Development of a Disability Employment Information System: 
An Information Systems Design Theory Approach

Benjamin L. Schooley, MBA, PhD  
Claremont Graduate University  
benjamin.schooley@cgu.edu

Sue S. Feldman, RN, MEd  
Claremont Graduate University  
sue.feldman@cgu.edu

Nagla S. Alnosayan, MSc  
Claremont Graduate University  
nagla.alnosayan@cgu.edu

Abstract
Employment has been shown to provide people with disabilities a sense of self satisfaction and contribution to society. However, a significant challenge exists in that social constraints are often imposed on this population by an uninformed or uneducated socio-political system. Governments struggle with appropriate means to address such constraints. One such program in the U.S., called Ticket-to-Work (TTW), rewards certain public and private organizations for providing employment services for people with disabilities. While multi-organizational e-government systems have been developed to enable a wide range of public programs, no disability employment system was found to exist to serve a clear need for improved employment services across public and private organizations serving the TTW program. This research employs Information Systems Design Theory (ISDT) to design, develop, and assess a disability employment system. End user data collection, system requirements, system design and kernel theories are presented, design propositions are evaluated, and implications are discussed on the role of e-government in disability employment management.

1. Introduction
The implementation of e-government worldwide has been categorized into three general sectors, namely: Government-to-Government (G2G), Government-to-Business (G2B), and Government-to-Citizen (G2C). However, there are an increasing number of unique arrangements that involve an array of government, business, not-for-profit, and citizen interactions. This research analyzes how an e-government system can be developed to support an innovative government to business to not-for-profit/business (G2B2N) arrangement. That is, while the immediate focus of e-government interaction is between government and business (and not-for-profit) organizations, the goal of the information system described herein is to: 1) facilitate communication between government and citizen via proxy service providers, 2) support transactions between government and businesses, and 3) support a government program aimed at enabling persons with disabilities to enter the workforce and migrate off of complete public assistance. As such, this research explores the design and development of a multi-tiered e-government information system aimed at supporting a government sponsored disability employment management program.

2. Background
2.1. Disabilities and e-Government
In 1986 Disabled Peoples International defined disability as such: “Disability is the loss or limitation of opportunities to take part in the normal life of the community on an equal level with others because of physical and social barriers [1].” The US Census Bureau further categorizes those with disabilities as unable to work and receiving federal benefits. These conceptualizations about persons with disabilities are beginning to move beyond the personal health limitations that persons with disabilities may face, to the social constraints imposed by an uninformed, uneducated, or otherwise unthinking socio-political system [1, 2, 3]. Disability can be viewed more as a social and political issue rather than solely a medical one. This perspective has been called the social model of disability, or social oppression theory [1]. Governments struggle with appropriate means for instantiating legislation and programs that address these socio-political conceptualizations [4]. An extension of these challenges presented herein lies in the development of e-government systems that support these legislative programs and initiatives.
One set of initiatives in support of this conceptualization maintain that a socio-political system should enable and facilitate opportunities for persons with disabilities to function, obtain, and retain jobs in the workforce.

2.2. Disabilities and employment

Employment is important for people with disabilities to maintain a sense of self satisfaction and contribution to society [3, 5]. For those with disabilities, employment has shown to provide both health and financial benefits. Health benefits include maintaining psychological health and reaching individual satisfaction and accomplishment. Research has found that psychological health has been linked to more expeditious recovery from a disabling event or avoidance of exacerbations from disabling conditions [6]. According to the psychology of working perspective, employment can fulfill three human needs; survival, relatedness, and self determination [3]. Financial benefits are also critical for the persons with disabilities – a sector of the population most commonly living under the federal poverty level [7]. As such, the United States government has sought to instantiate programs to enable people with disabilities find and retain jobs in the workforce. From a programmatic perspective, these programs have merit. However, an e-government system to support the administrative burdens of these programs has come as an afterthought long after the legislation was voted into practice.

2.3. Research aims

In this paper, we aim to investigate the design and development of a disability employment information system that aligns with the social model of disability. We are asking the following questions:

1. What is the role of information technology in helping people with disabilities obtain and maintain employment?
2. How can an Information System be designed to enable government to business to not-for-profit/business interactions to enable people with disabilities to obtain and retain employment?

The paper is organized as follows. We first describe the research context and theoretical background. We then describe our design framework. Next, we explain the use of the information systems design theory (ISDT) as applied to this research including the artifact we developed and the evaluation of the artifact. Finally, we conclude with a discussion and next steps.

2.4. Research context: U.S. Ticket-to-Work program

To fulfill the need to work and empower people with disabilities, the US Government has established the Ticket-To-Work (TTW) program. The TTW program builds upon the positive work expectations by beneficiaries [8]. It was established in 2002 by the Ticket to Work and Work Incentives Improvement Act of 1999. The aim of the program is to help Social Security disability benefit recipients, called beneficiaries hereafter, obtain employment while maintaining access to healthcare, as needed. Under this program, the Social Security Administration (SSA) provides the beneficiary with a “ticket.” Then, the beneficiary uses the ticket to request employment preparation services and referrals from organizations called Employment Networks (ENs). These can be for-profit or not-for-profit organizations. The EN provides a case worker who, in partnership with the beneficiary, develops an individual work plan (IWP). The IWP serves as a service provision tool for the EN. If the beneficiary succeeds in reaching employment milestones and the EN provides services as laid out in the IWP, SSA pays the EN for the beneficiary reaching those goals or milestones. These milestones and accompanying payment calculations are complex and outside the scope of this paper.1 Program and data administration and support of the TTW program is maintained through a service contract between SSA and a private company [8].

Many issues exist with the program. A key finding in a 2008 research by Mathematica [8] reveals that the TTW program is losing momentum because of the financial risks it poses on the ENs and the complex administration procedures associated with it. Many ENs have withdrawn from the program and the recruitment of new ENs has proven to be difficult. Moreover, two thirds of the available ENs have not accepted a ticket from a beneficiary. Yet, the increasing number of beneficiary enrollments in the program shows that it has the potential to grow [8]. As a result, SSA implemented new regulations to improve the program in 2008. Responsive to EN’s program and administrative assessments of TTW, these regulations provide vehicles by which the EN can get paid earlier in the beneficiary employment period and through various mechanisms [9].

Since the 2008 regulations, there has been a 6% increase in EN enrollment. However it is important to point out that this increase is amid a previous 9% drop in enrollment. As of mid 2010, only 1,275 ENs were enrolled in the program nationwide [10]. This is a concern for SSA because the success of the TTW program is dependent on ENs. In fact, every national evaluation of the program concludes that some changes are needed to encourage growth and sustainability in the amount of ENs serving the TTW program and new regulations. Accordingly, SSA works to strengthen the program by continuously revising the regulations.

As mentioned above, one of the main challenges facing current and potential ENs is the complexity of the program’s administration processes [11]. In particular, ENs have frequently complained about the payment process (i.e. the process in which the EN requests and receives payments from SSA) [11, 12].

Interestingly, some ENs have reported that the use of home-grown software (e.g. spreadsheets) helped them with administrative tasks of the program, however, these solutions are not refined nor widely distributed and therefore use is sparse [12]. Information technology is helpful in accessing and utilizing existing data for a variety of program efforts. For example, one effort towards using information technology to facilitate the use of existing data is the National Disability Data System (NDDS). The need for this system builds on the rationale that multiple data sources are collected about persons with disabilities (national surveys, government program data, etc.) and that the growing number of working-age people with disabilities coupled with the increasing number of programs offered by the government to support these people, mandate the need for a system [13]. There is value in having a system where silo data can be brought together to create efficiencies in an inefficient system. However, such a system is a long-term solution to an immediate problem.

Indeed, having a standard solution that serves the purpose of decreased data redundancy with increased data utilization makes sense. However, the TTW program needs a more immediate solution to reduce the administrative load; it is important for improving the future of the program for two reasons. First, it serves as a solution for ENs that are facing problems with keeping up with the program’s administrative needs and for new ENs joining the program. Second, it paves the way for future goals (e.g. sharing information among different entities such as SSA, support services, and other ENs); without a supporting information system, sharing information among the heterogenous systems is not possible [14].

3. Theoretical background

In this section, we describe the fundamental concepts in this study. Those include: empowerment, supported employment, business process management, and information systems design theories.

3.1. Empowerment theory and disability services

One principle of the empowerment theory is that people have the capacity to meet their own needs. In case they do not demonstrate their ability to meet their needs, then the social system, and not individual intrinsic deficiencies, may be the reason behind their inability [15]. This would be because the socio-political system did not create opportunities for them to display their abilities [16]. Empowerment is a valuable outcome for delivering service to those with disabilities [15].

From a resource allocation standpoint, appropriate resources need to be provided to achieve empowerment. Empowerment in disability services includes the dimensions of service provision (decision making, marketing, and creating an opportunity for choice) and the disability empowerment dimension of promoting self-determination [17]. One caution, however, is not to use empowerment as a perception in the design of services that are based only on managerial principles because this action worsens the well-being of the people who need the support. To avoid falling into this problem, it is important to involve individuals with disabilities in the design of the services [18]. Empowerment is an important underlying theory guiding the design of the system described herein.

3.2. Supported employment

Supported employment is a case worker oriented program approach that has been shown to improve integration into competitive jobs of individuals with disabilities [19, 20]. The approach consists of three components: ‘place-train-maintain.’ The first component ‘place’ includes profiling the individual in terms of skills, needs and desires, and, suggesting employment and employers that fit an individual’s profile. The ‘train’ component, involves breaking down tasks and training the individual on each part. The final component, ‘maintain,’ provides ongoing support as needed. The case worker plays a significant role in all three components. More
recently, the ‘choose-get-keep’ components have been used to more fully represent and integrate the empowered client (persons with disabilities) into the process of gaining and maintaining employment [21]. We draw from both models in the conceptualization of a disability employment information system.

3.3. Business process management for public services

Business Process Management (BPM) is important for effective and efficient service delivery. Since public services differ in nature from other services in terms of administrative processes and goals, BPM must address the characteristics of administrative process and meet the goals of the domain [22]. The characteristics of processes include complexity, dominance of information processing, legal regulations, numerous interactions between different parties (e.g. customers, businesses, public officials and information systems), different cases, unpredictable decision making, limited cross organizational collaboration and the need for support from public officials [22]. Knowledge, resources, integration, collaboration and specific features of the public service are essential for handling complex administrative tasks [22, 23]. We draw from principles and practices in BPM in the analysis and design of a disability employment information system.

3.4. Information system design theory for a disability employment system

Given the need for a disability employment system and the lack of near-term solutions that address this need, we use a design science framework to design an artifact that aims to improve the delivery of employment services to persons with disabilities.

Design science is a fundamental paradigm in information systems research that aims to improve organizational capabilities through the creation of an artifact. The artifact can be a construct, method, model, or instantiation [24]. Design includes both a process and a product [24, 25]. The design process is composed of the steps and procedures used to develop the artifact. The design product is the set of requirements and design characteristics that guide the development of the IT artifact [25]. The development of a disability employment system requires consideration of the design process and the design product.

In terms of the design process, we follow an iterative design process. We believe that the iterative design process is suitable because the context of disability employment is complex, unclear, and changing.

In terms of the design product, we use the Information Systems Design Theory (ISDT) model provided by Walls et al. (1992). According to Walls et al (1992), ISDT consists of four components: (1) meta-requirements define the goals that the theory applies to; (2) meta-design describes the artifacts hypothesized to meet the meta-requirements; (3) kernel theories from natural or social sciences which govern the design requirements; (4) testable design propositions that verify whether the meta-design meets the meta-requirements [25]. Table 1 shows the implementation of ISDT for disability employment.

4. Methodology

We conducted a multi-site case study to test the design theory on the TTW program, a disability employment program in the US. According to Yin (2009), a case study is suitable for testing a theory [26]. The unit of analysis in the study is the program’s processes.

We conducted 22 60-minute semi-structured interviews between July 13-24, 2009. Interviewees were purposively selected ENs in New York (6), Wisconsin (7), and California (9). These sites were chosen because they were interested in improving EN capacity to help people with disabilities obtain employment, and represented a cross-section of ENs (small, large, services, etc.). A majority of the interviews were conducted face to face at the EN office, however, when this was not possible, interviews were conducted over the phone.

Interviewees included representatives from private for profit and non-profit employment networks and government sponsored agencies. Two researchers took notes during each interview and compared notes and observations after each interview to increase reliability. To allow for proper preparation and effective use of interview time, interview questions were sent to participants in advance of the interview. Topics covered business operations (e.g. workflow), interactions with other agencies (i.e. SSA, Department of Rehabilitation), reporting, and training issues.

In addition, secondary data was obtained from SSA, service provider organizations, and ENs. The data included de-identified reports, documentation, and excel worksheets, as well as blank administrative forms.

Interviews and secondary data were analyzed to categorize issues, challenges, and future needs from a
process and programmatic perspective. This analysis resulted in 11 core categories as well as several programmatic issues.

5. Findings

The analysis found twelve processes for the TTW program and categorized issues, challenges, and future needs for the improvement of the program. We found that these core processes are not currently supported by an existing information system and thus, the ISDT approach was applied. The core processes were identified as: (1) beneficiary recruitment; (2) beneficiary assessment; (3) ticket assignment; (4) document and form creation, submission and tracking; (5) contact and service management; (6) ticket milestone and outcome tracking; (7) payment request submission and tracking; (8) obtaining proof of employment/pay; (9) managing program updates; (10) reporting and analytics; and (11) Employment Network training [27]. Figure 1 illustrates a process abstraction as presented to the users.

![Figure 1. TTW core processes for tracking beneficiaries](image)

The research findings were assimilated and an ISDT for disability employment was derived as illustrated in Table 1.

<table>
<thead>
<tr>
<th>ISDT element</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Meta-requirements</strong></td>
<td>The system should have the ability to address:</td>
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<td><strong>Public service objectives</strong></td>
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<td></td>
<td>• provide flexibility and adapt to changes</td>
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<td></td>
<td>• open and transparent</td>
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<td></td>
<td>• facilitate collaboration</td>
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<td>• cost effective</td>
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<td></td>
<td><strong>BPM objectives</strong></td>
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<tr>
<td></td>
<td>• provide effective and efficient service delivery</td>
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<td></td>
<td>• support core business processes</td>
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<td></td>
<td>• facilitate complex administrative tasks</td>
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<td></td>
<td><strong>Empowerment objectives</strong></td>
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<td></td>
<td>• create opportunities for competence to be displayed</td>
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<td></td>
<td><strong>Disability service provision objectives</strong></td>
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<td></td>
<td>• promote self determination</td>
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<td></td>
<td>• improve decision making</td>
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<td></td>
<td>• enable outreach and communication</td>
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<td>• create opportunities for choice</td>
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<td></td>
<td><strong>Supported Employment objectives</strong></td>
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<td></td>
<td>• place, train and maintain employment</td>
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<td></td>
<td>• choose, get, and keep employment</td>
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<tr>
<td><strong>Meta-design</strong></td>
<td>The employment disability system can be designed to</td>
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<tr>
<td></td>
<td>• be cost effective and adaptable to changes</td>
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<td></td>
<td>• ensure security and privacy of beneficiary information</td>
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<td></td>
<td>• provide task and process management and administration (i.e. add, delete, modify and administer tasks and processes)</td>
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<td></td>
<td>• support knowledge management, integration, interoperability and meet specific context requirements</td>
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<td></td>
<td>• provide means for people with disabilities to use the system</td>
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<td>• provide decision making functionalities for case workers and individuals with disabilities</td>
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<td></td>
<td>• provide different options for individuals and case workers to select from</td>
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<td></td>
<td>• provide modules for case workers to place, train and maintain individuals</td>
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<td><strong>Kernel theories</strong></td>
<td>Empowerment</td>
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<td></td>
<td>Supported Employment</td>
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<td>Business Process Management for public services</td>
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<td>Testable design product propositions</td>
<td>Description</td>
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<td>ISDT element</td>
<td>The disability employment system will</td>
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<td>• increase case worker face time with beneficiary</td>
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<td>• enable more consistent case worker follow up with beneficiaries</td>
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<td>• enable more timely payment tracking by the case worker</td>
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<td>• enable more consistent use of terms by the case worker</td>
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<td></td>
<td>• enable case workers to utilize information to inform decision-making regarding provision of beneficiary services including training</td>
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<td>• empower case workers with knowledge to assist beneficiaries to find and maintain work</td>
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<td>• enable streamlined processes for the range of routine tasks</td>
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The findings also revealed other programmatic issues such as state vocational rehabilitation centers competing with ENs for tickets, beneficiaries with mental disabilities not meeting milestones in the timeframe specified by the TTW program, insufficient program promotion, lack of transparency between ENs, service provider organizations, and SSA, unclear goals, and lack of collaboration between involved organizations. Addressing such programmatic issues is outside the scope of this prototype, however, it is possible that the use of this system could have an unexpected impact on some of these areas.

To represent the business processes from the EN’s point of view, we used Serviceflow modeling [28] because it helps in designing information systems for service tasks and coordination needs; in addition, it has been utilized to model e-government services in the past [23, 28]. To model Serviceflow, we identified the service points that depict the main tasks, from the EN’s perspective, along with their pre- and post-conditions. Figure 2 shows the simplified process pattern for disability employment from the EN’s perspective.

Next, based on the design theory described above, the interview findings, and the process analysis we developed a prototype application with limited functionality. The limits were due to budget and collaboration constraints and only addressed requirements related to processes for tracking beneficiaries in the TTW program.

To provide flexibility and future collaboration, we selected a Software as a Service (SaaS) architecture. We also adopted open source technologies to present a cost effective solution. Furthermore, the core processes related to tracking beneficiaries were also implemented. Figure 3 illustrates the high level implementation architecture for the disability employment information system prototype.

Figures 4 and 5 provide two sample screenshots of the web application. The first is a navigation screen, derived from the previously mentioned interviews and process analysis, that allows users to quickly access core modules (Figure 4). The second is a “dashboard” page that provides a personalized summary for each user about their current, upcoming,
and overdue activities related to the disability employment services they provide to their client beneficiaries (Figure 5).

Figure 4. SmartWorks Navigation Screen

Figure 5. SmartWorks Dashboard Screen

6. Evaluation

At this stage in the design we set forth a prototype for initial evaluation by potential end-users. This prototype is a limited-functioning application with selected test data inputs and outputs (e.g. forms). Understanding that the prototype itself is a balance between technical achievements and user utility, the purpose was to have the end-users assess how the prototype performs and what the user needs it to accomplish. End-user needs will constantly evolve and will continue to be central to next-stage development. During this evaluation, the researchers recognized that it might be difficult for users to imagine the potential for this tool relative to the testable propositions. To mitigate such self-imposing limitations on the tool’s technical capacity and user utility, participants were encouraged to think prescriptively. Prescriptive methods try to help people clarify their values and preferences so they can develop visions of desirable futures. A demonstration of the prototype was presented and questions were asked to elicit reactions about the design, workflow, and features of the system. This approach enabled researchers to validate current design as well as explore potential alternatives and improvements.

6.1. Evaluation approach

The participation of real future application users was made possible by a prototype demonstration at a national conference of industry experts as well as subsequent demonstrations. The demonstrations were conducted independently by two researchers between April and June 2010. Using test data, the demonstrations were situated to create a realistic environment supposing situations where a beneficiary seeks EN services. Due to the limited functionalities of the prototype, the researchers chose to mitigate the risk of application rejection at the pilot phase, and utilize a demonstration approach rather than a hands-on approach. This was disclosed to the participants during the demonstration. We conducted 41 expert-user one-on-one live demonstrations that included 2 users from our previous interview group (requirements gathering). Because of their professional background all users were familiar with the routine business processes performed by ENs and the potential for an application to streamline those processes as well as address other testable design product propositions set forth in Table 1. The remainder of the evaluation section is presented categorically according to these propositions.

6.2. Evaluation findings

6.2.1. Increase case worker face time with beneficiary. Participants validated that the application could enable case workers to spend more time with beneficiaries as opposed to administrative “paper work.” Broad reaching comments such as, “This is just what ENs need” and “this will really help keep me organized” spoke to the efficiencies the tool could provide. Users felt that additional features, such as more drop-down or check box choices would further increase efficiency.

6.2.2. Enable more consistent case worker follow up with beneficiaries. The filing and reminder system currently in use by most ENs gives opportunity for follow ups to go unattended. This
results in inconsistent contact with a beneficiary and
does not allow for the EN to take advantage of the
momentum of the beneficiary wanting to get a job.
Many users expressed that this system has many built
in features that would allow for consistent follow up.
As noted by one EN: “Sometimes I just lose track of
getting back to people. If I had it in front of me when
my screen came up, it would not be so easy to lose
track.” However, several commented that utility of
the application would increase with automatic
integration with the Microsoft Outlook email and
calendar system.

6.2.3. Enable more timely payment tracking by
the case worker. Timely payment to ENs is a
necessary component of the TTW program. However,
delays in payment processing have
demotivated many ENs from increasing the number
of beneficiaries they assist and is anecdotally
reported as a barrier to becoming an EN. While the
payment request and tracking module was reported as
“very helpful to keep better track of payment requests
and issue resolution,” it was also felt that the module
needs some fine-tuning to bring it into better
alignment with some of the programmatic nuances of
the Ticket to Work program. For example, it was
noted that annual reporting data could be collected at
multiple data entry points with a beneficiary.

6.2.4. Enable more consistent use of terms by the
case worker. There is no standardization of terms for
the Ticket to Work program. In fact, there is very
little standardization of forms. In addition to
increasing efficiency (section 6.2.1), several of those
participating in the evaluation noted that increased
use of drop down selections and check boxes would
drive standardization of terms. These standard terms
could then populate predesigned forms. Some noted
that such standardization may have some unanticipated benefits for government and service
provider organizations such that information would
always be in the same place on forms and terms
would be unambiguous.

6.2.5. Enable case workers to utilize information
to inform decision-making regarding provision of
beneficiary services including training. Users felt
that the current methods of prior knowledge
informing decisions and provision of beneficiary
services resulted in inconsistent utilization of
collective knowledge. More simply stated, those case
workers with years of experience carried more
diverse information in their brains as compared to
newer case workers. Users felt that SmartWorks, the
disability employment system, fostered collective
information stores and would lead to informed
decision-making especially in terms of services to
provide to beneficiaries. As noted by an EN
collaborative: “When new ENs come on board, the
learning curve is steep; this takes away from the time
they could be spending with a beneficiary.” In
addition to having decision support built into the
application, many felt that training built into each
module would also serve to lessen the learning curve
for newer ENs, thus allowing for more time to work
with beneficiaries.

6.2.6. Empower case workers with knowledge to
assist beneficiaries to find and maintain work.
ENs only receive payment when a beneficiary
reaches certain milestones within their job. Many of
these milestones will not be reached without
sustained employment. Several users could envision
how SmartWorks could collect information about
employers that would help them more properly place
beneficiaries. It was thought if beneficiaries are more
properly placed in the beginning that perhaps the
likelihood of sustained employment would increase.
Additionally, ENs are required to track employer
industries. It was suggested that this tool could make
that tracking effortless.

6.2.7. Enable streamlined processes for the range
of routine tasks. All users unanimously validated
some degree of technical achievement and the
potential utility of this tool as a means to streamline
repetitive and necessary business processes. Several
noted that the automation of putting in the
information once and having it populate multiple
areas of the tool as well as needed forms holds a lot
of value. It was further noted: “If my annual reports
to SSA could collect information from the system –
that would be a big timesaver.” While the data
collection was noted to be comprehensive, several
data elements were noted that users thought would
not be useful and therefore could be eliminated.

6.3. Evaluation discussion

Overall, the prototype received positive
feedback from participants. As a result, we believe
that this corresponds to the initial evaluation of the
ISDT and appears to be positive. Users commented
on the intuitive nature of the system, but also noted
that this will only truly be accomplished after the
pilot when users are working with it in a real-time
environment. One interviewee commented, “I can see
myself using this and the time I will save.”

Suggestions of refinements prior to the pilot
were also made in terms of the technical ability and
utility of the tool. In terms of technical ability, participants commented that the application would benefit from some integration with other TTW programmatic and data areas especially for ticket assignments and payments. These suggestions are very helpful and are considerations in near-term development prior to the pilot phase of this project.

The overall evaluation served to validate interview data collected during the requirements analysis. Moreover, comments such as, “This was more than I could have ever imagined” were important validations as to the synthesis of interview data into a preliminary prototype design. With the initial goal of developing an application that would decrease barriers to becoming an EN and support sustainability for all ENs, one participant commented, “This is exactly what we [ENs] need.”

7. Conclusion and future work

E-Government systems enable a wide range of interactions between various entities including governments, businesses, not-for-profits, and citizens. This research has illustrated an e-government design process around a specific G2B2N/B government program that was mandated through U.S. legislation. In this regard, the e-government challenge was two-fold. First, the information system in support of the legislative program was designed and developed only as an afterthought to the implementation of the government program, and only after the program was not performing as expected and hoped. Second, the system was aimed at supporting a program that is based on evolving concepts and definitions. That is, people with disabilities were once defined as “unable to work,” but are now encouraged to work. As such, both the government program and the e-government system under development have forged new paths and been met with new and unforeseen challenges. This paper has provided an example illustration as to how researchers and system developers might approach the design and development of an e-government system under such constraints.

This study has contributed to the body of knowledge in e-government theory, research and practice. In terms of theory, past research has discussed the more common G2G, G2C, and G2B e-government interactions. However, an increasing number of unique arrangements involve a wide array of government, business, not-for-profit, and citizen interactions. This paper has provided an example of issues, challenges, and considerations in the development of an e-government system for a unique government to business to not-for profit/business (G2B2N/B) arrangement. Furthermore, the research investigated an e-government domain that has been understudied – the area of disability information systems – where governments are grappling with how to efficiently administer programs aimed at social inclusion, employment, and self sustainability of their citizens.

In terms of research, this paper offered an ISDT for disability employment drawing generally from a social model of disability. An ISDT is an important contribution as it guides system developers and sets an agenda for academic research.

In terms of practice, the paper offers guidelines for developers of this type of system. The design of a disability employment information system is aimed at helping organizations that assist persons with disabilities to become gainfully employed. Moreover, such a system provides support to persons in achieving their goals of sustained employment. We found theories in BPM, public services, empowerment and supported employment to be useful in guiding the design of such a system. Future work should consider other approaches, such as the health/medical model or person-consumer centric model of disability to further expand the ISDT presented herein.

Future research should also seek to address the people most impacted by the system: the people with disabilities searching for employment, and the employers themselves, as neither group were involved in the design, development, or evaluation of the system at this stage. This is largely due to inaccessibility and impracticality of their involvement during this stage of the project. We believe that new and innovative approaches to seeking and obtaining employment could be discovered if and when this segment of consumers becomes involved.

In this regard, we acknowledge that a limitation of the study is that it only covers one phase of the solution design and therefore only one, albeit significant, segment of a long-term design and implementation project. The development and evaluation of the system should continue through several iterations through pilot implementation and testing. For example, many issues related to ownership, accountability, and security are yet to be included in the design. The fact that different ENs operate using different business models also requires more attention in terms of coordination. As stated above, it will also include additional stakeholder groups. Future work will focus on addressing these issues and modifying the design framework with new findings.
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9. References