Analysis of an Instructional Design System for Designer by Assignment through a Soft System Methodology

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Purpose

The instructional design field evolved from military training courses to a methodical design process in a university setting (Richey,2000). Instructional designers (ID) have a history of being designers of learning activities. With the growing requirements of structuring, designing, and creating course materials, a subset of designers has risen as a designer by assignment (DBA) also called novice designers with limited instructional system design and design theory training (Wills-Espinosa, 2014; Merrill, 2007). There is a need for a self-service instructional design system with instructional design theory, principles, procedures, pedagogy, and technology tools to help the designer by assignment create quality instructions (Richey, 2000). Soft systems methodology (SSM) is used through real-world data to analyze this complex system, through a seven-stage approach to deliver a clear picture of an online instructional system module used for decision-making (Warren et al., 2019). The methodology of the new instructional design system is drawn by defining the root definition and subsequently the human activity. The study will observe the whole system as well as concentrate on each element through system thinking to better understand the processors to achieve the overall functions that benefit the user.

Literature

In various settings, including education, government, and corporation, instructional design (ID) and technology are involved in improving learning and performance by following a process of analyzing, designing, developing, implementing, and evaluating the management of instructional that includes non-instructional processors and resources (Wills-Espinosa, 2014;

Merrill, 2007). Reiser (2001) stated that an essential practice of the profession of instructional design is the identification of research, theory as well as practice. Instructional design has two main practices for instructional purposes, the use of media and systematic instructional design procedure (Reiser, 2001).

Beirne et al. (2018) indicated that the instructional design practice dates back to the 1940s. With technological advancements, higher education has a growing demand for instructional designers. A survey conducted in 2017 showed that distance learning enrollments are increasing year by year; in the fall of 2016, 6.3 million students took at least one distance education course. Therefore, the instructional designer plays a significant role in the demands of higher education faculty and students by integrating tools, lecture capture systems, collaborative platforms, and learning management systems, including traditional learning environments (Beirne et al.,2018, p. 2).

Wills-Espinosa (2014) mentioned that with the rise of eLearning and the internet, most companies seek help to train online as some lack technical skills. Accordingly, 95% of all instructional designers are designer by assignment because the staff is assigned to serve as instructional designers, not that they are trained. The designers by assignment are subject matter experts (SME), faculty members, curriculum designers, or other assigned experts in the industry. The designer by assignment carries out the instructional design role of designing instructions without formal instructional design training. The sub-set of designers has now become integrated into the field and is known as designers by assignment (Wills-Espinosa, 2014; Gensburg-Sawall, 2018).

According to Pesce (2012), SMEs include K-12 teachers, construction merchants, medical educators, corporate trainers, and different professionals who are assigned or tasked to train others. The training is assigned to the SMEs due to their familiarity with content

knowledge, and the learning environment, they are also obliged to act as trainers in their place of employment, even though they lack the instructional design background to make training effective. Merrill (2007) mentioned that if a professional has published in their field, they would know how to teach and design courses, but the industry believes that everyone who teaches, and designs content can be a designer.

Bellaby (2020) found that with the COVID-19 pandemic, the demand for instructional designers increased because the learning platform changed overnight to online. During the pandemic, higher education increased the online course delivery models and tools, and instructional designers supported the instructors to cater to the fast delivery of educational content. Xie (2021) explained that the role of instructional designers was subject to prompt service since the sudden start of the pandemic as the design, and preparation of courses was impossible. With the high demand for instructional designers in the educational field, they started delivering lectures for faculty and students alongside the faculty. Although there was a growing change with professionals known as designers by assignment, there was a notable increase in these professionals after COVID-19, where they played a role in designing learning solutions. The study aims to explore the interconnected framework of the system thinking approach among the instructional strategies of how to teach, what to teach, and how to organize content to build an effective learner-centered online instructional design system within the overall system of an educational environment (Xie, 2021).

Learner-centered Instructional Design System Model

Reigeluth (1983) stated that instructional designs are built up by principles and procedures that include instructional lessons, materials, and whole systems. These principles are used to guide designers to work effectively and efficiently when producing instructions right for a broad range of learning environments. Instructional designers are an element of a field of

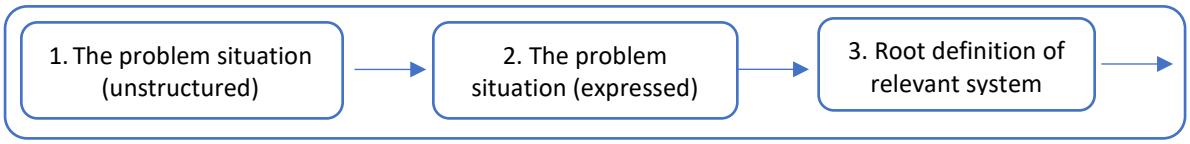
theory and practice and lie within the discipline of instructional technology (Molenda, et al., 2003). They work in many professional entities, including the military, government agencies, schools, colleges, universities, and corporations, and take on many disciplines like educational psychology, philosophy, anthropology, and organizational theory. According to Merrill (2007, p. 3),

> instructional design involves science and technology. Whereas science is a pursuit of understanding, technology is the creation of artifacts. While the goal of science is knowledge of the physical world that the scientist predicts and understands. The goal of the designer and engineer is to design valuable artifacts and predict the performance of the product they design. The primary role of instructional design is to study instruction and design. The instructional theory involves the specification of the necessary instructional condition for the student to acquire the desired learning outcome. The designers seldom read the theory and research by assignment. The learned theory needs to be transformed into tools to gain knowledgeable outcomes; otherwise, these are mealy academic excises. Instructions can be asynchronous or synchronous. The type of interactions with material, practice, learner guidance, coaching, and feedback will contribute to effective and efficient learning, whether the teacher is online or in real-time.

The environment does not matter, but the effective use of the instructional theory will determine its effectiveness. In aiming to improve the unstructured Instructional design system (ISD), the soft system methodology (SSM) is employed for analysis of complex systems. Presented in Figure 1 are the first three analysis stages, which mirror the instructional design analysis phases.

Figure 1

Analysis stages 1-3



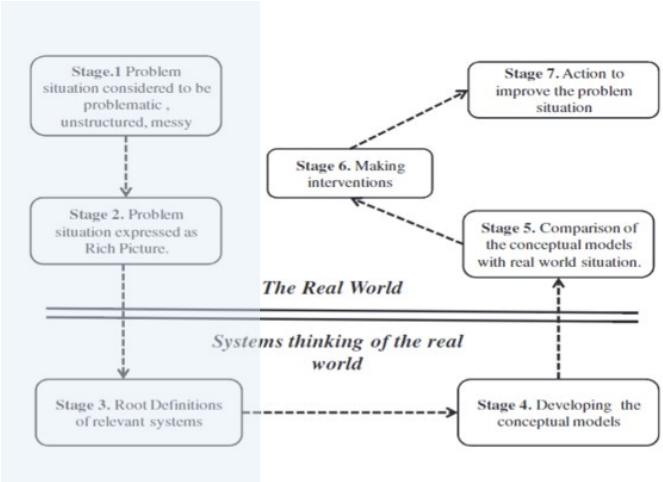
The first stages of reflect the initial problem complexity present in instructional design products, structured as e-learning, curriculum development, and computer-based training are not designed by experienced instructional designers but by novices or designers by assignment. While the core problem situation is that these novices or designer by assignments does not have proficiency about advanced instructional products or instructional design. Therefore, a structured system is to be placed to guide the designer by assignment and novice staff to improve the overall system process by using the soft system methodology.

Applying Principles of Effective ID Instructions to Soft System Methodology

A complex problem situation analysis uses the soft system methodology (SSM). With the seven-stages approach, the soft system methodology Figure 2 allows the development of a representation of a complex problem that delivers a clear picture of the analysis that can be used for decision-making (Warren et al., 2019).

Figure 2

SSM – complex problem



This figure was adapted from Checkland and Scholes (2003) and is used, to define the activities under the SSM to review the levels of resolution for the instructional design system model.

The 21st century brings challenges to the economic, humanitarian, and to educational environment. Technological advances lead to new ways of thinking and more complex and flexible ways of acting. System thinking is a highly guided approach to finding interactions between humans, institutions, and natural processes. With system thinking, organizations can implement new innovative changes while looking at the complex interfaces between parts of the system rather than individual elements (Wright, 2019). System thinking provides a systematic approach to solving problems that cannot be clearly defined, but a learning cum inquiry process aims to improve a human situation.

Stage I: Problem situation (unstructured)

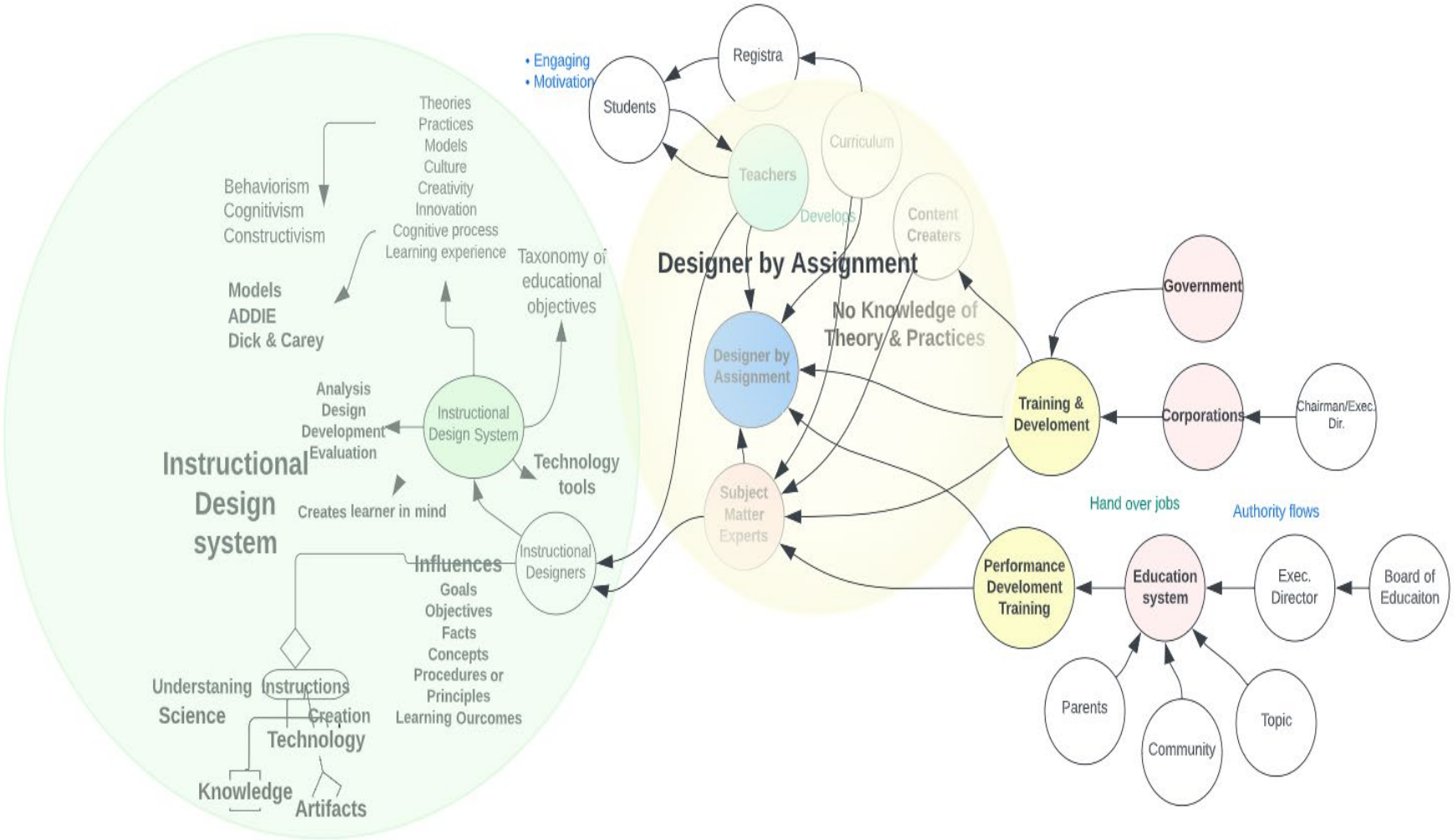
Nair (2015, p. 39) stated that a *system* is a "complex-organized whole." The system approach supports viewing any occurrence as a whole and developing a thorough understanding of human activity with the inter-relationships levels among people and the situation (Nair, 2015). A notable change in the field of instructional design is that a growing subset of professionals known as DBA or SMEs play the role of designing learning solutions (Reiser, 2001; Wills-Espinosa, 2014). These professionals lack the formal training needed to become expert designers and leave out the important accepts of the design process with an ill-structured problem-solving approach due to lack of experience. The gap that exists between the competencies and skills of designers by assignment and expert instructional designers will negatively affect learning solutions (Wills-Espinosa, 2014; Pesce, 2012).

Gensburg-Sawall, (2018) found that in real-world settings, instructional design learners start from higher education or the business community. According to International Futures (2016), around 13,000 instructional designers work in higher education and job analysis shows

that instructional design jobs are primarily focused on corporate and higher education. However, the DBA working in K-12 continued to expand (Gensburg-Sawall, 2018). After COVID-19, there was a shortage of instructional designers joining higher education who preferred to work remotely. Due to this reason, there was a rapid overhaul of instructional designers (Xie, et al., 2021). The soft system methodology Figure 3 presents the system of interest from different levels to determine to depict the growing issues. SSM uses both symbols and words to compile the big picture to provide areas of concern.

Figure 3

Soft system methodology of the overall system



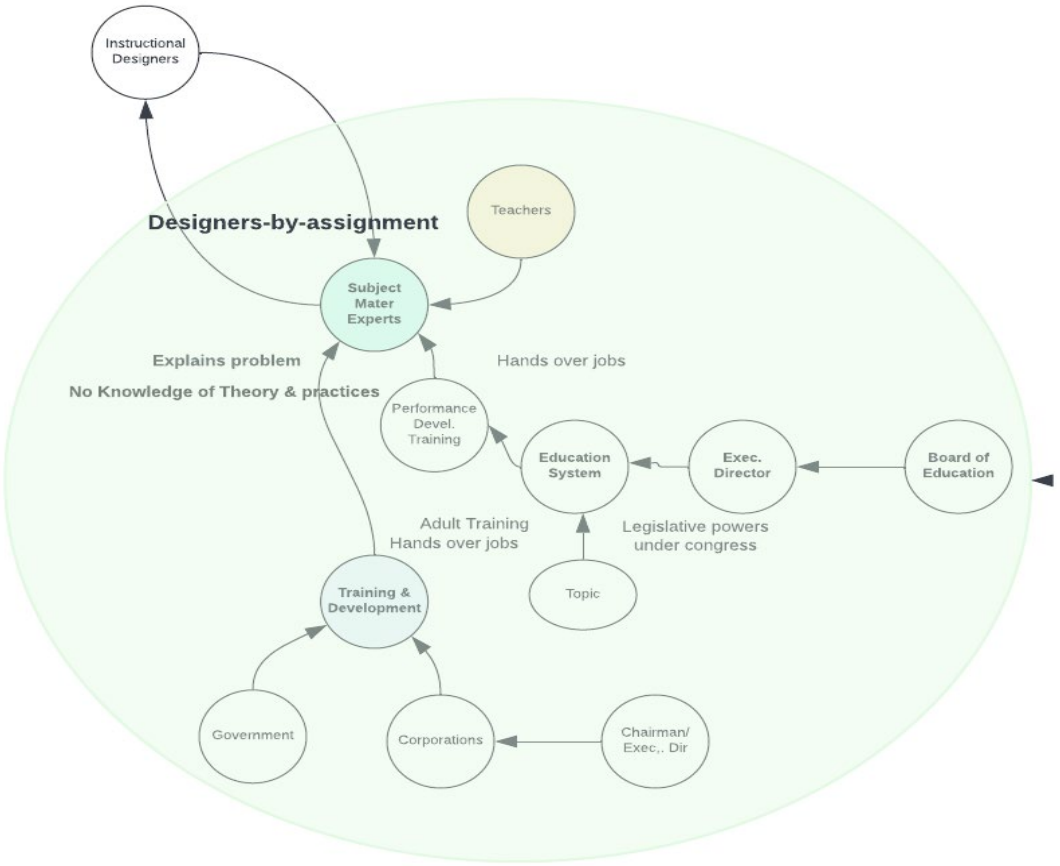
The soft system methodology above reflects an instructional design model that incorporates an education system, government, and a corporate setting. The corporation and government entities give projects to the designer by assignment or subject matter experts through the training and development member team. The education system hands over projects through performance development training members where in some environments expert instruction designers are not present. Not focusing on design theory aiming at technologies, tools and processors may contribute to design quality issues (Gensburg-Sawall, 2018). An instructional design system will develop from the analysis of SSM to aid and train these designers by assignment or novice members. Wills-Espinosa (2014) reported that there is a challenge to close the gap between designers by assignment and expert instructional designers by addressing the problem situation below.

Stage 2: Problem situation (expressed)

Wills-Espinosa (2014) stated that instructional designers have designed of learning activities and information architects, acting as strong contributors to powerful solutions. However, this role has now changed to individuals with a complete approach to designing, analyzing, developing, implementing, evaluating, and managing learning activities. As per Pesce (2012), these designers are known as DBA, which represents all that have not been trained as instructional designers. Designers by assignment have no formal training. They are training; rather, these professionals are trained on the subject matter and if they know the subject on which they act as trainers. The corporate trainers are also human resource personnel, salespersons, and engineers who often design and teach instructions without being trained. Figure 4 presents the elements of designer by assignments in the SSM analysis.

Figure 4

Designers-by-assignment



The DBA needs an instructional design system tool for guidance on theory in technology-based or conceptual learning-oriented knowledge with extensive guidance (Merrill, 2007).

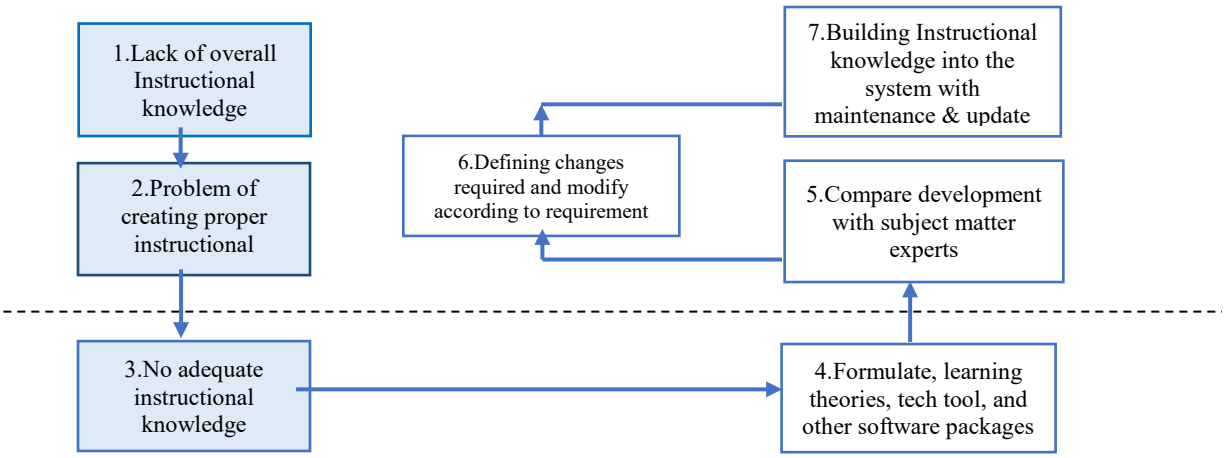
Stage 3: root definition of relevant system

The DBAs are individuals who are teachers and subject matter experts (Figure 4) who develop instructional materials as assigned without formal instructional design training (Merrill, 2007). Wills-Espinosa (2014) explained that past studies revealed a gap between the skills of an expert designer versus a novice designer in building instructional. Expert designers take more

time to analyze problems while relying on design principles and drawing knowledge from past experiences and different sources. In contrast, novice designers try to analyze information by focusing on reaching a fast decision on the solution. Due to lack of experience, focusing more on the content and experience leads to a lack of innovation. A learner-centered online instructional design system will be created, with an interconnected framework of system thinking methodology between the instructional strategies of what to teach, how to teach, and how to organize content within an educational environment's overall system. The system will provide the necessary skills for the DBA. Figure 5 below presents the steps covered in the analysis process of the instructional design system.

Figure 5

Resembles the system of interest for instructional design system model

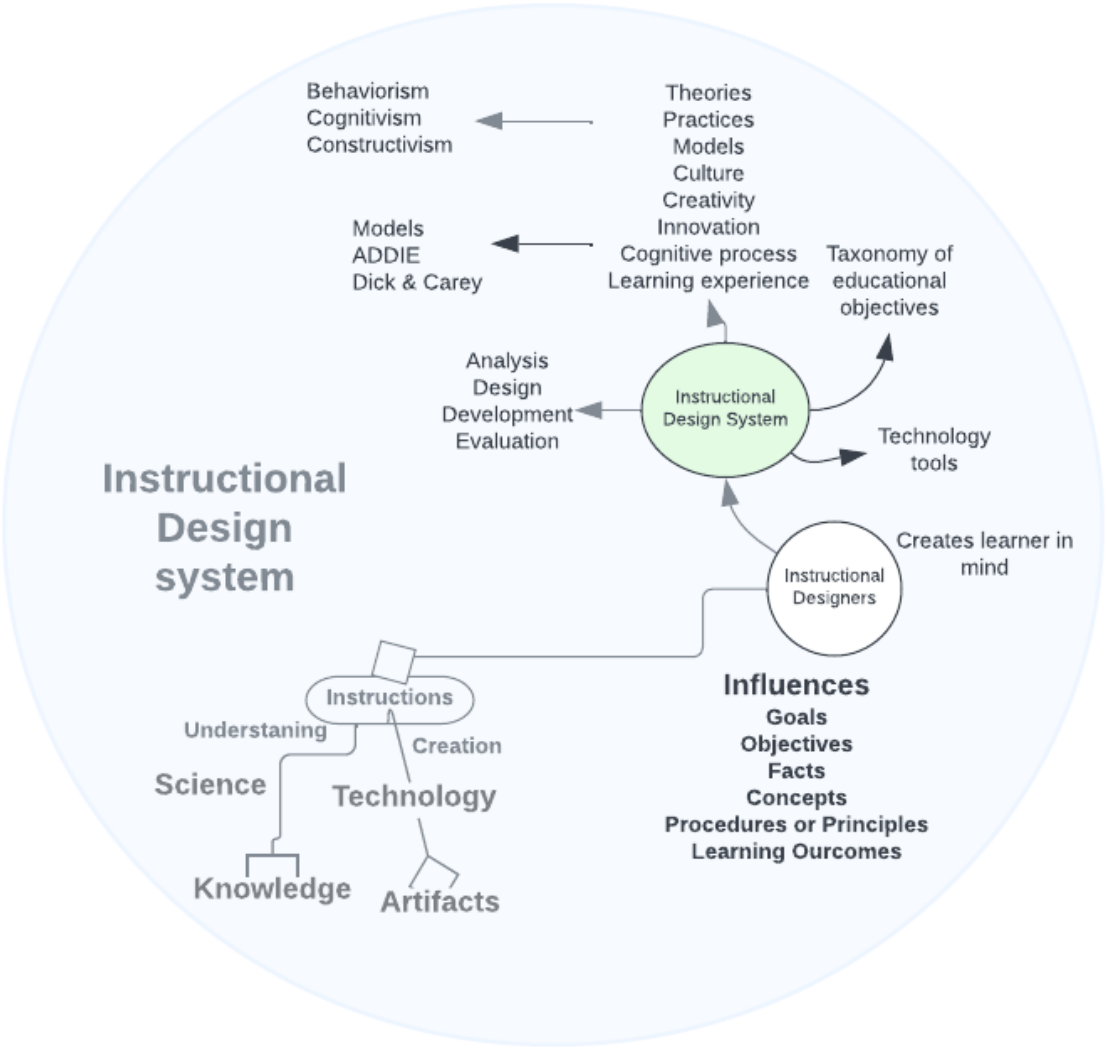


The above system description is designed for an instructional design system model by formulating the learning theories, technology tools, and other required software packages, will compare the created instructional development with the subject matter experts, modify the required changes and build the knowledge base system with continuous system maintenance and update.

The system drawn below Figure 6 is the planned instructional design system design that will be designed and created by instructional designers.

Figure 6

Module design for instructional design system



The instructional design system module in this figure will be created by the instructional designer experts for the designer by assignments which include instructions with both science and technology, the theories, tools, research, and development.

Wills-Espinosa (2014) stated that IDs are vital contributors to creating robust learning solutions. The system will be design-oriented, making the theory more valuable for educators (Reigeluth, 1999). The system will reflect Gagne's contributions. Richey (2000) explained that macro-design procedures use instructional system design principles. Alternatively, micro-design uses lessons and instructional strategies primarily based on past experience, controlled, and stimulated by external procedures and instructions depending on the nature of the desired outcome.

The structure of the soft system methodology will be identified and defined through the CATWOE method, which stands for Customers – Actors – Transformation – World view – Owners – Environmental constraints, which is used as a simple checklist to find a solution to the above problem.

Table 1

The CATWOE table

C - Customer	The student, teacher, parent, and community *are some affected by the system*
A - Actor	Teachers, Subject matter experts, Education system, Government, Corporations *are some working together in cross-disciplinary*
T - Transformation process	Topic – Processed by instructional designers or subject matter experts – curriculum development and planning, theories, and procedures, *the input – output state or need for – need met*
W - World view	Design of an instructional system in a real-world setting to train the novice will bring effective and efficient training products.
O - Owner	Instructional designers, government, educational system, and corporations
E - Environmental constraints	Curriculum development policy guidelines for credit-bearing courses or academic programs

With the CATWOE analysis, problem areas can be identified while simulating multiple approaches. The above CATWOE analysis outcomes are used in SSM helped to examine whether the root definition is relevant and formulated precisely. The development of a conceptual model can be derived from the creation of an implementation plan thinking of the

broad development of the instructional design system for the benefit of the designer by assignment.

Stage 4: Developing the conceptual model

Implementation Plan

Setting and users

The setting/system where the learning technology will be used

The instructional design system will be implemented online as a web-based system. The system will integrate theory into a technology-based or conceptual learning-oriented instructional design tool. The system designed will help to train the designers by assignment, including teachers, subject matter experts, junior instructional designers, content creators, and curriculum developers who require more knowledge on the subject (Merrill, 2007). Currently, training on instructional design theories, practices, procedures, and tools are conducted at a high price by individuals that are instructional designers, curriculum developers or training and development personnel. These online trainings are mostly directed towards curriculum development or for teachers that require experience on content development for their teaching practices and these learning sites need to be searched as per individual requirement. Even though the material does cover some of the instructional design theories and practices, more is needed to entirely give the designer by assignment the guidelines for efficient and effective learning methods. The proposed system solution will incorporate a complete module that will be useful for the user groups, improving the quality of the instructional products they develop.

Description of all likely user groups

Merrill (2007) stated that designers by assignment rarely read the sources of research and theory. The theory has to be transformed into tools that facilitate academic influence. The

designer by assignment, subject matter experts, junior instructional designers, instructional tech specialists, and teachers need to be aware that the development of instructional material needs to be always learner centered.

1. Instructional designers

   IDs will understand scientifically evidenced theories that will divulge teaching approaches to be used to teach each type of content. IDs will be continued to challenge and make the ideas of academic course design to be more aligned with the modern use of communication devices and networks. ID's will also base the grounded taxonomies for learning outcomes with the proper need assessment (Merrill, 2007).

2. Subject matter experts

   SMEs bring more specialized knowledge to the forefront (Merrill, 2007). Pesce (2012) explained that an SME is a qualified person that shares information, content, and resources on all topics that need to be designed. The instructors or teachers also could serve as SMEs.

3. Designer by assignment

   Pesce (2012) indicated that designers by assignments are subject matter experts who are assigned as instructional designers because of their knowledge and familiarity with the subject areas or the learners. Although they lack the fundamental knowledge of instructional design principles.

Learning technologies

The learning technologies to be used

As instructional design system will be the learning technology solution for all user groups, a website will be used to host the instructional technology materials that could be

accessed by anyone. The teaching and learning of instructional design theories and practices will be conducted by expert instructional designers and pioneers of instructional design practice. Slagter et al. 2018, p. 28) describes the re-instructional and post-instructional activities with Gagne's (1987) nine events of instruction that will enhance the student's design alternative and learning outcome. The animation would be developed to demonstrate task performance. Through audio the instructional designer's thoughts, decisions and actions will be accompanied.

Goals and outcomes for the learning technologies use

The expected learner outcomes for the instructional learning technology solution would be as follows:

The instructional design system will have both science and technology. Where science is the pursuit of understanding the knowledge of the physical world and technology is the creation of artifacts predicting the performance of the product design (Merrill, 2007). The expected learner outcomes for the instructional learning technology solution would be as follows:

Table 2

The science and technology of instructional design

Science		**Technology**		
Research	**Theory**	**Tools**	**Development**	**Evaluation**
Experimental Research Products or Research Review	Outcomes Concepts Propositions, models, theories	Technology-based tools Conceptual Tools	Instructional products	Field Research

The system will be implemented taking into consideration theory expressing a fact or prediction from a given condition and how to test these conditions with the appropriate research methodology. The theory will indicate what is necessary for the learner and how to obtain the

specific knowledge, skill, and learner outcomes which are then can be empirically tested and verified. The technology inclusion will support the development of the instructional product to enable students to achieve the desired outcome effectively and efficiently. As per Wills-Espinosa (2014), and Gensburg-Sawall (2018), the learner will be able to:

1. Learn the systematic process of implementing a thorough analysis of learning, setting tasks, clear links between goals and instructional strategies, directed by clearly linked learning goals, and creating decisions based on empirical research.
2. Learn the design competencies and skills needed in the development of strong learning solutions.
3. Learn how to create learnings' solutions based on instructional design principles and to have clear ideas of what learner needs are to create learning effective, efficient, and motivating.
4. Learn to effectively design and implement technology-enhanced collaborative learning systems to improve teaching and learning outcomes.
5. Learn and become competent in instructional design theories, instructional strategies, and design practices.
6. Demonstrate a higher level of skills in Bloom's taxonomy.

Practical uses of the technology in the setting

The primary use of the self-service instructional design model with embedded instructional design theory and pedagogy is created to provide instructional design knowledge to designers by assignment that also includes teachers, subject matter experts, junior instructional designers, librarians, and many others who are tasked to do instructional design work by educational institutes, companies, and government entities. The system will also provide a guide

to instructional designers who join the field and junior instructional designers should also benefit from a hands-on experience model (Gensburg-Sawall, 2018).

Learning technology integration plan

The instructional design system intended to extend the knowledge base of instructional design to support the designers by assignment and actively assist learning in a real-life practice. As per Newman (2015), anywhere there is a learning need instructional designers systematically employ design theories, models, and instructional media to influence the design of instructional experience. As such, the plan is to develop the instructional design system module as a website that can be easily transferred to an open-source website at a later stage once the system is built up. This approach should give the designing by assignment users up to date knowledge and skills. The system will allow users to share ideas and knowledge. Create an online community of educational technology professionals, developers, and instructional designers. The site is intended to support designers to share ideas, and techniques, while they are able to ask questions from designers and professionals in academia, the government, the military, and the corporate world. This will be a knowledge base where valuable knowledge can be shared among all (Cox et al., 2003).

The number of learning technology units necessary to support the goals

In order to support the goals and outcomes of the learning technology module the project will have five parts:

Part 1 – Instructional design and technology history

- History
- Pioneers of ID

Part 2 – Instructional learning analysis and management

- Instructional design models

    - ADDIE
    - Backward design
    - Design Thinking Model
    - Dick & Carey
    - Kirkpatrick Model
- Blooms Taxonomy
- Gagne's nine events of instruction
- Merrill's Principles of instructions
- Cognitive Apprenticeship

Part 3 – Research, theory, and practice

- Behaviorism
- Cognitivism
- Constructivism
- Humanism
- Connectivism

Part 4 – The influence of the performance technology movement has had on professional practices.

- Goals
- Objectives
- Facts
- Concepts
- Procedures or Principles
- Learning outcome

Part 5 – Instructional Design best practice based on (Richey et al., 2001)

How often is the technology being likely to be used?

Technology will be used with the form of inquiry throughout the process requirement either to solve a problem or ways to improve the performance. The resources will be used to research instructional practices, theories, models, concepts. Technology changes daily with new developments as such the website materials need to be updated monthly as the system should be maintained. The site has to be updated and checked whether all forms and instructional materials run smoothly, while checking for broken links and make periodical backups.

Technology replacement cycle

As the instructional design module will be hosted in a website there will be no technology replacement, although yearly website renewal cost needs to be paid to keep the website hosted on Cloud hosting. The cost of dedicated hosting with HostGator $ 9.95 per month (Whitfield, 2022). The website will be developed by an instructional design team who will come together to assist the field of instructional designers to reduce the cost of design and development and implementation.

Training and support resources

Resources needed to support stakeholders

In order to complete the project, the resources will be provided for the following stakeholders (Savchenko, 2021):

- Instructional Designers
- Project Manager
- Development Manager
- Website designer & development
- Implementation
- System Maintenance

To have a successful project, each individual stakeholder will be given the necessary guidelines to support the project.

Table 3

Stakeholders and resources for the project

Stakeholders	Resources
Instructional designers	The instructional designer will review all materials that will be hosted on the website. • Need analysis

	• How the needs can be met • The learning goals • Selecting and collecting the material for the design of website. • Development of the teaching strategy and leaching methods • Monitor the learning outcome and access of the entire learning process
Project manager	The project manager will be designated to review and accelerate the entire project. Beginning and end dates • Tasks and goals • Document selection • Digital recording • All training material availability • Website design • Document upload • Weekly status meeting and project review meetings • Testing • Website Launch
Website designer & development	• Design guideline, standards, and practices • Contents resources • Software layout • Photo editing • Select colors and images
Implementation	Implementation will be coordinated by the implementation team and the project manager by • Investigating the planning process • Implementation
System maintenance	The members from the instructional design team, web design and development team members will part of the members that will work with the resources to continue the maintenance of the system. • The detail manual of the resources • Online training module (on-request) • Continuous maintenance

In this model, the stakeholders and resources have been included as presented in Table 3. The instructional designers will follow proper guidelines in selecting the teaching and learning materials for the instructional systems module drawing from research that includes research, theory, technology, policies, and practices. Training will be drawn upon availability of the instructional designer and the pioneers of the field with hands-on experience, on weekdays full

day 8:00 am – 5:00 pm from Monday to Friday. On five consecutive Saturdays training will take place for a full day 8:00 am – 5:00 pm, accelerated with group sessions.

The project manager will handle the project, while overseeing the timeline for the overall project. Web designer and development personal will handle the website creation and content. Implementation team will investigate into the planning process and implementation. While the maintenance team will be fully responsible for the continuous maintenances of the system. With the completion of the project work distributed towards all stakeholders, a training plan will be generated for the users who will use the instructional design system module.

Training plan for each group of users

The instructional design module will be hosted on a cloud website with open access capability, allowing users to gain access to the cover a set of learning outcomes to the instructional design module which will be customized prior to allowing access to the group trainer. All training requests will be directed to the senior instructional designer who will grant access according to the user requirements. The access to be granted as follow:

- Instructional designers to access materials or learning module to conduct training
- A learning tool for user requirement
- For teachers, a guiding tool on instructional design
- For Subject matter experts a training module

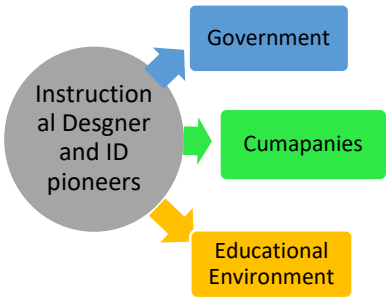
Based on the customer types, models, pricing, and special features will be built into the instructional design module e.g., educational environment, corporate solution, and government entities. The responsibility of training falls under senior instructional designers and pioneers in the field of instructional designing that will be examined next.

Human resources for training and support

Senior instructional designers and the pioneers in the field of instructional designing will be given the responsibility to move the system training forward. An agreement/ contract will be drawn yearly between both the instructors and the service delivery company. Once the system is established, Coursera or edX to be contacted to check into the possibility of providing training through massive open online courses (MOOCs). This will provide a broader spectrum of training designer by assignment worldwide. Figure 7, depicts, the entities that should benefit through the new instructional system module.

Figure 7

Responsibility of training



The instructional designers will create instructional design tools that allows everyone who acts as a designer by assignment to be more effective designers of instructions. The system will enable to carry on the training through a systematic process (Merrill, 2007).

Timeline for training and re-training

Table 4

Training plan

	Primary Column	Column2	Column3
1	**Full day training (Mon-Fri) 8:00am - 5:00pm - Two Weeks**		
2	Part 1	History of Instructional Design Technology	
3	Day 1		- History
4	Day 2		- Pioneer's of Instructional design
5	Part 2	Analysis of learning and performance problems, design, development, implementation, evaluation, and management	
6	Day 3	Instructional Design Models	ADDIE, Backward, Design Thinking Moel, Dick & Carey, Kirkpatrick
7	Day 4		- Blooms Taxonomy
8			- Gagne's nine events of instruction
9			- Merrill's Principles of instructions
10			- Cognitve Apprenticeship
11	Part 3	Research, theory, and practice	
12	Day 5		Behaviorism, Cognitivism
13	Day 6		Constructivism, Humanism & Connetivism
14	Part 4	The influence of the performance technology movement has had on profess	
15	Day 7		Goals, Objectives, Factis
16	Day 8		Concepts, Procedures or Principles
17	Part 5	Instructional Design best practice based on (Richey et al., 2001)	
18	Day 9		Best practices, Accessibility
19	Day 10		Hands-on Experience

This training plan was drawn up for two weeks. The training will be scheduled by full day 8:00am – 5:00pm, and weekends Saturday and Sunday training. For those who require training on weekend the training will continue for two months every weekend on Saturday and Sunday from 8:00am to 5:00pm. The online classes will depend on the individual, corporate or government requirements which will be a created training program according to the specific requirements of the individual or the groups.

Plan for just-in-time training and support

As part of the facilitating the user experience, the training will be recorded through voice over and available for download on the site. This will provide just-in-time support for the user to go back and have these as reference guidelines. These will also be available as just-in-time

training. Training will be delivered online using the instructional design website. The website will be promoted through advertising in conferences, meetings and on the web. There will also be a portal for past students that could be accesses through the organization for quick fixes or for guidance and support.

As per Merrill (2007), the instructional design module training includes:

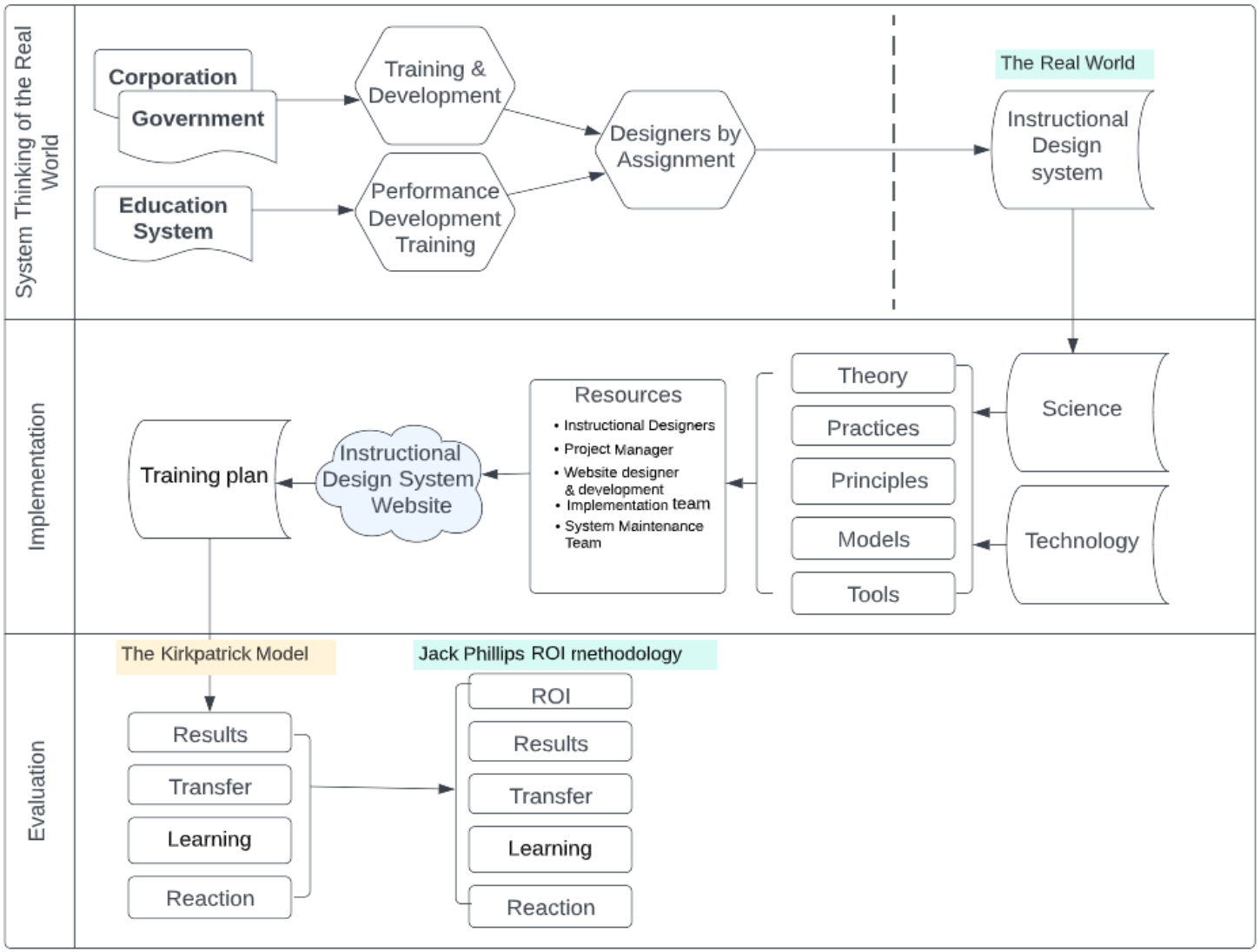
- History of instructional design (short overview).
- Instructional design theory/ learning theories, in order to advance in learning the desired outcome (clear practical application on theory)
- Product design
- Principles of effective and efficient instruction through technology
- Design and developing instruction project to demonstrate the use of tools
- Attempts to test principles for instruction for the product.
- Distinguish the learning goals and learning outcomes with instructional objects
- Design tools (templates, authoring tools, widgets, learning-oriented tools, adaptive learning-oriented tools)

Stage 5: Compare the conceptual model to the real world

The comparison was carried out between the instructional design system model and the implemented real system design model. The presented question was how the system function in a real-world situation? which will bring the proposed model and the changes implemented to improve the system or the situation (Roytek, 2010). Figure 8 shows a narrative description of the real world, the implementation planned above, and the fundamental guide of the evaluation plan on the instructional design system model.

Figure 8

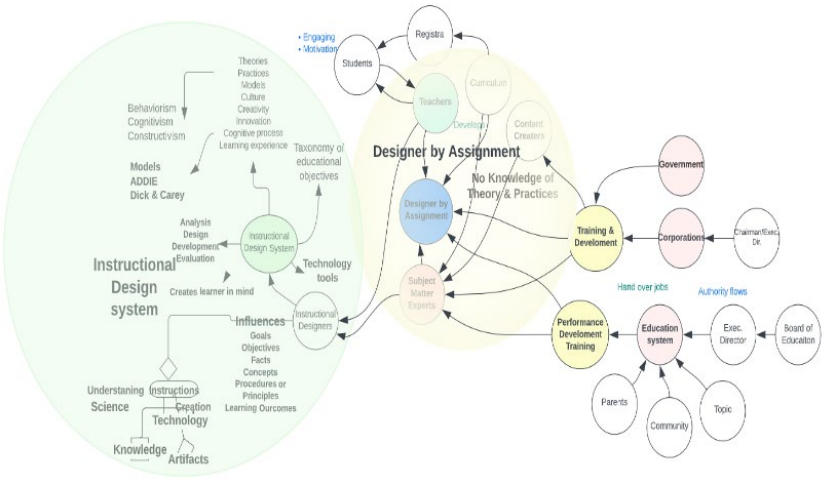
Narrative description



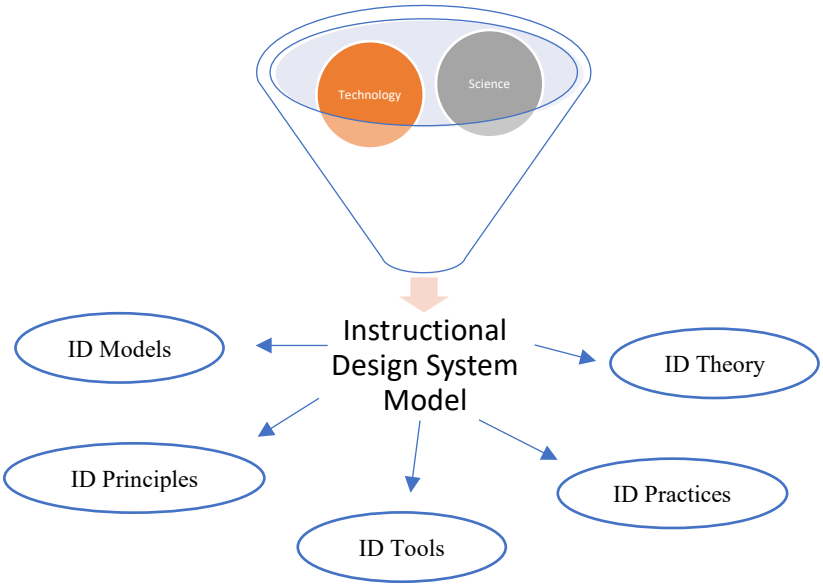
The narrative description above reflects the planned detailed description of the evaluation to advocate whether the implementation plan produced the desired results. Figure 9 reflects a closer description of the real world of the instructional design model to the whole instructional design system and the components that make the instructional design system.

Figure 9: Evaluate the new system

Real World



Evaluate the whole system



This figure compares Stages 2 and 4, and the root definition of CATWOE worked in stage 3 to check what happens in the real world. As per Table 2, the instructional model will have both

science and technology. What exists, what is missing, what is similar, the technologies used and could be used, the activities/observations of the stakeholders towards the system, and what the whole system reveals with the comparison of the real world (Nair, 2015). Boardman & Sauser (2008) focused on a single objective and the need for reengineering, agreeing collaboratively to the ideal viewpoint by the stakeholders and constituents of the community. Next, the technology and training values were evaluated to identify the areas of effectiveness, how resources support over time and whether these resources need to be updated. How often are the evaluations conducted, and what is the format preferred?

Evaluation of the technology and training value

Evaluation mechanism for the training and support resources

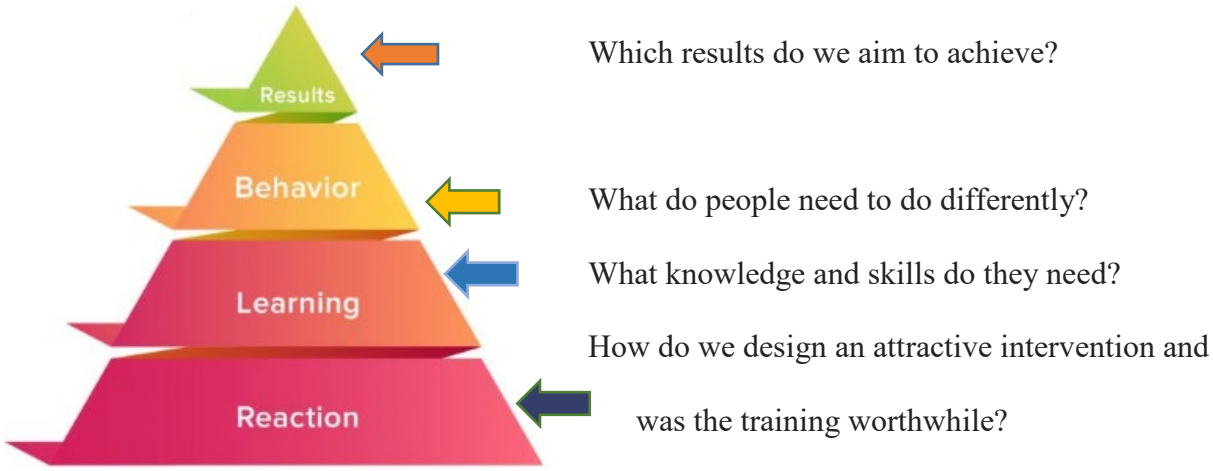
The training is a planned learning experience that brings permanent changes to individual knowledge, skills, and attributes (Rama Devi et al., 2007). Increasing complexity and technological changes, socio-cultural and economic forces have brought instant work environmental changes that influence the need for system changes and continuous training for productivity and organizational improvement (Bell et al., 2007). Rama Devi et al. (2007) indicated that the evaluation of training defines the organized process of collecting data to define whether the training was effective. The evaluation must include the training activity procedures with organizational and instructional design strategies. Reiser (2001) described the necessity to run through outlines of instructional materials with learners before materials are in the final form, where the process will enable educators to evaluate material in the formative stage that could be checked for the effectiveness of the materials and could revise before the final stage.

As the training evaluation dominant model is “The Kirkpatrick Model,” with four levels of evaluation, the Kirkpatrick model will be used to evaluate the instructional design system

model training. When planning to assess the learning experience, the following questions were considered.

Figure 10:

Kirkpatrick Model of evaluation



Rama Devi et al. (2007) further explained the Kirkpatrick model can be used to evaluate training by:

(1) The reaction to the training program by the participants.

(2) The changes in knowledge, attitude, and skill level.

(3) Changes to behaviors in work.

(4) Changes desired outcomes, and the result.

1. Reaction evaluation: The reaction to the Instructional design training module will be measured by surveys, interviews, and discussions to get feedback on the overall satisfaction and engagement; how satisfied was the training, was the training engaging,

and how will the learner rate the facilitator, and can this training be recommended to others.

2. Learning evaluation: the learning would be measured by pre-posttest, knowledge test and interviews, focus groups, discussions, and observation to know whether the learner learned new knowledge, skills, and attitudes.
3. Behavior evaluation: the learning will be measured by the extent of applied knowledge on the job, the key performance indicators, work reviews, interviews, and group discussions with the supervisors of the trainees.
4. Results evaluation: the results would be measured by seeing desired results, whether the trained users adhere to the instructional design practices and procedures connecting them to the learning environment, and whether the organization is validated with the return on investments.

The instruction design module can also be analyzed and explored through the interconnected framework of the system thinking approach by micro-, meso- and macro levels below (Niskanen et al., 2016).

(1) Micro-level analysis impacts meeting with other members of designers by assignment, subject matter experts, stakeholders, instructional designers, teachers, curriculum developers, and content creators within the organizations. The top management empowers, initiate, guide, and encourage all to support the system.

(2) Meso-level analysis impacts the operational safety level between micro- and macro-levels. The interactions within the internal colleagues and peers. External stakeholders, curriculum designers, teachers, and content creators in the organization build sound relationships. Niskanen et al. (2016) recognized that mastering instructional design

modules needs efforts to understand the principles and practices, new understanding, new behaviors, thinking, and doing.

(3) Macro-level analysis impacts legislation. The successful implementation should be with quality and a foundation for a safe working environment. The interactions that transfer impacts and interactions over to designers by assignments to help build them with knowledge in instructional design practice to build an instructional design system module.

When training is conducted, it is assumed that the training was effective by going through the "smile sheets" that are handed to the learner at the end of the training session. The training activities may not tie to the dollar value considered necessary by organizations (Rowden, 2005). Hence, the evaluation of the return on investment will be discussed below.

Evaluation mechanism for the return on investment with the learning technology

Measuring success is a mix of theory, practice, and contributions derived from evaluation theory. Success in the instructional design system module means determining that all parts of the science and technology of instructional design practices and the procedure have been conveyed to the trainees. Also, the knowledge has been passed for the DBA to continuously carry out the instructional design work efficiently and effectively (Barnett,2010). Returning to the Kirkpatrick model of training in figure 9, Rowden (2005) stated that the Level 1 reaction is described as how well the trainees like the instructional design training program. The confirmation of the training satisfaction can be a measure of user satisfaction that is evaluated as how well the participants reacted to the training program. Therefore, if the training is adequate, the trainees will react favorably. They will need more motivation to learn. Level 2 is learning, which evaluates the extent to which the participants change their attitudes, improve their knowledge, and increase

their skills by attending the training program, in which we measure the training program's content. Level 3 behavior is defined by how the training involvement changes the performance.

Moreover, Level 4 results in the effects the training intervention had on the organization's bottom line, which is described as a return on investment (ROI) dollar value. As quoted by Kirkpatrick, "the results are the most effective in terms of cost." The need for effectiveness (i.e., how well it works to support learning outcomes) against efficiency (i.e., how much it costs to reach effectiveness) must be considered at the resulting level of evaluation. Table 5 shows the Level 4 module that was developed by Kirkpatrick and the addition of the Level 5 named ROI suggested by Phillips (2006).

Table 5

Framework of Kirkpatrick model and Jack Phillips ROI methodology

Level of Evaluation	Key Questions
Level 1: Reaction, Satisfaction, and Planned Action	• Was the ID training relevant to DBA jobs? • Was the ID training important to BA jobs? • Did the ID training provide new information? • Do DBA intend to use what is learned? • Would DBA recommend the training to others? • Is there room for improvement with facilitation, materials, and the learning environment?
Level 2: Learning	• Did DBA acquire the knowledge and skills presented in the training program? • Do DBA know how to apply what they learned? • Are DBA confident to apply what they learned?
Level 3: plication and implementation	• How effective are DBA at applying what they learned? • How frequently are DBA applying what they learned? • If DBA is applying what they learned, what is supporting them? • If DBA is not applying what they learned, why not?
Level 4: Business impact	• So, what if the application is successful? • To what extent did application of learning improve the measures the program was intended to improve? • How did the program affect output, quality, cost, time, customer satisfaction, employee satisfaction, and other measures?

	• How do you know it was the program that improved these measures?
Level 5: ROI	• Do the monetary benefit of the improvement in business impact measures outweigh the cost of the program?

The instructional design system module was evaluated by ascertaining the trainees' feedback on the training's quality, knowledge, and usefulness, guided by the key questions. If learners have learned and are confident, they are likely to place their learning into practice. The calculation of return on investment will use the following formula:

ROI (%) = Net program benefit / Training Program cost x 100

Rowden (2005) suggested that when ROI is calculated for the first time, organizations should select one training program or a training program conducted by either the senior instructional designer or ID pioneers. Calculating too many will be time-consuming; as such, adding the ROI as Level 5, there is a possibility to collect post-program data to calculate the actual return.

Stage 6: Making intervention

The difference between developed models and reality will focus on modifications to the system. These changes should be systematically assessed to check their effectiveness in place, ensuring adequate resources are sufficient and ethnically feasible (Khisty, 1995). Nair (2015) suggests systematically running through all stages of SSM to have a thorough insight into the problem situation under consideration by conducting the following.

- Re-running the model with different CATWOE processes
- Different system analysis
- How do the various norms, roles, and values present in the real world
- What are the strengths and weaknesses of using particular methods

Stage 7: Action to improve the situation

Based on the insights developed and analyzed from stages 4-6, the changes analyzed in Stage 6 will be put into practice. New theories and practices could also be due to technological advancement that must be validated and updated throughout the maintenance process. These changes will be planned to set incremental changes while reassessing the need for changes and involving the members who had ownership of these changes, as implementing changes could be not the person who suggested the changes unless these changes are written and endorsed (Glasson, 2013).

Conclusion

The study incorporated the soft system methodology analysis stage and system thinking to find a broader overview of the instructional design proficiencies required by designers by assignment in the instructional design field to create learning materials effectively and efficiently. This study also analyzed the implementation plan for setting up users, goals, and outcomes of learning the new system and training and support resources on the intended system. With the evaluation of the system, the elements of the ID system will be helpful for novice designers who play an essential role as designers by assignment. The result of this study will have advanced effects to support designers by assignment and benefit student-centered learning.

Research Plan

The Background

With the growing requirements of instructional designers in educational, government, and business companies, a subset of designers has risen as designer by assignment (DBA), also called novice designers with limited instructional system design and design theory training (Wills-Espinosa, 2014; Merrill, 2007). As such, there is a need for a self-service instructional design system with instructional design theory, principles, procedures, pedagogy, and technology tools to help the designer by assignment create quality instructions.

Objectives

To design an instructional design system through analyzing soft system methodology that will aid and train these designers by assignment and novice members. The DBA needs an instructional design system tool for guidance on theory in technology-based or conceptual learning-oriented knowledge with extensive guidance (Merrill, 2007).

Research method

Qualitative analysis of research through system thinking theory.

Participants

The participants will be the designer by assignment, subject matter experts, junior instructional designers, instructional tech specialists, and teachers.

Methodology

A complex problem situation analysis uses the soft system methodology (SSM) with the seven-stages approach.

An interview guides

Participants will be the pioneer instructional designers, subject matter experts, and senior instructional designers. Interview questions will draw as open-ended questions as per the:

"Tell me…"
"Explain…"
"Describe.."
"Walk me through…."

Timeline

Four - Six months

Resource

Document: Research Analysis of an Instructional Design System for Designer by Assignment through a Soft System Methodology

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