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Technology in Counseling Education and Practice: Case Analysis and a Dynamic Course Design

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Technology has been increasingly used in counseling education and professional practice in the past two decades. To ensure technology is appropriately used to produce expected quality of counseling work, design of technology integration in counseling becomes a key point. The first part of this article presents a critical literature review and analysis on factors identified from the literature that may influence the success of a counseling case. A total of 261 cases from current literature were analyzed on five factors (Overall Design, Design of Counseling, Design of Technology Integration, Purpose of Technology Use, and Format of Counseling) regarding their influence on the success of counseling experiences. The first three factors in the five were found to be significant and hence included in a prediction model. The second part of this article demonstrates a dynamic design of an online course that prepares counseling students to use technology in their practice.

Keywords: counseling education, case analysis, technology in counseling, dynamic design

INTRODUCTION

During the past two decades, the use of technology in the field of counseling education and professional practice has been rapidly increased (Adedokun, et al, 2012; Barak, Klein, & Proudfoot, 2009; Berry, Srebalus, Cromer, and Takacs, 2003; Liu, Maddux, & Smaby, 2006;), such as the use of video, internet resources, social media tools, and programs that provide virtual environment (Adedokun, et al, 2012; Reese, Slone, Soares, & Sprang, 2012; Rees, & Stone, 2005), mostly in online counseling, cybereherapy

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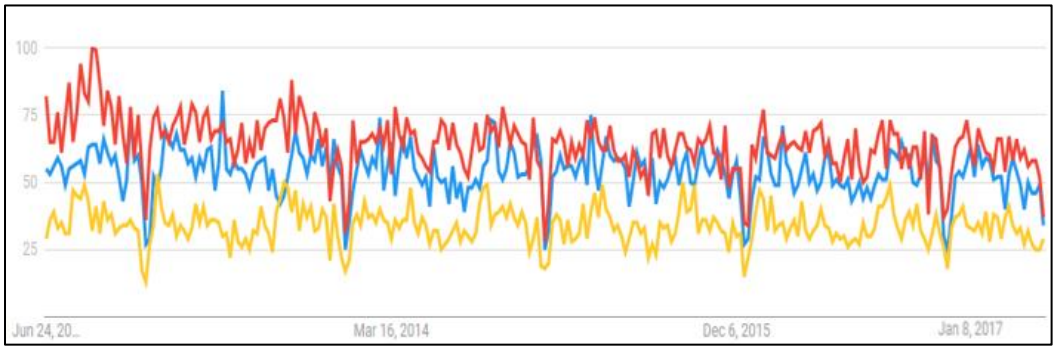
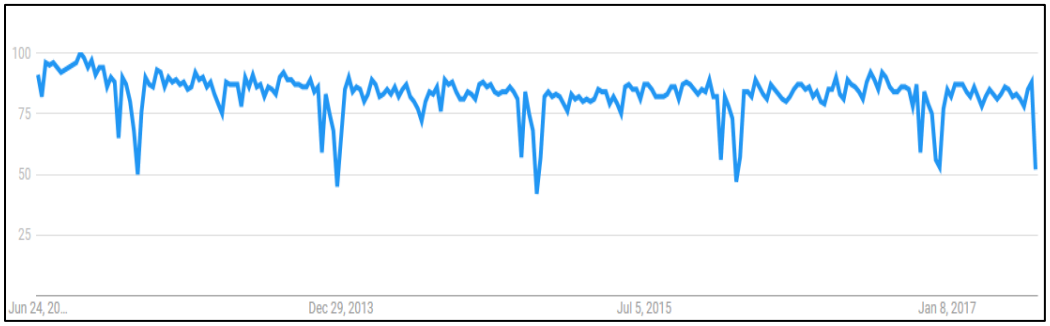
or intelligent e-therapy (Callahan & Inckle, 2012; Chester, & Glass, 2006; Cicila, Georgia, & Doss, 2014; Mishna, et al, 2013; Papandonatos, Erar, Stanton, & Graham 2016). Figure 1-a visualizes a trend of parallel development of research and publications from 2012 to 2017 on the three themes – technology integration (blue), counseling education (red), and counseling practice (yellow). Figure 1-b show trend of research and publications on the theme of *technology integration in counseling*.



(a)



(b)

Figure 1: Research Trends: Technology Integration in Counseling (*Google Trends*, 2017)

To assess whether or how technology is appropriately used to produce expected quality of counseling work, design of technology integration is always a key point (Liu & Gentile, 2008; Liu & Maddux, 2008). Previous literature suggests that research and practice have been done at (a) an initial level of technology integration to explore technology tools for counseling (Bickman, Kelley, & Athay, 2012; Bloom, & Taylor, 2015; Bornas, Tortella-Feliu, Labres, & Fullana, 2001; Schafle, Smaby, & Liu, 2006), and (b) a higher level of integration that focuses on the design and implementation of integrating technology to improve counseling education and practice (Duncan, Velasquez, & Nelson, 2014; Gilat, Tobin, & Shahar, 2012; Liu, Maddux, & Smaby, 2006). Obviously in the literature, there is plenty of room for more explorations on factors that may influence the success of technology integrated counseling.

The main purpose of this study is, based on a critical review of current literature, to examine and identify factors that may influence the success of a counseling case, and formulate a case based predictive model. The first part of this article presents the case analysis and the resulted predictive model. The second part of this article describes an application of this model with a new approach of dynamic design in an online course that prepares counseling students to use technology in their practice.

LITERATURE REVIEW

To examine the factors that may influence the success of technology-integrated counseling, we will start with the ITD technology integration model proposed by Liu and Velasquez-Bryant (2003) and tested over years (Cantrell, Liu, Leverington, & Ewing-Taylor, 2007; Lee & Liu, 2016). Information (I), Technology (T), and Design (D) are the three dimensions of this model, where *Information* indicates learning contents, subject knowledge and skills, *Technology* means any hardware, software or media used to improve teaching, learning, or educational practice, and *Design* includes a set of instructional design principles applied to the design of information delivery and technology use to achieve the learning goals. The model suggests that success of technology integration in any cases is the product that merges careful work from all three dimensions, and missing work at any dimension would influence the quality of the outcomes (Liu, Ripley, & Lee, 2016; Liu & Velasquez-Bryant, 2003). The literature review in this section will map this integration model specifically with the ITD dimensions in the context of using technology in counseling education and practice, and identify the factors to be examined.

COUNSELING EDUCATION AND PRACTICE: KNOWLEDGE AND SKILLS

In the field of counseling, the specific content area, as the dimension of *Information* (I) in the ITD model, can be defined under two scopes: counseling education and counseling professional practice.

Under the scope of counseling education, content area includes theories, knowledge, and skills that counseling programs, curriculum, and courses would teach or prepare students for. Specifically, there are eight common core areas that represent the foundational knowledge required for entry-level counselor education graduates by the Council for Accreditation of Counseling and Related Educational Programs (CACREP, 2016):

1. Professional counseling orientation and ethical practice
2. Social and cultural diversity
3. Human growth and development
4. Career development
5. Counseling and helping relationships
6. Group counseling and group work
7. Assessment and testing
8. Research and program evaluation (p. 8)

In each core area, a list of content requirements and standards are described, which provide a clear guidance to the curriculum or course design.

Smaby and Maddux (2011) proposed eighteen highly structured counseling skills along with two related objectives in three different stages of the counseling procedures. In the first stage, *Exploring Stage*, the objectives are: (a) Attending, and (b) Questions and Reflections; and the following counseling skills are practiced: (1) eye contact, (2) body language, (3) verbal tracking, (4) questioning, (5) paraphrasing, and (6) summarizing. In the second stage, *Understanding Stage*, the objectives are: (a) Interchangeable Empathy, and (b) Additive Empathy; and the following skills are practiced: (7) feeling and content, (8) self-disclosure, (9) concrete and specific, (10) immediacy, (11) situation action and feelings, (12) confronts caringly. In the third stage, *Action Stage*, the objectives are: (a) Decision-Making, and (b) Contracting; and the following skills are practiced: (13) deciding, (14) choosing, (15) consequences, (16) agreements, (17) deadlines, and (18) reviewing goals and actions to determine outcome. Counselor trainees will first learn,

assess and master basic attention and reflection skills, then apply intuitive skills, and finally develop cognitively complex decision-making skills such as deciding and choosing.

Counseling clinical practice basically provides for the utilization of theories and development of counseling skills. Students will have opportunities to counsel clients who represent the ethnic and demographic diversity of their community.

DESIGN IN COUNSELING EDUCATION AND PRACTICE

Content design or *Information Design* (ID) is another dimension of the ITD model, and when applying to the context of counseling education and practice, it goes through the same stages and procedures of the ADDIE design model: *Analysis, Design, Development, Implementation, and Evaluation* (Gagne, Wager, Golsas and Keller, 2005).

First, content design in counseling education basically focuses on the design of courses or training instructions. The main procedures include (a) *Analysis* – to conduct needs assessment, content assessment and learner assessment, and set the goals and objectives; (b) *Design* – to determine source of information/materials, format of course delivery (face-to-face or online), instructional strategies and methods, hardware/software for learning, and a to-do list to complete the course or instructions; (c) *Development* – to prepare for and complete the tasks on the to-do list; (d) *Implementation* – to conduct and complete the instructions and all activities as planned; and (e) *Evaluation* – to evaluate the learning processes and learning outcomes (Lee & Liu, 2016; Liu & Maddux, 2008).

Second, in counseling clinical practice the design focuses on the settings and procedures of clinical sessions. The main procedures include: (a) *Analysis* – to conduct assessment to the client, in which the counselor obtains the background information and the issues or problems of the client; (b) *Design* – to determine treatment plan, specific activities, backup preparations, and all the tasks need to be completed; (c) *Development* – to prepare for and complete the tasks; (d) *Implementation* – to conduct counseling session, which can be a single session or multiple sessions where the counselor will use the above skills; and conduct follow-up communications with the client, this can be an option, or in any format (such as informal meeting, chat, or providing supplementary materials to the client to learn more relevant information about certain particular issues he/she may have); and (e) *Evaluation* – to evaluate the procedures, this is for the counselors to learn and improve (Liu & Gentile, 2008a). *Individual* counseling and *collaborative* counseling are two most-often-studied types of practice where a well-designed plan would lead to a more positive outcome (Smaby & Maddux, 2011).

TECHNOLOGY USED IN COUNSELING

The standards by the Council for Accreditation of Counseling and Related Educational Programs (CACREP) have clearly described the inclusion of using technology in counseling, emphasizing the impact of technology on counseling process and clinical supervision, and the needs of assistive technology (CACREP, 2016). As the dimension of *Technology* (T) in the ITD model, use of technology is addressed Professional Counseling Identity (in sub-sections: F-1-j, F-4-c, F-5-d, F-5-e), Entry-Level Specialty Areas (in sub-sections: D-2-q, D-3-a, D-3-d), and Doctoral Program Standards (in sub-section B-2-g) in CACREP standards.

Types of Technology. In literature, researchers and counseling educators have used a variety of technology tools to promote better outcomes or solutions in counseling education or clinical services (Meshriy, 2009; Wilkinson & Reinhardt, 2015). The most common application is web-based or online counseling where the Internet is used to deliver information, conduct pre-assessment, or as the platform of interaction between counselors

and clients (Levin, Pistorello, Hayes, Seeley & Levin, 2015; Nota, Santilli & Soresi, 2016; Shaw & Shaw, 2006;). With the rapid development of technology, social media applications such as Facebook, or Twitter (Brew, Cervantes, & Shepard, 2013), and mobile devices (Warren, 2012) become more applicable in counseling. Traditionally, video technology or products have been used in counseling skill training (Lux & Sivakumaran, 2010; Rees, & Haythornthwaite, 2004), to current, more video based game design is integrated into university counseling (Mathis, 2010). Furthermore, in contrast with the telephone-based counseling that has been in use in the past three decades (Dorstyn, Mathias, & Denson, 2011; Papandonatos, Erar, Stanton, & Graham, 2016; Simpson, Guerrini & Rochford, 2015), now the robot assisted counseling is available (Rabbitt, Kazdin, & Hong, 2015).

Purpose of Using Technology. The literature reveals two main purposes of using technology in counseling: (a) as a media to deliver information, and (b) as a means to communicate between counseling educators and students, or between counselors and clients. The issue is whether or how technology could be used in an appropriate way to effectively improve counseling education or practice. This leads to design of technology integration.

DESIGN OF TECHNOLOGY INTEGRATION IN COUNSELING

Technology Design (TD), or design of technology integration in counseling, is relatively more comprehensive and involves all three dimensions of the ITD model (*Information, Technology*, and *Design*). When applying the technology tools in counseling education and practice, it goes through the same stages and procedures of the ADDIE design model: *Analysis, Design, Development, Implementation, and Evaluation* (Gagne et al., 2005), but focuses more on the details and procedures of technology integration.

Based on the outcomes from above design in counseling education and practice, the content design or *Information Design* (ID), decisions on the use of technology, such as whether, what, how, and when technology will be used, can be lined up with each activity, procedure, and specific purposes. Table 1 shows an example of technology integration design for the *pre-assessment* to a career counseling client (Liu, 2007).

Table 1. *Design of Technology Integration: Pre-Assessment to Career Counseling Client*

Purposes	**Activities/ Procedures**	**Technology Tools**	**To Do List**
To obtain general info	Survey screening (online)	• Online survey Google Form	• Create online survey form • Test the form • Deliver to client
	Pre-interview (web conference, or phone)	• Video conference • GoMeeting • Doodle	• Set up video conference • Create instructions and deliver to client • Schedule testing and provide support
To obtain career personality	Career personality screening (conduct the test on Holland's Inventory)	• Online testing • Google From	• Create online form for the test • Test the form • Create and deliver test instructions • Schedule • Deliver to client

Technically, all the activities that demand the use of technology need to have an task-based design as detailed in the example shown in Table 1. However, in the literature review of the current study, 41% of the technology-based counseling cases did not demonstrate a careful design.

OVERALL DESIGN: STATIC DESIGN VERSUS DYNAMIC DESIGN

While the above sections have summarized micro procedures of the design, an *Overall Design (OD)* in the strategies and principles of management and operation is always a core dimension in the ITD model, based on which overall strategical decisions can be made regarding counseling program, curriculum, courses, professional training, or clinical practice.

Liu and Maddux have proposed a dynamic design model (2005), which features nonlinear design, from multiple dimensions, as process-focused, and with open-ended solutions or directions (See Table 2). They examined the model from their teaching and research over years, and constantly received positive outcomes when the dynamic design is applied to their developmental projects, such as courseware design, design of online counseling skill training, educational multimedia application design, and flipped learning design (Liu, 2005; Liu & Gentile, 2008b; Liu & Maddux, 2010; Liu, Ripley, & Lee, 2016). When such a developmental "project" is divided into the very basic units, that is, the specific and operational tasks, activities, operations, or procedures that are necessary to complete the project and to achieve the preset goals, an overall design model serves as the framework to connect all the units and an engine to drive the operations. The dynamic model serves as such a framework and engine.

Table 2. *Static vs Dynamic Design (Liu & Maddux, 2005)*

Static Design (Type I)	**Dynamic Design (Type II)**
Linear	Nonlinear
Single-dimension	Multiple-dimension
State-based	Process-based
Close-ended	Open-ended

In the literature, overall design in technology-integrated counseling was often addressed but no evidence shows any systematical design procedures or models.

SUMMARY OF THE FACTORS

In summary, from the literature, the following five factors are of the authors' interest:

1. *Overall Design (OD)*
2. *Design of Counseling (DC)*
3. *Design of Technology Integration (DT)*
4. *Purpose of Using Technology (PT)*
5. *Format of Counseling Practice (FC)*

A critical content analysis of literature on *technology in counseling* is conducted, and the five factors are examined whether or to what extent they could influence the possibility of a technology-based counseling case to be successful as described in the literature.

CASE ANALYSIS: INFLUENTIAL FACTORS

RESEARCH QUESTIONS

The purpose of the study was to examine and identify factors that may influence the success of a case of counseling education or practice. Specifically, the case analysis was guided by the following research questions:

1. Can the probability that a counseling case is successful be predicted by any of the five factors — overall design, design in counseling, design of technology integration, purpose of using technology, and format of counseling practice?
2. To what extent do the significant factors (if any from question 1) influence the probability of a counseling case to be successful?

THE SAMPLE OF COUNSELING CASES

The sample of cases were selected from the literature of technology in counseling over the past ten years. More than 300 peer-reviewed journal articles were reviewed including quantitative studies, qualitative studies, and on-going project reports. Cases were identified from the articles based on the experiences described by their authors. A case from an article was selected and coded so long as the article provided necessary information for the analysis: the participants (counselor and clients, or counseling educator and students), the counseling area, technology used, procedures of technology-integrated counseling experiences, and outcomes from the counseling experiences. It was not critical whether the case is from a quantitative study, qualitative study, or project report.

For the case analysis, a final of 261 technology integrated counseling cases were selected as the sample of this study. The sample consisted of quantitative studies (20.3%), qualitative studies (14.6%), mixed studies (18.4%) and project reports (46.7%), among which 18.4% are on counseling skill training, and 73.9% on clinical practice. *Counseling areas* included career counseling (3.8%), school counseling (13.4%), family and marriage counseling (5.0%), health counseling (10.0%), psychological therapy (35.2%), and others. *Technology tools* varied from online and social media tools (38.3%), video production (4.2%), telepractice (2.3%), to mixed (29.5%) and others.

FACTORS EXAMINED AND CODING

Again, the purpose of the case analysis was to explore the factors or variables that influence the probability of a technology integrated counseling case to be successful as described in the cases. Therefore, the factors were coded into binary variables, as response variable and explanatory variables, to perform logistic regression analysis.

The response variable was Case Success (CS), where success was defined by the outcomes from the technology based counseling experiences as described in the articles. For a given case selected from an article, a value of 1 is coded for "success" when any one of the criteria is met: (a) technology integrated counseling experiences result in *better or positive outcomes* if the outcomes are quantitatively measureable such as evaluation scores, (b) technology integrated counseling exhibits *expected features* in counseling skill performance if the outcomes are summarized from observations or qualitative data, or (c) technology integrated counseling shows positive trends in counseling skill performance towards improved performance if the case is an on-going study. Otherwise, a value of 0 is coded for an "unsuccessful" case. The five factors summarized from the literature are explanatory variables (or predictor variables). The factors are coded as follows.

Although previous studies have focused on the influence of dynamic design versus static design on learning outcomes (Liu, 2005; Liu & Maddux, 2005, 2010), in the field of

counseling education and practice, design was rarely systematically advocated. So, in this case analysis, the variable Overall Design (OD) is coded as 1 for a given case when activities with the features of either dynamic or static design are conducted, and coded as 0 if no design related descriptions are reported. For the other two design-related variables, the Design of Counseling (DC) and Design of Technology Integration (DT), a value of 1 is given for a case, if design principles, tasks and procedures (as described in the ADDIE model) are employed and details are specifically explained. Otherwise, a value of 0 is given to code the variables as "design is not presented" for the case.

For the variable Purpose of Using Technology (PT), a case is coded as 1 if technology tools are used for the purpose of interactions or communications, and coded as 0 if used only for the purpose of information delivery. The Format of Counseling Practice (FC) is coded as 1 for a given case if the experiences described in the article is collaborative or group counseling, and a value of 0 is given for individual one-to-one counseling or skill training. Table 3 shows the coding values for the variables.

Table 3: *Variable Coding*

Variables	**Values**	
(presented in articles)	**1**	**0**
(CS) – Case Success (RV)	Successful	Unsuccessful
(OD) – Overall Design (EV)	Yes	No
(DC) – Design of Counseling (EV)	Yes	No
(DT) – Design of Technology Integration (EV)	Yes	No
(PT) – Purpose of Using Technology (EV)	Interaction	Information
(FC) – Format of Counseling Practice (EV)	Collaborative	Individual

Note: RV—Response Variable, EV—Explanatory Variable

DATA ANALYSIS AND RESULTS

Logistic regression analyses were conducted to determine whether Overall Design (OD), Design of Counseling (DC), Design of Technology Integration (DT), Purpose of Using Technology (PT), and Format of Counseling Practice (FC) could be used to predict the success of a technology integrated counseling case (Case Success). The assumptions of logistic regression were checked and no violations were found. Frequencies for each variable are shown in Table 4.

Table 4: *Frequencies*

Variables	**Values**	
	1	**0**
(CS) – Case Success	183	78
(OD) – Overall Design	186	75
(DC) – Design of Counseling	138	123
(DT) – Design of Technology Integration	154	107
(PT) – Purpose of Using Technology	239	22
(FC) – Format of Counseling Practice	169	92

First, a logistic regression analysis was performed with all five explanatory variables. The results showed that the model was significant ($X^2 = 32.097$, $p < 0.001$), but two of the five variables did not significantly contribute to the model: Purpose of Using Technology (*Wald* $X^2 = 0.587$, $p = 0.443$) and Format of Counseling (*Wald* $X^2 = 0.754$, $p = 0.385$). Therefore, these two variables were eliminated from the model in the next model

examination. A second logistic regression analysis was conducted with the three explanatory variables: Overall Design (OD), Design of Counseling (DC), Design of Technology Integration (DT).

Results from the second logistic regression showed that the second model with these three explanatory variables was significant ($X^2 = 30.661$, $p < 0.001$), indicating that this model significantly predicts group membership. The model accounted for about 26% of the variation in the response variable ($R^2 = 0.257$). The Hosmer and Lemeshow Goodness-of-Fit Statistic ($X^2 = 4.914$, $p = 0.555$) was not significant, indicating that the hypothesis that the model provides a good fit of data should be accepted. Specifically, 15 out of 78 unsuccessful cases (19.2%), 178 out of 183 successful cases (97.3%), and a total of 193 out of 261 cases (73.9%) were correctly predicted by the model.

Table 5: *Logistic Regression Results*

	DF	**Parameter Estimate**	**Standard Error**	**Wald Chi-Square**	***P***	**Odds Ratio**
(OD)	1	0.845	0.303	7.788	0.005	2.327
(DC)	1	0.782	0.289	7.315	0.007	2.286
(DT)	1	1.008	0.288	12.269	0.001	2.741
Constant	1	-0.647	0.314	4.240	0.039	0.524

Response variable: Case Success (CS)
Explanatory variables: Overall Design (OD), Design in Counseling (DC), and Design of Technology Integration (DT).

A significant Wald Chi-square value for a given variable indicates that the variable is significantly related to the response variable. As shown in Table 5, the Wald chi-square values are significant for all three explanatory variables. Therefore, all three explanatory variables are included in the model equation. The Parameter Estimate generates the estimated coefficients of the fitted logistic regression model, and they are used to formulate the following logistic regression equation (1):

$$\text{logit}(\hat{p}) = -0.647 + 0.845(OD) + 0.782(DC) + 1.008(DT) \quad \text{---------- (1)}$$

The sign ($\hat{p}$) indicates an estimated probability value (also called *log odds*) for the response variable (Case Success) to be 1, and logit represents *logit transformation* of the event probability.

An estimated coefficient for one explanatory variable indicates the contribution that particular variable makes to the possibility of the response variable being 1. For example, when the variable *DC* (Design of Counseling) is 1 (that is, when the principles and tasks of design are applied in the counseling experience), the logit transformation of event probability (that the technology based counseling case to be successful as described by in the case article) increases by 0.782 (see Table 5). The estimated coefficients for the other two explanatory variables can be determined following the same logic.

Odds ratio is another statistic to explain the contribution of an explanatory variable to the model. If the odds ratio for a given explanatory variable is larger than 1, the probability of the response variable being 1 increases because of the presence of that explanatory variable. For example, the odds ratio for variable *DC* (Design of Counseling) is 2.286 (see Table 5), indicating that a counseling case would be 2.286 times more likely to be successful if the design of the counseling practice is engaged in the case, compared to cases that do not engage. If the odds ratio is smaller than 1, the probability of the response variable being 1 decreases (that is, the probability of a counseling case to be successful

decreases when that explanatory variable exists). As seen in Table 5, all three odds ratio values are larger than 1, therefore, all three variables positively contribute to the success of a technology integrated counseling case.

SUMMARY OF THE CASE ANALYSIS AND THE PREDICTIVE MODEL

In summary, from the analysis of 261 cases, three influential variables are identified—Overall Design (OD), Design of Counseling (DC), Design of Technology Integration (DT), reflecting the three dimensions of the ITD model. The three variables can be used to predict the probability of a technology integrated counseling case to be successful. The probability increases when (a) overall design is carefully conducted with either dynamic design or static design, and strategical plans for management and operation are clearly laid out (b); counseling contents are intentionally designed to meet the CACREP standards and particular goals and objectives of the counseling case; and (c) the use of technology tools are chosen appropriately for information delivery or interactive communications and ITD or ADDIE design models are carefully applied.

Results and relationships produced from the logistic regression analysis can be summarized into the following model function equation (2) in Figure 2.

P (CS) = *f* [OD, DC, DT] ---------- (2)

Where:
CS = *Case Success* **P (CS) =** *Probability of Case Success* ***f* […]** indicates "a function of …"
OD = *Overall Design* **DC** = *Design of Counseling* **DT =** *Design of Technology Integration*

Figure 2. Model Function

Model function (2) reads "the probability of a technology integrated counseling case to be successful is a function of overall design, design of counseling, and design of technology integration." It exhibits the relations between the group of explanatory variables and the response variable. Logistic regression equation (1) in the "Data Analysis and Results" section is the concrete model that describes all specific predictive relations or influences. This model basically is a literature based model.

In the next section, the authors will demonstrate an example to apply this model with dynamic design principles in developing an online course.

DYNAMIC COURSE DESIGN: APPLICATION OF THE MODEL

THE COURSE

One author of this article had successfully developed and implemented an online counseling course (Liu, 2007). After that, she was assigned to develop another online course *Career Counseling and Information Technology*, introducing theories and procedures of career information, career counseling, and career development with an emphasis on using current information technology tools. The objectives of the course are:

1. Demonstrate an understanding of fundamental theories and practical models of career counseling;
2. Identify components and procedures of career development and career counseling;
3. Discuss current trends and issues with respect to the use of information technology in the field of career development and career counseling;

4. Be familiar with some widely used computer-based career information systems;
5. Be familiar with the appropriate use of certain career development inventories, and use computer-based system to perform the assessment with the inventories.
6. Use technology tools to perform the following tasks:
    - Using online databases
    - Using a variety of search engines to locate career development information resources
    - Developing information Websites for specific groups
    - Developing electronic/online career development portfolio
    - Conducting online career counseling
7. Conduct a comprehensive project demonstrating the above theories and technology skills.

DYNAMIC DESIGN OF THE COURSE

At the time, dynamic design (Liu & Maddux, 2005) was initially piloted in research and teaching by the authors. In the development of this course, the four approaches of the dynamic design are: (a) nonlinear, (b) multiple dimension, (c) process-focused, and (d) open-ended. When the coursework is divided into the very basic units or operational tasks and procedures, they can be framed within the dynamic design model, organized and executed in the way of dynamic learning.

Nonlinear. The term "linear" here is not a mathematic concept. It simply means to do things one after another, and one at one time. In the course, the required readings and discussions, online activities, assignments, projects, and group-individual work are arranged into a net map where students can work on and complete several tasks simultaneously. The benefit of this nonlinear learning is that macro learning to understand the structure of the knowledge and micro learning to obtain basic skills or details can occur at the same time.

Multiple Dimensions. Contentwise, work from three dimensions (counseling skills, technology tools and skills, and technology integrated counseling practice) are developed. With the nonlinear approach, the learning tasks or activities on each dimension can be matched or paralleled, and then implemented at each dimension as well. These are the three dimensions of the ITD model.

Process-Focused course projects include on-going portfolios on the three dimension: (a) a counseling skill e-portfolio, (b) a technology skill online portfolio, and (c) a technology integrated counseling practice video portfolio (which is a video production assembling a series of videos produced during the course from several projects). The three portfolios are built through the course, reflect the path of student learning, and interconnect knowledge and skills among the three dimensions.

Another process-focused activity, performed by the instructor, is the dynamic assessment. During the learning process, students learning data can be collected in a dynamic way, and data analytics can be processed and constantly produce dynamic "prediction" results that can be used to identify potential "problems" or "weaknesses" of student learning. This indeed is an out-standing point of dynamic design.

Open-Ended. A typical product along with the open-ended design is a personalized technology integrated counseling model. After all the work through the course, students are able to formulate a self-developed model, which opens the directions of their further research and practice.

Course Implementation and Evaluation. The course has been offered first by the professor who designed the course. Revisions, adjustment, and updates in research and new technology tools are done over years. As a well-designed and -delivered online course,

several instructors have taught the course since and received excellent evaluations on the course design and materials.

DISCUSSIONS AND CONCLUSIONS

In summary, Overall Design, Design of Counseling, and Design of Technology Integration are the three predictor variables identified from the cases reported in the literature of counseling education and clinical practice. A model to predict the success of a technology integrated counseling case is generated with these three variables. As an application example, the predictive model, extended into a platform of dynamic design, is reflected in the above online course design. Overall, the case analysis and our experiences of course design could lead to two conclusions: (a) dynamic design is in need, and (b) knowledge of design in counseling is in need.

DYNAMIC DESIGN IN NEED

Since Liu and Velasquez-Bryant (2003) proposed the ITD model, it has been examined through a series of experimental, quasi-experimental, and meta-analysis studies (Liu & Jones, 2004; Lin & Maddux, 2005, 2010; Liu, Ripley & Lee, 2016), including the current study. Findings consistently demonstrate the weight of "design" in the success of technology based learning. Now it is the time to advance the model to a dynamic design model for the following reasons.

First, dynamic learning has become a new learning style of the 21st century's learners (Rotherham & Willingham, 2010; Silva, 2009). With rapid development of technology, a variety of information resources are available for student-centered learning, new technology tools make collaborative learning more active, social media applications provide new communication platforms and formulate a dynamic learning community, and multiple learning outcomes are produced in open-ended directions. In such a context of dynamic learning, obviously the traditional ways of instructional design are not adequate. In 2005, Liu and Maddux proposed a dynamic design model (see Table 2), as planted a seed (2005). However, at that time, even static design was not widely known of or applied in the field let alone the dynamic design. Not until recently does the "seed" have the right soil and air to grow. A dynamic version of the design model seems a natural solution to design dynamic learning (Liu, 2017).

Second, *learning analytics* is a relatively new concept, and more and more related work and studies have been presented in the literature, representing a new approach of research (Ali, Hatala, Gasevic, & Jovanovic, 2012; Joksimovic, Hatala, & Gasevic, 2014). An in-depth reading of the articles published from 2015 to 2017 in the *Journal of Learning Analytics* reveals that learning analytics mainly consists of two parts: (a) dynamic learning, and (b) dynamic assessment (Liu, 2017). The dynamic design model can be used to align dynamic assessment with dynamic learning activities, procedures and outcomes. The course development experiences described in this paper demonstrate the need of dynamic design as well.

KNOWLEDGE OF DESIGN FOR COUNSELING IN NEED

Tied back to the purpose of this study, since design is a significant factor to predict the success of a counseling case, it will make a difference whether or not the counselors and counseling educators have mastered necessary knowledge and skills of design. Although CACREP standards (2016) has clear requirements on instructional design, design of program and evaluation, the components of design have not systematically incorporated into the curriculum of counseling program. As in the case analysis, Design of Counseling

is missing in 47% of the cases, and Design of Technology Integration is missing in 41% of the cases. If the case conductors (who are previous or current counseling candidates) had received systematical training in the area of design, they could have addressed or emphasized it in the experiences.

NON-SIGNIFICANT VARIABLES

In developing the prediction model, two original explanatory variables (Purpose of Using Technology and Format of Counseling Practice) are not significant. They are eliminated from the model. Whether a counseling case is collaborative or individual, or whether the purpose of using technology is for communication or information delivery, may not make significant influence on the case success. What matters is whether the designs are well conducted in the Overall Design (OD), Design of Counseling (DC), and Design of Technology Integration (DT).

However, it may not be true that these two non-significant variables are not relevant to technology integrated counseling. The model with all five variables, including these two non-significant ones, was still significant ($X^2 = 32.097$, $p < 0.001$) and accounted for about 16% of the variation in the response variable ($R^2 = 0.164$). Therefore, from the perspective of practice or when conducting a study, these two variables would definitely deserve consideration of reference.

LIMITATIONS AND FURTHER STUDIES

In this study, the case analysis generates a predictive model with three influential variables. As stated at the beginning of this article, the model is actually the results of a critical literature review based on the information provided by the case authors. One limitation of this study is that the data is second-hand data based on the descriptions in the articles where the cases are identified. Some information was not reported. For example, if a case did not include the description of design procedures, it could be that the design was not the focus of the study and it was not reported.

Although the model is based on counseling and technology literature, it can still be applied in a general education setting, with a larger size of first-hand data. What interests the authors most is a research scope to explore and examine the dynamic design model in a variety of educational settings and applications. Further efforts are in need in this area.

REFERENCES

Adedokun, O. A., Hetzel, K., Parker, L. C., Loizzo, J., Burgess, W. D., & Robinson, J. P. (2012). Using virtual field trips to connect students with university scientists: Core elements and evaluation of zipTrips™. *Journal of Science Education and Technology, 21*(5), 607-618. doi:10.1007/s10956-011-9350-z

Ali, L., Hatala, M., Gasevic, D., & Jovanovic, J. (2012). A qualitative evaluation of evolution of a learning analytics tool. *Computers and Education, 58*, 470-489.

Barak, A., Klein, B., & Proudfoot, J. G. (2009). Defining internet-supported therapeutic interventions. *Annals of Behavioral Medicine, 38*(1), 4-17. doi:10.1007/s12160-009-9130-7

Berry, T., Srebalus, D. J., Cromer, P. W., & Takacs, J. (2003). Counselor trainee technology use, skills, learning styles, and preferred modes of instruction. *Journal of Technology in Counseling, 3*(1). Available: http://jtc.colstate.edu/vol3_1/Takacs/Takacs.htm

Bickman, L., Kelley, S. D., & Athay, M. (2012). The technology of measurement feedback systems. *Couple and Family Psychology: Research and Practice, 1*(4), 274-284. doi:10.1037/a0031022

Bloom, Z. D., & Taylor, D. D. (2015). New problems in today's technological era: An Adlerian case example. *The Journal of Individual Psychology, 71*(2), 163-173. doi:10.1353/jip.2015.0020

Bornas, X., Tortella-Feliu, M., Llabres, J., & Fullana, D. (2001). Computer assisted exposure treatment for flight phobia. *Psychotherapy Research, 11*(3), 259-273.

Brew, L., Cervantes, J. M., & Shepard, D. (2013). Millennial counselors and the ethical use of facebook. *TPC the Professional Counselor, 3*(2), 93-104. doi:10.15241/lbb. 3.2.93

CACREP (2016). CACREP Standards. By Council for Accreditation of Counseling and Related Educational Programs. Available: http://www.cacrep.org/wp-content/uploads /2012 /10/ 2016-CACREP-Standards.pdf

Callahan, A., & Inckle, K. (2012). Cybertherapy or psychobabble? A mixed methods study of online emotional support. *British Journal of Guidance & Counselling, 40*(3), 261-278. doi:10.1080/03069885.2012.681768

Cantrell, P., Liu, L., Leverington, M., & Ewing-Taylor, J. (2007). The Effects of Differentiated Technology Integration on Student Achievement in Middle School Science Classrooms. *International_Journal of Technology in Teaching and Learning, 3*(3), 36-54.

Chester, A., & Glass, C. A. (2006). Online counselling: A descriptive analysis of therapy services on the internet. *British Journal of Guidance & Counselling, 34*(2), 145-160. doi:10.1080/03069880600583170

Cicila, L. N., Georgia, E. J., & Doss, B. D. (2014). Incorporating internet-based interventions into couple therapy: Available resources and recommended uses. *Australian and New Zealand Journal of Family Therapy, 35*(4), 414-430. doi:10.1002/anzf.1077

Dorstyn, D. S., Mathias, J. L., & Denson, L. A. (2011). Psychosocial outcomes of telephone-based counseling for adults with an acquired physical disability: A meta-analysis. *Rehabilitation Psychology, 56*(1), 1-14. doi:10.1037/a0022249

Duncan, A. B., Velasquez, S. E., & Nelson, E. (2014). Using videoconferencing to provide psychological services to rural children and adolescents: A review and case example. *Journal of Clinical Child and Adolescent Psychology, 43*(1), 115-127. doi:10.1080/15374416.2013.836452

Gagne, R. M., Wager, W. W., Golsas, K. C., & Keller, J. M. (2005). Principles of Instructional Design (5th Ed.). Belmont, CA: Thomas Wadsworth.

Gilat, I., Tobin, Y., & Shahar, G. (2012). Responses to suicidal messages in an online support group: Comparison between trained volunteers and lay individuals. *Social Psychiatry and Psychiatric Epidemiology, 47*(12), 1929-1935. doi:10.1007/s00127-012-0508-7

Google Treads. (2017). Searched by Technology Integration + Counseling Education + Counseling Practice. https://trends.google.com/trends/

Joksimovic, S., Hatala, M., & Gasevic D. (2014). Learning analytics for networked learning models. *Journal of Learning Analytics, 1*(3), 191-194.

Lee, A. M., & Liu, L. (2016). Examining flipped learning in sociology courses: A quasi-experimental design. *International Journal of Technology in Teaching and Learning, 12*(1), 47-64.

Levin, M. E., Pistorello, J., Hayes, S. C., Seeley, J. R., & Levin, C. (2015). Feasibility of an acceptance and commitment therapy adjunctive web-based

program for counseling centers. *Journal of Counseling Psychology, 62*(3), 529-536.

Liu, L., & Jones, P. (2004). Impact of online communication design on student motivation and performance. *Journal of Research on Education, 14*(1), 40-56.

Liu, L., Ripley, D., & Lee, A. (2016). Flipped Learning and Influential Factors: Case Analysis. *Journal of Educational Technology Development and Exchange*, ***9***(2), 89-107.

Liu, L. (2005). Evaluating online learning applications: Development of quality-related models. *International Journal of Information and Communications Technology Education, 1*(3), 21-35.

Liu, L. (2007). Design and Implementation of an Online Course in Counseling and Information Technology. In C. Crawford, R. Carlsen, I. Gibson, K. McFerrin, J. Price, R. Weber & D. A. Willis (Eds.), *Technology & Teacher Education Annual 2007* (pp. 2404-2409). Charlottesville, VA: AACE

Liu, L., & Gentile, T. (2008a). Video applications for online counseling: Design and practice. In C. McNaught & C. Montgomerie (Eds.), *Proceedings of ED-MEDIA, Educational Multimedia, Hypermedia and Telecommunications* (pp. 5662-5667). Charlottesville, VA: AACE.

Liu, L., Gentile, T. (2008b). Online Training to prepare counselors for online counseling: new strategies and tools. In C. Bonk, M.M. Lee, & T. Reynolds (Eds.), *E-Learn in Corporate, Government, Healthcare and Higher Education Annual 2008* (pp.1579-1586). Charlottesville, VA: AACE.

Liu, L., & Maddux, C. (2005). Influences of course design on student evaluations: An initial logistic prediction model. *Journal of Excellence in College Teaching*,*16*(1),125-148

Liu, L., Maddux, C., & Smaby, M. (2006). Integrate Digital Video Technology into School Counseling Training. In C. Crawford, R. Carlsen, I. Gibson, K. McFerrin, J. Price, R. Weber & D. A. Willis (Eds.), *Technology & Teacher Education Annual 2006* (pp. 625-630). Charlottesville, VA: AACE.

Liu, L., & Maddux, C. (2008). An online course to prepare school counselors for online career counseling. In K. McFerrin, R. Weber, R. Carlsen, & D. A. Willis (Eds.), *Technology & Teacher Education Annual 2008* (pp. 3035-3040). Charlottesville, VA: AACE.

Liu, L., & Maddux, C. (2010). Using dynamic design in the integration of type II applications: Effectiveness, strategies and methods. *International Journal of Technology in Teaching and Learning, 6*(1), 71-88.

Liu, L., & Velasquez-Bryant, J. (2003). An information technology integration system and its life cycle: What is missing? Computers in the Schools, 20(1-2), 93-106.

Liu, L. (2017). An initial model of dynamic instructional design and learning analytics: The power of dynamic assessment and prediction. Keynote speech invited for AECT/SICET, Jacksonville, FL. 2017.

Lux, A. C., & Sivakumaran, T. (2010). Video integration in graduate counseling programs: Considerations for training and supervision. *Journal of Technology Integration in the Classroom, 2*(2), 181-189.

Mathis, J. D. (2010). Increasing the capacity of college counseling through video game design. *Journal of College Admission,* (209), 14-23

Meshriy, N. (2009). Technology in counseling. *Career Planning & Adult Development Journal, 25*(3), 82-88.

Mishna, F., Levine, D., Bogo, M., & Van Wert, M. (2013). Cyber counselling: An innovative field education pilot project. *Social Work Education, 32*(4), 484-492. doi:10.1080/02615479.2012.685066

Nota, L., Santilli, S., & Soresi, S. (2016). A life-design-based online career intervention for early adolescents: Description and initial analysis. *Career Development Quarterly, 64*(1), 4. doi:10.1002/cdq.12037.

Papandonatos, G. D., Erar, B., Stanton, C. A., & Graham, A. L. (2016). Online community use predicts abstinence in combined Internet/phone intervention for smoking cessation. *Journal of Consulting and Clinical Psychology, 84*(7), 633-644. doi:10.1037/ ccp0000099

Rees, C. S., & Haythornthwaite, S. (2004). Telepsychology and videoconferencing: Issues, opportunities and guidelines for psychologists. *Australian Psychologist, 39*(3), 212-219. doi:10.1080/00050060412331295108

Rees, C. S., & Stone, S. (2005). Therapeutic Alliance in Face-to-Face Versus Videoconferenced Psychotherapy. Professional Psychology: Research And Practice, 36(6), 649-653. doi:10.1037/0735-7028.36.6.649

Reese, R. J., Slone, N. C., Soares, N., & Sprang, R. (2012). Telehealth for underserved families: An evidence-based parenting program. *Psychological Services, 9*(3), 320-322. doi:10.1037/a0026193

Rabbitt, S. M., Kazdin, A. E., & Hong, J. H. (2015). Acceptability of robot-assisted therapy for disruptive behavior problems in children. *Archives of Scientific Psychology, 3*(1), 101-110. doi:10.1037/arc0000017

Rotherham, A. J., & Willingham, D. T. (2010). 21st-century skills: Not new, but a worth challenge. *American Education, Spring vol*. 17-20.

Schafle, S., Smaby, M. H., & Liu, L. (2006). Counselors' attitudes toward video editing technology. *Vistas, 3*(1), 1-9. Online journal by American Counseling Association.

Shaw, H. E., & Shaw, S. F. (2006). Critical ethical issues in online counseling: Assessing current practices with an ethical intent checklist. *Journal of Counseling & Development, 84*(1), 41-53.

Silva, E. (2009). Measureing skills for 21st-century learning. *Phi Delta Kappan, May vol*. 630-634.

Simpson, S., Guerrini, L., & Rochford, S. (2015). Telepsychology in a university psychology clinic setting: A pilot project. *Australian Psychologist, 50*(4), 285-291. doi:10.1111/ap.12131

Smaby, M. H., & Maddux, D. D. (2011). Basic and Advanced Counseling Skills: The Skilled Counselor Training Model. Belmont, VA: Brooks/Cole.

Warren, J. M. (2012). Mobile mind mapping: Using mobile technology to enhance rational emotive behavior therapy. *Journal of Mental Health Counseling, 34*(1), 72.

Wilkinson, T., & Reinhardt, R. (2015). Technology in counselor education: HIPAA and HITECH as best practice. *TPC the Professional Counselor, 5*(3), 407-418. doi:10.15241/tw.5.3.407