applying the framework.

4. Conceptual Framework

This section develops a theoretical construct for EGOV education. The construct is explicated through a conceptual model which closely reflects the meaning of the concept, thus balancing deductive (theoretical) and inductive (empirical) approaches [38]. The model applies six questions to any EGOV education instance – who, why, what, how, where and when, and given eight answers to the first question (Section 1), it can be depicted as an eight by six matrix depicted in Table 3. In the table, the cells are colored depending on the number of references, with white cells still awaiting confirmations. The section contains one subsection for each question and one to explain relationships between columns (consistency) and rows (integration).

4.1. Who should receive EGOV education?

Section 1 identified eight stakeholder or learner groups: political leaders; government leaders; project, management, technical and service staff; businesses and citizens. Table 2 maps these groups to four other stakeholder identification efforts: policy- and decision-makers, administrators and public service managers (PSM), and ICT professionals [30]; project staff, project managers and senior managers [39]; political and government leaders, managers and IT specialists [3]; and project leaders, general staff and executives [41]. For a deeper analysis, we could also apply the Stakeholder Theory to examine the power, legitimacy and urgency attributes of each group [42][43].

Table 2. EGOV Learner Map

	Political Leaders	Government Leaders	Project Managers	Management Staff	Technical Staff	Service Staff	Businesses	Citizens
Policy-, decision-makers [29]	X	X						
Administrators and PSM [29]				X		X		
ICT professional [29]					X			
Project staff [38]					X			
Project managers [39]			X					
Senior managers [39]				X				
Political/gov. leaders [3]	X	X						
Managers [3]			X					
IT specialists [3]						X		
Project leader [41]			X					
Working-level staff [41]					X	X		
Executives [41]				X				

Table 3. Conceptual Model for EGOV Education – Detailed View

Consistency

Who - Learners Who should receive EGOV education?	Why – Roles Why should they receive EGOV education?	What - Competencies What EGOV competencies should they receive?	How - Programs How should EGOV competencies be built?	Where - Schools Where should EGOV education be carried out?	When - Prerequisites When should EGOV education be delivered?
Political Leaders [3][30]	Express citizen needs, make visionary and strategic decisions, define priorities [3][30]	Set vision and strategy, communicate effectively, manage politics, influence others, value diversity [44]	Study visits, field trips, role-playing, simulation and serious games, e-learning [46]	International dev. agencies, international and network-based organizations, national training organizations [46]	Leadership and i-Society, then EGOV awareness, then role-specific training
Government Leaders [3][30]	Perform vertical planning, secure resources, ensure collaboration, motivate staff [3]	Solve problems, make decisions, navigate the organization, develop others, build relationships [44]	Study visits, field trips, role-playing, simulation and serious games, e-learning [46]	International dev. agencies, international and network-based organizations, national training organizations [46]	Leadership and i-Society, then EGOV awareness and horizontal issues, then EGOV domain issues
Project Managers [3][39]	Execute projects that implement EGOV strategies, working with business and other partners	Persistence and negotiation, design knowledge, stress resistance, networking, and design/implementation [41]	Simulation and games [47], seminars, workshops, courses, degree programs	International organizations, professional institutions, consulting companies, universities, in-house	Management, then organization and stakeholder issues, then strategy issues
Management Staff [30][39]	Own EGOV implementation [45] and oversee organizational environment for EGOV operation [29]	Persuasion and cooperation, knowledge of IT and processes, abstraction and design methods [41]	Simulation and games [47], seminars, workshops, courses, degree programs	International organizations, professional institutions, consulting companies, universities, in-house	Management, then organization and stakeholder issues, then strategy issues
Technical Staff [3][30][39]	Design and manage systems [29], and ensure provision of the technical environment for EGOV operation	System development, system implementation and maintenance, service and user support [3]	Workshops, courses, degree programs, and simulation and games [47]	Professional institutions, competence centers, consulting companies, in-house	Technology, then organizational and stakeholder issues
Service Staff [29]	Carry out EGOV operation relying on organizational and technical environments, and interact with citizens	Participation, teamwork and self-organization, analysis of work, self-reflection, work redesign skills [41]	Workshops, courses, and simulation and games [47]	Professional institutions, competence centers, consulting companies, in-house	Stakeholder and organization issues, then technology
Businesses [3]	Support EGOV operation and implementation, bring skills and innovation, share risks and costs [3]	IT specialized knowledge, innovation, public-private partnerships, government organization and procedures	Seminars, workshops, courses	Professional institutions, competence centers, universities	Technology and management, then government and stakeholder issues
Citizens [32]	Participate in EGOV policy and design, and interact with service staff when requesting EGOV services	Information skills, strategic skills, operational skills, formal skills [32]	Regular schooling, parental supervision, company training, special courses [32]	Schools, homes, companies, social and community organizations, public libraries, NGOs [32]	Operational skills, then formal skills, then information skills, then strategic skills [5]

Integration

Level of confirmation in literature: ☐ no reference, ☐ one reference, ▨ two references, ▧ three references, etc.

4.2. Why should they receive EGOV education?

Table 4 depicts an assignment of the policy, design, implementation, and operation responsibilities to each group. Political leaders are responsible for: strategic and visionary decisions, expressing citizen needs and defining development priorities [3][30]. Government leaders perform vertical planning, secure resources, motivate staff and ensure collaboration in government and with stakeholders [3]. Project managers execute EGOV projects jointly with business and government partners. Management staff oversees the organizational environment for EGOV operation, including human resources, budgeting, accounting and procurement, evaluation, etc. [30], and act as senior owners for the implementation [45]. Technical staff design and manage EGOV systems [30], and ensure the provision of the technical environment for EGOV operation, and take part in the implementation teams. Supported by the organizational and technical environment, service staff carries out EGOV operation and interacts with citizens. Businesses take part in implementation and operation, bringing skills and innovation, sharing risks and costs, integrating public and private services [3]. Citizens participate in policy and design, and interact with service staff when requesting EGOV services.

Table 4. EGOV Role Mapping

	Political Leaders	Government Leaders	Project Managers	Management Staff	Technical Staff	Service Staff	Businesses	Citizens
Policy [3][29]	X							X
Design [3][29]		X						X
Implementation [3][29][42]			X	X	X		X	
Operation				X	X	X	X	X

4.3. What competencies should they receive?

Political leader need the abilities to set a vision, communicate effectively, manage politics, value diversity and difference, and influence others [44]. Government leaders need the ability to solve problems, make decisions, understand and navigate organization, build and maintain relationships, and develop others [44]. Project managers need stress resistance and networking, detailed design knowledge, persistence and negotiation, and design and implementation skills [41]. Management staff needs knowledge of IT and processes, persuasion and cooperation, abstraction and design methods [41][6]. Technical staff needs system

development, system implementation and maintenance, service and user support skills [3]. General staff needs participation, teamwork and self-organization skills, critical work analysis, self-reflection, and work redesign skills [41]. Businesses need specialized IT knowledge, knowledge of public-private partnerships and government organization and procedures, and ability to innovate. Finally, citizens need four kinds of digital skills: operational – to operate digital media; formal – to handle digital media structures; information – to search, select and evaluate digital media; and strategic – to use digital media to achieve goals [32].

4.4. How to deliver EGOV competencies?

A range of options exist for building EGOV competencies. For political and government leaders [46] the options include: study visits, field trips, role-playing and e-learning. For project managers and management staff: simulation and games [47], seminars and others. For technical and service staff: workshops, courses, and simulation and games [47]. For businesses: seminars, workshops and courses. For citizens: regular schooling and parenting (children), company training (employees) and special courses (seniors) [32].

4.5. Where to deliver EGOV education?

Again, many options exist to host EGOV education programs. For political and government leaders: international development agencies, network-based, international and national training organizations [46]. For project managers and management staff: international organizations, professional institutions, consulting companies, universities or in-house training. For technical or service staff: professional institutions, competence centers, consulting companies or in-house training. For businesses: professional institutions, competence centers and universities. For citizens: schools, homes, companies, social and community organizations, public libraries and NGOs.

4.6. When to deliver EGOV education?

This question determines existing order constraints, if any, between developments of competencies. It can build relationships between programs, by one program developing entry competencies another one requires.

For political leaders, building information society and leadership skills would precede building EGOV awareness and role-specific training. For government leaders, building information society and leadership skills would precede EGOV awareness and training on horizontal issues, before domain-specific issues. For

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project managers and management staff, management would be taught as foundation, then organization and stakeholder issues, then strategy. For technical staff, technology is a foundation, before organizational and stakeholder issues. For service staff, stakeholder and organization issues are a foundation before technology. For businesses, technology and management are foundation, before government and stakeholder issues. For citizens, skills should be built from operational to formal, information and strategic skills [31].

4.7. Consistency and integration

The model requires that for a given case of EGOV education, the answers provided in different cells are consistent. To this end, five conditions are put forward:

1. Roles (why) reflect responsibilities of learners,
2. Competencies (what) fulfill role requirements,
3. Programs (how) develop the competencies,
4. Schools (where) are able to execute programs, and
5. Learners are ready (when) to participate.

The model can also help design and analyze various integration measures between EGOV programs taught to different roles, particularly those who should work together, such as: shared education programs [23], common courses, co-located training, joint events, etc.

5. Landscaping EGOV Education

The conceptual framework was validated through the study of seven EGOV university programs:

1. Professional Master of Science in e-Government, Danube University Krems, Austria;
2. MSc in e-Governance for Developing States, The University of West Indies, Barbados;
3. Professional Master in Technologies for e-Government, University of Trento, Italy;
4. Master in Public Management Program, Specialization in Technology-Based Enterprise, Ateneo de Manila University, Philippines;
5. Executive Master in e-Governance, Ecole Polytechnique Federale de Lausanne, Switzerland;
6. International Master in Electronic Governance, Orebro University, Sweden; and
7. Certificate of Advanced Study in E-Government Management and Leadership, Syracuse University.

The validation process was carried out as follows. First, the what, how, where and when questions were determined based on the information available about each program online: what – knowledge areas of the courses taught and skills developed (some can be deduced from the type of curricular components); how – modes of training delivered; where – an institution issuing a degree, an academic unit hosting the program and its partners; and when – criteria and prerequisites for student admission. Then, the content of each curricular component was classified as one or more of policy, design, operation or implementation categories. For example, the privacy and security course was classified as implementation, while the course on policy, strategy and project management was classified as policy, design and implementation. On this basis, the why question was determined by calculating percentages of courses in each category over the whole curriculum. Finally, the who question was determined from the program's target audience or, if a program defines a broad audience, using the answer to the why question together with the map in Table 4.

The outcome from this process, when applied to the seven EGOV programs, is summarized in Table 5 and described as follows. Who – 2 programs (29%) train political leaders, 4 (57%) government leaders, project managers and management staff, and 3 (43%) technical staff. Why – two programs (29%) focus on one role, most (71%) address more than one role, and none addresses all roles. Design and implementation are considered in 86% and 71% of cases (see Figure 1). What – knowledge areas and skills differ between programs unless they target the same roles, e.g. policy-related programs teach public policy and legal issues; while design-related programs teach organizational design and strategy. How – most programs (86%) apply a blended approach: courses (100%), thesis (57%), practicum (29%), project (29%) and field trips (14%); courses are delivered face-to-face and online. Where – all programs are delivered by university units: Department of Government, Sociology and Social Work (Barbados); Faculty of Science (Italy); School of Government (Philippines), School of Social Sciences (USA) and College of Management of Technology (Switzerland), one program is delivered in partnership (Italy) and one by a specialized center (Austria). When – all programs require a university degree – bachelor or equivalent, one (Italy) requires degree in a specific field (computer science or engineering), and 5 (71%) require professional experience from mid to senior and executive levels, with required years of experience from 2 (Philippines) to 7 (USA). Consider consistency based on the case from Sweden: the learners include project managers and technical staff; 58% of the courses address implementation – learners' main responsibility; competencies delivered include implementation issues, like e.g. privacy and security; the program comprises 13 courses, projects and thesis; and applicants must possess a university degree and English proficiency, due to international nature.

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Table 5. EGOV Education Landscaping – Seven University Programs

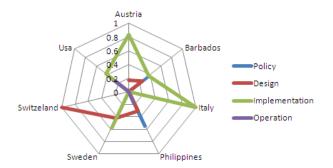| Cases	Who	Why	What	How	Where	When
	Learners	Roles	Competencies	Programs	Schools	Prerequisites
Austria	project managers, management staff government leaders	17% design 83% implementation	process management interoperability management skills	courses	Center for e-Governance Danube University	university degree executive level experience in PA
Barbados	political leaders management staff government leaders	38% policy 25% design 38% implementation	legal issues strategy development project management	courses practice thesis	Faculty of Social Sciences University of West Indies	2nd class honors degree; mid-senior executive capacity
Italy	technical staff project managers	100% implementation	data management application integration public management	courses project thesis	Univ. of Trento; Fnd. B.Kessler-Ist; Inf.Trentina S.p.A.	degree and know-ledge in computer science or equiv.
Philippines	political leaders management staff	54% policy 31% design 15% operation	public policy organizational design operation management	courses internship	Ateneo School of Government, Ateneo University	bachelor degree 2 years working experience
Switzerland	government leaders	100% design	ICT for development innovation e-readiness	courses field trips thesis	EPFL-CDM-MIR with international academic partners	bachelor degree 5 years experience in management
Sweden	project managers technical staff government leaders	42% design 58% implementation	EGOV development IT systems privacy and security	courses project thesis	Orebro University	bachelor degree proficiency in English
USA	project managers technical staff management staff	33% policy 42% implementation 25% operation	managerial leadership ICT policies EGOV operation	courses	Maxwell School, Syracuse University	7+ years mid-level professional experience

Figure 1. EGOV Programs and EGOV Roles

6. Discussion

The validation exercise showed that the conceptual framework can be applied to existing educational programs based on the information made available online, and how in practical terms to determine the answers to questions. In the presence of electives, the framework could cover all configurations of learners (who) and roles (why), or create different programs to represent different specializations.

The conceptual framework could be used in various ways: 1) as a tool for landscaping, comparing and analyzing the offerings by different programs; 2) as a tool applied to individual programs to help students make decision on the ways to approve them or to highlight possible improvements; 3) as a tool to help design new programs, using foundational constructs provided by the conceptual model, and benchmark them with other programs; and 4) as a tool to help detect and correct inconsistencies within a program.

The conceptual framework developed in this paper could be applied to help analyze any set of EGOV education programs, as demonstrated in Section 5. More generally, the methodology could be reused to develop conceptual frameworks for other education domains, for instance e-commerce or information society, including domains that rely on collaboration between stakeholder groups. The demonstration of this possibility is planned as part of our future work.

7. Conclusions

Motivated by the lack of conceptual underpinnings to facilitate analysis and comparison between existing EGOV education programs, and to help design and implement new programs, this paper developed a theoretical construct for EGOV education. The resulting conceptual framework applies six questions to any instance of EGOV education: who (learner), why (role), what (competency), how (program), where (school) and when (prerequisites). The model also provides the means of analyzing the consistency of the

replies and designing any overlaps in the curricula offered to the roles that are supposed to work together. The model was validated through a landscaping exercise comprising seven cases of EGOV university programs, while documenting the lessons learnt.

The model provides a comparative analysis tool for EGOV education problems. It enables further analysis of the six dimensions and the relationships among these dimensions, e.g. what kinds of programs (how) are most effective for different categories of learners (who), what is the best way (how) to educate citizens (who) on the use of electronic public service (what)? The holistic approach covering all EGOV stakeholders across the EGOV value chain enables a comprehensive design of EGOV education or training programs.

Future work includes further empirical validation of the framework to inform its refinements, broadening the scope of the landscaping exercise in terms of the number and type of education programs, defining the ontology to classify EGOV curricula and capture the meaning of and relationships between various elements of the framework, further theory development to be able to build and relate prescriptive and descriptive models and to elaborate on the six dimensions, and reusing the methodology for developing conceptual frameworks for other education domains.

References

[1] A.M. Cresswell, G.B. Burke, and T.A. Pardo, "Advancing Return on Investment Analysis for Government IT: A Public Value Framework", Center for Technology in Government, 2006.

[2] P.N. Blanchard, and J.W. Thacker, Effective Training - Systems, Strategies and Practices, Pearson, 2004.

[3] T. Field, E. Muller, and E. Lau, "The e-Government Imperative", OECD, 2003.

[4] Å. Grönlund, and T.A. Horan, "Introducing e-Gov: History, Definitions, and Issues", Communications of the Association for Information Systems, vol. 15, 2005, pp. 713-729.

[5] H.J. Scholl, "Central Research Questions in e-Government, or Which Trajectory Should the Study Domain Take?", Transforming Government: People, Process and Policy, vol. 1, 2007, pp. 67-88.

[6] T.A. Pardo, "Building a Relevant Digital Government Curriculum", Proceedings of the 8th Annual International Conference on Digital Government Research, 2007, p. 339.

[7] F. Bannister, and R. Connolly, "New Problems for Old? Defining e-Governance", Proceedings of the 44th International Conference on System Sciences, IEEE, 2011.

[8] S.S. Dawes, "The Evolution and Continuing Challenges of E-Governance", Public Administration Review, 2008.

[9] M. Yildiz, "E-Government Research: Reviewing the Literature, Limitations, and Ways Forward", Government Information Quarterly, vol. 24, 2007, p. 646–665.

[10] H.J.J. Scholl, "Electronic Government: A Study Domain Past its Infancy", E-Government: Information, Technology, and Transformation, M.E. Sharpe, 2010.

[11] P. Rossel, and M. Finger, "Conceptualizing E-Governance" 1st International Conference on Theory and Practice of Electronic Governance, Macao SAR, China, ACM Press, 2007, pp. 399-407.

[12] J. Shahin, and M. Finger, "The Operationalisation of e-Governance", Proceedings of the 2nd International Conference on Theory and Practice of Electronic Governance - ICEGOV 2008, Cairo, Egypt, ACM Press, 2008, pp. 24-30.

[13] R. Heeks, and S. Bailur, "Analyzing e-Government Research: Perspectives, Philosophies, Theories, Methods, and Practice" Government Information Quarterly, vol. 24, 2007, p. 243–265.

[14] J. Gil Garcia and T. Pardo, "E-government Success Factors: Mapping Practical Tools to Theoretical Foundations", Government Information Quarterly, vol. 22, 2005, pp. 187-216.

[15] J. Davies, T. Janowski, A. Ojo, and A. Shukla, "Technological Foundations of Electronic Governance", 1st International Conference on Theory and Practice of Electronic Governance, Cairo, Egypt, ACM Press, 2007, pp. 5-11.

[16] M. Janssen, P. van der Duin, R.W. Wagenaar, M. Bicking, M.A. Wimmer, S. Dawes, and R. Petrauskas, "Scenario Building for E-Government in 2020: Consolidating the Results from Regional Workshops" Proceedings of the 40th International Conference on System Sciences, IEEE, 2007.

[17] S.S. Dawes, "Governance in the Digital Age: A Research and Action Framework for an Uncertain Future", Government Information Quarterly, vol. 26, Apr. 2009, pp. 257-264.

[18] N. Botts, B. Schooley, and T.A. Horan, "Learning Object Development and Repository Design for Digital Government Instruction," HICSS41, IEEE Computer Society, 2008.

[19] S. Kaiser, "Qualification Requirements in e-Government: The Need for Information Systems in Public Administration Education", Electronic Government, LNCS 3183, Springer, 2004, pp. 464-467.

[20] M.A. Biasiotti and R. Nannucci, "Teaching e-Government in Italy," Electronic Government, LNCS 3183, Springer, 2004, p. 460–463.

[21] A. Augustinaitis and R. Petrauskas, "Master Studies on e-Governance Administration: The First Experience in Lithuania", Electronic Government, LNCS 3183, Springer, 2004, p. 453–456.

[22] P. Elovaara, S. Eriksen, C. Hansson, M. Nilsson, and J. Winter, "Educational Programs in e-Government - An Active, Practice and Design-Oriented Network?", Electronic Government, LNCS 3183, Springer, 2004, pp. 457-459.

[23] F. Slack, and J. Walton, "Organizational Culture and Stakeholder Power: A Case Study of Postgraduate Initiatives in e-Government," Proceedings of the 2nd International Conference on Theory and Practice of Electronic Governance, Cairo, ACM Press, 2008, pp. 331-336.

[24] X. Hu and F. Wen, "The Exploration and Research of e-Government Profession Teaching Reform in Higher Vocational College", E-Health Networking, Digital Ecosystems and Technologies (EDT), IEEE, 2010, pp. 416–419.

[25] S. Chiu, "Understanding the Adoption and Diffusion of Innovative Information Technology Curricula: A Case Application to Master of Public Administration Programs", Proceedings of the 2006 International Conference on Digital Government Research, ACM, 2006, pp. 375-376.

[26] P.V. Ilavarasan, and C.M. Malish, "Computing Professionals in e-Governance: Policy Implications," Proceedings of the 2nd International Conference on Theory and Practice of Electronic Governance, Cairo, ACM Press, 2008, pp. 239-244.

[27] W. Holmes, "The Future of the Computing Profession," Computer, 2010.

[28] T. Obi, "Current Topics in the Discussion on the Relationship between e-Governance and Education," Proceedings of the 2nd International Conference on Theory and Practice of Electronic Governance, ACM Press, 2008, pp. 211-215.

[29] United States Government, "CIO University - Federal Executive Competencies".

[30] UNESCO, "Curriculum Guide on E-Governance For African Government Institutions".

[31] C. Leitner, "e-Government: People and Skills in Europe's Administrations", 2006.

[32] A.J.A.M. van Deursen, and J.A.G.M. van Dijk, "Improving Digital Skills for the Use of Online Public Information and Services", Government Information Quarterly, vol. 26, Apr. 2009, pp. 333-340.

[33] R. Pipe, "Government CIO Survey Results", Journal of e-Governance, vol. 34, 2011, pp. 9-10.

[34] S. Chan, "Challenges and Opportunities in e-Commerce Education", 2001.

[35] C. Wu, "Exploring Requirements of the Electronic Commerce Curricula: A Perspective of Industry, Government, and Academy," IEEE, 2007.

[36] P. Chang and B. Lee, "A Contextualist Approach to the Development of e-Commerce Education: An Analysis of Key Issues and Challenges", Journal of Information Technology, vol. XVII, 2006, pp. 69-90.

[37] D.M.S. Lee, E.M. Trauth, and D. Farwell, "Critical Skills and Knowledge Requirements of IS Professionals: A Joint Academic/Industry Investigation," MIS Quarterly, vol. 19, Sep. 1995, pp. 313-340.

[38] C.P. Middendorp, "On the conceptualization of theoretical constructs", 1991.

[39] COMPAT, "Competency Assessment and Training for the Uptake of eGovernment Services by Public Authorities", 2011.

[40] A.M. Pettigrew, R.W. Woodman, K.S. Cameron, and K.I.M.S. Cameron, "Studying Organizational Change and Development: for Future Research", Management, vol. 44, 2011, pp. 697-713.

[41] T. Schuppan, "E-Government Competencies: Looking Beyond Technology. What are Competencies Empirical Findings Case Example Conclusions", Handbook of Public Information Systems, Third Edition, 2010, pp. 354-369.

[42] R.K. Mitchell, B.R. Agle, and D.J. Wood, "Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts", The Academy of Management Review, vol. 22, Oct. 1997, p. 853.

[43] H.J.J. Scholl, "Applying Stakeholder Theory to E-Government: Benefits and Limits," Towards the E-Society, Springer, 2002, pp. 735-747.

[44] C.D. McCauley, "Developmental Assignments: Creating Learning Experiences without Changing Jobs", Center for Creative Leadership Press, 2006.

[45] UK Office of Government Commerce, "Successful IT-Enabled Business Change - The Senior Responsible Owner", 2001.

[46] A. Ojo, Z. Dzhusupova and Tomasz Janowski. International Training Programs in Public Administration and e-Government: Case Reviews and Recommendations. EU-China Information Society Project, 2009.

[47] B. Klievink and M. Janssen. Simulation Games for Collaborative Development in E-Government. 43rd Hawaii International Conference on System Sciences. IEEE, 2010.

[48] Z. Dshusupova, T. Janowski, A. Ojo and E. Estevez. Sustaining Electronic Governance Programs in Developing Countries. In Proceedings of the 11th European Conference on eGovernment, Ljubljana, Slovenia, 16 - 17 June 2011.