Gilbert's Behavioral Engineering Front-End Analysis Model

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Background

As the world changes, so does the need for new innovations for all types of instructional and educational materials. The instructional designer carries a unique set of tools and capabilities that make them excellent problem solvers. The instructional designer plays a pivotal role in shaping learning through many different techniques such as the development of courses, redesigning current courses, or creating training and teaching materials, just to name a few. The instructional designer looks to close a human performance gap based on the current performance versus the desired performance. The foundation of the instructional design process is the Analysis Design Development Implementation Evaluation (ADDIE) process.

The ADDIE process is systematic and helps the instructional designer with creating instruction that provides the learner with greater, more efficient success. Although this process is extremely effective, it can be time consuming. The analysis phase within ADDIE can, in some cases, take thousands of hours to conduct depending on the defined problem. For this reason, many times there are various steps missed and shortcuts taken due to time constraints. Fortunately, there are many tools and models out there to assist the instructional designer with closing the human performance gap with the aim of making the performance more efficient for the learner.

Some of the most effective means of assisting instructional designers with bridging the human performance gap come in the form of Front-End Analysis (FEA) models and tools. These FEA models and tools help provide a systematic approach that provides even greater detail to the analysis phase within ADDIE. This can greatly enhance the instructional designer's ability to ensure all aspects of the human performance are taken into consideration and are thoroughly analyzed. The FEA model that I will look to provide depth and breadth on during this project is Gilbert's Behavior Engineering Model (BEM).

According to (Surry, D. and Stanfield, K., 2017), Thomas F. Gilbert, who developed the BEM "is widely known as the father of performance technology" (Chapter 28). Gilbert's BEM and its design is extremely useful for managers, consultants, leaders, and instructional designers who look to jolt the results of an organization or individual's performance. The foundation of this FEA model can be found in its title by trying to "engineer" a "behavior" and looks to expand both the behaviors and environmental factors to managers within the organization giving them better control, cost-effective methods, and high-principled achievements. This project will take a deeper look into the framework, components, information, advantages, and disadvantages of Gilbert's Behavior Engineering (BEM) Front-End Analysis a (FEA) model.

Purpose of the Model

Gilbert's Behavior Engineering Model (BEM) is based on the understanding of a human's performance technology and the systems they are associated with. The framework of this FEA model does not look to change performance as it pertains to knowledge and skills, but rather focuses on a change in behavior. In this model, the behaviors that people exhibit are primarily attributed to the influences on those people . Therefore, if you want to change a person's behavior, you must change the influences that affect them. This model closely shares values and characteristics with the classic theory of Behaviorism by Ian Pavlov. According to (Green, C., n.d.), in 1913 John B. Watson summarized that "in behaviorism, there are three components which contribute to its theory that include the stimulus *(where something happens),* the response *(behavior)*, and the consequence *(what happens as a result)*" (pg. 158-177). In both cases, it is the influences that play a critical role in the behavior and both have extremely similar foundational characteristics.

In 1978, Thomas Gilbert's book Human Competence: Engineering a Worthy Performance (2007) stated that he "tried to create a useful, simple, and coherent system for engineering more worthy performance in individuals and especially groups of people." For a front-end analysis to be successful it must take a systematic look at the problem and incorporate data and opinions from a variety of sources to assist in making effective decisions. In reading the Human Performance Technology (HPT) manual, Gilbert's BEM FEA model tool aligns perfectly as a resource that can aid in the front-end analysis process. As (Granda-Malaver et al., HPT manual, n.d.), states "it helps to look at an organization's performance gap, take a deeper look at the causes of the identified gap, and look to apply a possible solution" (para. 1). Whether it is with a new performance front-end- analysis that deals with new goals, processes, workers, or technologies, or it is a diagnostic front-end-analysis when people within the current organization or environment are not meeting established goals and objects, Gilbert's BEM FEA model assists in helping to diagnose and close the problem that is leading to the human performance technology gap with great results.

Gilbert's Model Application

Gilbert's Behavior Engineering Model (BEM) foundation represents and depicts six factors that look to close the human performance gap for both individuals and groups. The six boxes as depicted in the following table help segregate the gap in human performance from the current performance and desired performance. Training alone does not optimize performance. A deeper look into what other portions of the equation (training) were missing was required to segregate the gap. Table 1 helps to visualize the missing components within the equation.

The Behavior Engineering Model

	Information	Instrumentation	Motivation
Environment	*Data* 1. Relevant and frequent feedback about the adequacy of performance 2. Descriptions of what is expected of performance 3. Clear and relevant guides to adequate performance	*Resources* 1. Tools, resources, time and materials of work designed to match performance needs	*Incentives* 1. Adequate financial incentives made contingent upon performance 2. Non-monetary incentives made available 3. Career-development opportunities 4. Clear consequences for poor performance
Individual	*Knowledge* 1. Systematically designed training that matches the requirements of exemplary performance 2. Placement	*Capacity* 1. Flexible scheduling of performance to match peak capacity 2. Prosthesis or visual aids 3. Physical shaping 4. Adaptation 5. Selection	*Motives* 1. Assessment of people's motives to work 2. Recruitment of people to match the realities of situation

Reference: Dr. Thomas F. Gilbert, "Human Competence: Engineering Worthy Performance," 1978, 1996

Table 1. Gilbert's Behavioral Engineering Model

According to (Granda-Malaver et al., HPT manual, n.d.), "the framework and components of Gilbert's Behavior Engineering Model (BEM) Front-End Analysis (FEA) model focuses on six categories that influence human performance along with the associated behaviors and shows ways to analyze it in the (data and information; environmental supports and resources; consequences, incentives, and resources; knowledge and skills; capacity; and motives).

Data

The data and information category looks at making sure people understand what they must do and have been given clear and concise expectations. Feedback within this category should be on time and specific to the problem.

Resources

Environmental support and resources category refers to the appropriate allocation of resources (time, equipment, material, etc.) to support the desired achievement.

Incentives

The consequences, incentives, and rewards category can appear in different positive and negative configurations. The incentives and rewards offered need to have meaning to be effective. Without effective rewards or incentives, it will not achieve the desired outcomes.

Knowledge

The knowledge and skills of the BEM model asks if the performer has the right skills and knowledge to perform at the proper level. In this category, a holistic approach is determined to ensure the performer has the proper formal education, training, and experience.

Capacity

The capacity category simply deals with the mental and physical aptitude of the performer.

Motives

Finally, the motives category has a focus on all the things that drive the performer. This could include a variety of things such as the performers necessities, wishes, distresses, morals, values, and various other foundational characteristics.

Leisurely Theorems

Within Gilbert's Behavior Engineering Model (BEM) there contains multiple leisurely theorems that help provide a detailed breadth and depth within the model. In his thoughts Gilbert stated, (1978), "When we make judgements about the competence of human conduct, we often look at performance from the wrong vantage point." The theorems that he created aimed to improve human behavior with measurable formulas.

According to (Daniel, R. et. al, n.d), Gilbert (2007), "the first leisurely theorem looks to help define worthy performance. This theorem defines worthy performance *(W)* as the valuable accomplishments *(A)* to the costly behavior *(B)* (Gilbert, 1978)". In this theorem the formula is:

$$W=A/B$$

First Leisurely Theorem (Gilbert, 2007)

The need to establish a solid determination that there is a decline in performance. (Feedback, analysis of exams, etc.) can be misleading and it is important to properly identify the declination in performance. Investment in the performance can affect the accomplishment and a worthy performance can be obtained through investment.

According to (Daniel R. et. al, n.d.), Gilbert (2007), "the second leisurely theorem is meant to define the Potential for Improving Performance *(PIP)*. The potential to improve performance is equal to the ratio of exemplary performance *(Wex)* to typical performance *(Wt)"*. In this theorem the formula is:

$$PIP=Wex/Wt$$

Second Leisurely Theorem (Gilbert, 2007)

<u>Example</u>=The highest vertical jump in history would represent exemplary performance *(Wex)* and you as a typical vertical jump performance *(Wt)* of a jump that is 15% of that record. The potential for improving performance *(PIP)* for you to increase your vertical jump using the second leisurely theorem would be 85%.

According to (Daniel, R. et. al, n.d), Gilbert (2007), the third leisurely theorem is meant to focus on understanding the elements of the behavior. Behavior (B) is equal to a person's repertory of behavior (P) modified by their supportive (working) environment (E).

$$B=P+E$$

Third Leisurely Theorem (Gilbert, 2007)

The definition of behavioral repertories by Gilbert (2007) "part of their personal characteristics, those they bring to their jobs" (Gilbert, 1996 pg. 75). Within this theorem Gilbert identified three features to behavior.

1. The information tells a person what to do.
2. The response of the person.
3. Action response from the stimulus is reinforced.

Model Reasoning

The reasoning for using a model like Gilbert's Behavior Engineer Model (BEM) can vary. One of the main reasons that the application of this model would be both relevant and applicable could be directly correlated to training. The bottom line is that a manager cannot offer a solution to the problem unless there is verification that there is a problem, and the organization knows what the problem really is. Training plays a pivotal role in helping to improve the performance within an organization but there are many more variables that must be considered to help close the gap in human performance as it relates to behaviors.

Using Gilberts Behavioral Engineering Model (BEM) can help organizations identify other variables outside of training that highlight the six aspects of human behavior. Organizations that use this model will be able to use a holistic approach to the entire equation of behaviors in human performance and not solely focus on training as the sole solution.

Example and Practical Application of Model

Recently I came across a dissertation written by (King, 2013) titled "exploration on the use of Gilbert's Behavior Engineering Model (BEM) to identify barriers to technology integration in a public school". This dissertation looked to investigate if Gilbert's Behavior Engineering Model (BEM) and its application could help identify integration of technology within a public educational school setting. This dissertation was professionally written and provided an extreme depth and analysis of the application of Gilbert's Behavioral Engineering Model (BEM) to a real-world problem. The dissertation of his problem used a two-phase approach which allowed application of the model superbly.

Environmental Factors of the Model

The applications of online cause analysis surveys help provide highly measurable and actionable feedback during the front-end analysis. The online surveys in King's dissertation were scaled on a 4-point scale with a measurable points value. Although feedback mechanisms in the form of surveys can be judgmental, this survey was vetted for validity. Extreme thought was put into the content of questions through the Cronbach alpha. According to the (UCLA Institute for Digital Research and Education, 2021),

> " Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability. A "high" value for alpha does not imply that the measure is unidimensional. If, in addition to measuring internal consistency, you wish to provide evidence that the scale in question is unidimensional, additional analyses can be performed. Exploratory factor analysis is one method of checking dimensionality. Technically speaking, Cronbach's alpha is not a statistical test – it is a coefficient of reliability (or consistency)."

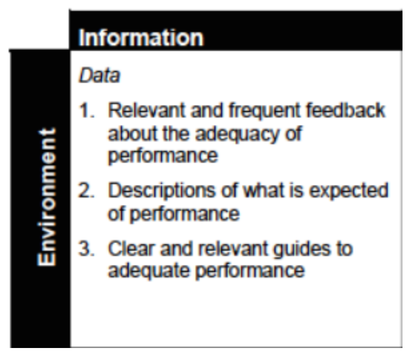
The questions within the survey aimed at hitting some of the environmental factors within Gilbert's Behavior Engineering Model (BEM). Each question was carefully designed to fit the design of Gilbert's Engineering Model (BEM). Each of the three boxes within the environmental factors of the model were carefully analyzed. The questions were excellently detailed and tailored to ensure that every aspect of the environmental factors was covered. The following are just a couple of example questions from the survey to show how well the cause analysis questions were designed to fit the requirements within Gilbert's Behavioral Engineering Model (BEM).

Table 9 *Factor 1 Information*

Questions:
1. Have the school division/ state technology requirements for teachers been communicated to you?
2. Do you understand your role in using technology as an instructional tool?
3. Does the observation/ evaluation system assist your primary evaluator in describing expectations for the use of technology?
4. Do you receive relevant feedback about the use of technology in your classroom?
20. During your recruitment and subsequent hiring, were you informed that teachers are expected to integrate the use of technology into their instructional practices?

Charles King's Cause Analysis Online Survey (2013)

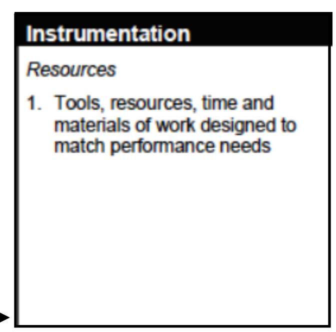
As you can see from Table 9 Factor 1 from Charles King's online survey this section had carefully detailed questions aimed at matching Gilbert's Enviormental factors of **Information** *(Data)* within the model. This area of the survey attempted to capture clarity, communication, relevance, and detailed descriptions about the current state within the public school setting.



In Table 10 Factor 2 Resources of Charles King's cause analysis, the online survey aimed at getting after the Environmental factors of **Instrumentation** *(Resources)* within Gilbert's Behavior Engineering Model (BEM). This section of the survey had questions tailored to tools, resources, and time for the desired human performance and the behaviors associated with it.

Table 10 *Factor 2 Resources*

Questions:
5. Do you have the materials, such as manuals, instructional aides, or other documents needed for technology use in the classroom?
6. Are the processes and procedures for the use of technology defined in such a way that it enhances your ability to teach?
7. Are you provided with access to the network, computers, and software necessary to implement technology in your classroom?
8. Do you receive sufficient time to become familiar with technologies used for administrative and instructional purposes?



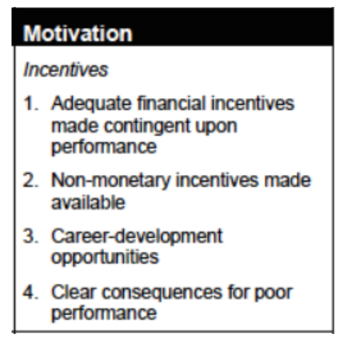
Charles King's Cause Analysis Online Survey (2013)

Finally the last section of online survey questions within Charles King's cause analysis in Table 11 Factor 3 aimed at analyzing the **Motivation** (*Incentives)* section of Gilbert's Behavior Engineering Model (BEM). This section of the survey tailored questions to the incentives, consequences, and career development opportunities as it applies to technology within the public school system.

Table 11 *Factor 3 Incentives*

Questions:
10. Are there sufficient financial incentives present to encourage the use of technology?
11. Are there sufficient non-financial incentives present to encourage the use of technology?
12. Do measurement and reporting systems track the use of technology?
13. Are there opportunities for career development related to technology?

Charles King's Cause Analysis Online Survey (2013)



In this case study application of environmental factors with the creation of a validated online survey helped to properly apply Gilbert's Behavior Engineering Model (BEM). It enabled the organization to look deeper than just training within the needs assessment during cause analysis and this method of application not only fit the requirements but did an excellent job of capturing the environmental factors within the cause analysis beyond training. The online survey and its practical application was executed properly within the intended methodology of environmental factors of Gilberts Behavior Engineering Model (BEM).

Individual Factors of the Model

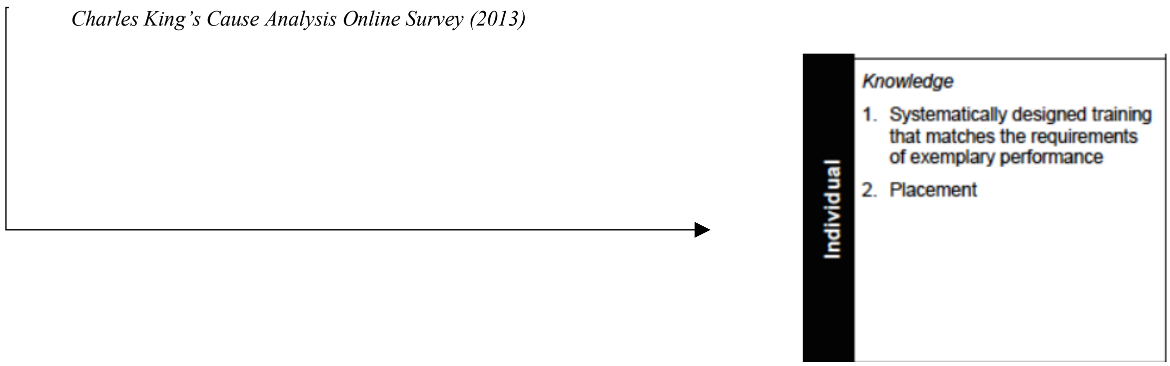
In addition to the environmental factors this case study also looked at the individual factors of behaviors for the performance problem. The questions within this section, like the environmental section, were carefully tailored and designed to fit Gilberts Behavior Engineering Model (BEM). The following couple of examples help depict the highlights of this section within the case study.

In Table 12, Factor 4 of Charles King's cause analysis it aimed at meeting and tailoring the questions to identify and match exlemplary performance of the individual factors under **Information** *(knowledge)*. The knowledge and systematic training programs look to analyze if the right knowledge is available for technology within the public school system.

Table 12 *Factor 4 Knowledge*

Questions:
22. Do you believe that your ability to effectively integrate technology in the instructional process will positively impact student achievement ?
23. Do you have the necessary knowledge to successfully integrate technology in the classroom?
24. Are you involved in a systematic training program to enhance your knowledge and skills of technology?

Charles King's Cause Analysis Online Survey (2013)

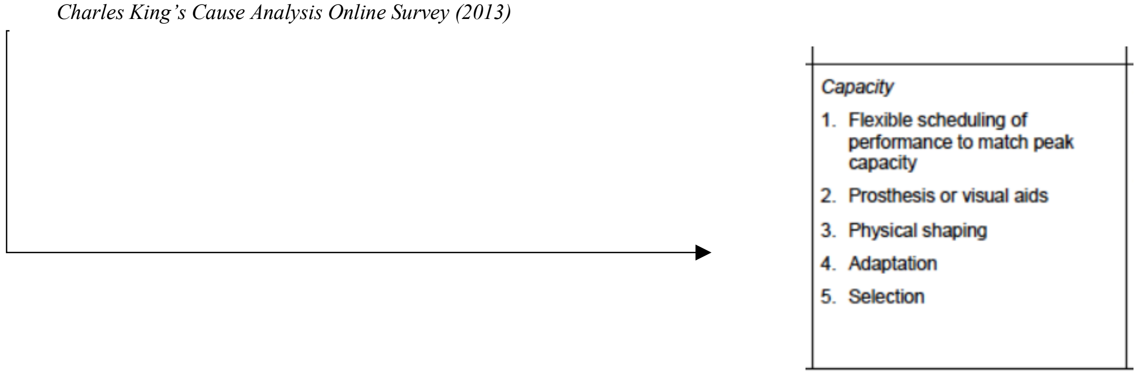


As the case study progressed in its development of the online survey, Table 13 Factor 5 within the individual factors of **Instrumentation** *(Capacity),* the questions within the survey were tailored to meet the requirements including flexibility, selection, shaping, adaptation, and capacity for technology within the public school system.

Table 13 *Factor 5 Capacity*

Questions:
17. Do you have a desire to integrate technology in your classroom?
18. Do you experience anxiety or stress related to the use of technology?
19. Do you think you can learn what is expected to successfully integrate technology in your classroom?
21. Do you have any physical disabilities or limitations that impede your ability to integrate technology in the classroom?

Charles King's Cause Analysis Online Survey (2013)



Lastly, in the individual set of six boxes Table 14 Factor 6 of Charles King's online survey aimed at analyzing the individual factors of **Individual** *(Motives)* within Gilbert's Behavior Engineering Model (BEM). These tailored questions within this section nested well with the intent of motives, realities, incentives and reasons individuals would use technology within the public school system.

Table 14 *Factor 6 Motives*

Questions:
9. Is the work environment safe, clean, organized, and conducive for the use of technology?
14. Do you view your work environment as positive one to use technology?
15. Are there any rewards that reinforce the minimal use of technology?
16. Are there any negative consequences for frequent use of technology in the classroom?

Charles King's Cause Analysis Online Survey (2013)

Motives

1. Assessment of people's motives to work
2. Recruitment of people to match the realities of situation

In this case study application of individual factors with the creation of a validated online survey helped to properly apply Gilbert's Behavior Engineering Model (BEM). It enabled the organization to look deeper than just training within the needs assessment during cause analysis and this method of application not only fit the requirements but did an excellent job of capturing the individual factors within the cause analysis beyond training. The online survey and its practical application was executed properly within the intended methodology of individual factors of Gilberts Behavior Engineering Model (BEM).

Expert Review

Along with a well designed online survey that applied all six boxes effectively, Charles King also applied an expert survey of subject matter experts to verify the efficiency and effectiveness of his methodical application of Gilbert's Behavioral Engineering Model (BEM) to technology in the public school system. The use of experts with technology experience in public schools and respect within the field, further validated the feedback that these subject matter experts provided. This method was another level of measurable analysis to validate that Gilbert's Behavior Engeering Model (BEM) could be efficiently and effectively applied to assessing any barriers to technology in a educational public school setting.

Example Conclusion

The online survey used to assess barriers to technology integration within the public school for this project were excellent. The survey followed the six box principal of Gilbert's Behavioral Engineering Model (BEM) in a effective manner. The online survey in combination with the subject matter expert survey to validate the use of technology in the classroom proved to be valuable to the orgainization. Gilbert's Behavior Engineering Model (BEM) was slightly altered in its questions to fit the educational setting for this particular study. Gilbert's Behavioral Engineering Model (BEM) proved to be as effective, as it was designed to help determine in this case, all of the "other" variables that contribute to human performance as it relates to behavior outside of just training.

Advantages of Model

As this model aims to help management of an organization provide a framework for optimizing both the environmental and individual components that they can control, there are many assumptions or advantages that can be produced from this model. For starters, this model, like many behavior models, can be cost effective. As seen in my example, sometimes a simple survey can look at assessing all the different variables associated with what causes might be contributing to the human performance gap or behaviors.

Second, the model is very interactive with its intended audience. The feedback of behavior within the model comes directly from its audience. Whether you are talking about the environmental (data, resources, incentives) or the individual (knowledge, capacity, motives) within the model, the target audience interacts and can provide the feedback to change the behavior. This interactive feedback and analysis directly with the target audience helps to provide a better cause analysis within the needs assessment of determining if there is a problem, and how to close the gap on that deficiency through behavior in human performance.

Lastly, and most importantly, is Gilbert's Behavior Engineering Model (BEM) uses many variables to assess behaviors and does not simply assume that the behavior is directly tied to training. This expansion in six boxes helps the model in validating if there really is a problem and what box that problem in behavior might stem from.

Disadvantages of Model

Gilbert's Behavioral Engineering Model (BEM) though it has advantages also has some disadvantages as well. Within the model many ways of determining the behavior can be very judgmental. This judgment may lead to inaccuracies within the model. The assessment of behavior can be exceedingly difficult to judge accurately and thus, as you apply it to Gilbert's Behavioral Engineering Model (BEM) it can lead to fallacies within the results. The model relies on feedback from the intended audience and does not possess a clear way to validate without some judgement within the environmental and individual factors.

Another disadvantage of this model can be the method in which the environmental feedback is obtained. There is data that will show that most of the problems identified as it relates to behavior can be related to the environmental category. This model is primarily used for cause analysis and the lack of depth and breadth within the environmental categories can lead to issues within this model. Not only does this model have two levels, but as it relates to most behavior problems, falling into the environmental category more levels of depth would be beneficial. The right questions for each of the six sections must be formulated and designed with its intended audience in mind. Each organization is different and if the questions or methods to obtain the information within the model are not designed with more focus on the environment, it can lead to poor results.

Lastly, the use of Gilbert's Behavior Engineering Model (BEM) can lead to poor results as it is applied to ill-structured problems. This model is effective and efficient to meet simple problems with fewer variables than you would find in those more ill-structured problems. Application of this model to ill-structured problems will not necessarily lead you to the root cause of the problem and may lead to more behavior performance problems down the road.

Conclusion

There is statistical data that shows performance issues within an organization can be caused by the work environment. Data, resources, and incentives within the work environment can all contribute to human work performance and their behaviors. In addition, individual knowledge, capacity, and motives also play a critical role for human performance. Ultimately using a behavioral model like Gilbert's Behavior Engineering Model (BEM), if used properly, can look to identify, and ultimately change the behavior to close a human performance gap within the organization.

The ability to use a front-end analysis model like Gilbert's Behavior Engineering Model (BEM) to look beyond the assumption that training is the root cause, can be valuable for any instructional designer. The use of this model can help unlock the desired behavior so that members of the organization can drive themselves to the desired results. The instructional designer must understand and know all the various front-end analysis tools and models available to them to help provide the best results to their clients. The use of this model by the instructional designer within front-end analysis can help the client and organization look past the symptom that is an assumption and help identify that hidden root cause of the problem.

Gilbert's Behavioral Engineering Model (BEM) is not the answer to all the problems an instructional designer might encounter, but it is a valuable tool for the instructional designer to rely on if they are looking to engineer a change in behavior. It will assist the instructional designer in pinpointing the hidden root cause, through its influences, to close the necessary human performance gap by means of identifying and changing behaviors and excel any organization to the next level of performance and success.

Appendix A

Cause Analysis Survey

Causal Analysis Survey

Part 1. Please select the answer that best represents your position regarding environmental factors such as information, resources, and incentives that influence technology integration in the classroom:

1. Have the school division/ state technology requirements for teachers been communicated to you?

Extremely well ○ Very well ○ Slightly well ○ Not at all ○

Comment

2. Do you understand your role in using technology as an instructional tool?

Clearly ○ Somewhat ○ Slightly ○ Not at all ○

Comment

3. Does the observation/ evaluation system assist your primary evaluator in describing expectations for the use of technology?

Always ○ Sometimes ○ Rarely ○ Not at all ○

Comment

4. Do you receive relevant feedback about the use of technology in your classroom?

Always ○ Sometimes ○ Rarely ○ Not at all ○

Comment

Cause Analysis Survey

5. Do you have the materials, such as manuals, instructional aids, or other documents needed for technology use in the classroom?

Always ○ Sometimes ○ Rarely ○ Not at all ○

Comment

6. Are the processes and procedures for the use of technology defined in such a way that it enhances your ability to teach?

Always ○ Sometimes ○ Rarely ○ Not at all ○

Comment

7. Are you provided with access to the network, computers, and software necessary to implement technology in your classroom?

Always ○ Sometimes ○ Rarely ○ Not at all ○

Comment

8. Do you have sufficient time to learn about technologies and use for administrative and instructional purposes?

Always ○ Sometimes ○ Rarely ○ Not at all ○

Comment

9. Is the work environment safe, clean, organized, and conducive for the use of technology?

Always ○ Sometimes ○ Rarely ○ Not at all ○

Comment

Cause Analysis Survey

10. Are there sufficient financial incentives present to encourage the use of technology?

Always ◯ Sometimes ◯ Rarely ◯ Not at all ◯

Comment

11. Are there sufficient non-financial incentives present to encourage the use of technology?

Always ◯ Sometimes ◯ Rarely ◯ Not at all ◯

Comment

12. Do measurement and reporting systems track the use of technology?

Always ◯ Sometimes ◯ Rarely ◯ Not at all ◯

Comment

13. Are there opportunities for career development related to technology?

Always ◯ Sometimes ◯ Rarely ◯ Not at all ◯

Comment (if necessary)

Cause Analysis Survey

Causal Analysis Survey

Part II. Please select the answer that best represents your position regarding individual factors such as motives, capacity, knowledge and skills that influence technology integration in the classroom:

14. Do you view your work environment as a positive one to use technology?

Always ○ Sometimes ○ Rarely ○ Not at all ○

Comment

15. Are there any rewards that reinforce the minimal use of technology?

Always ○ Sometimes ○ Rarely ○ Not at all ○

Comment

16. Are there any negative consequences for frequent use of technology in the classroom?

Always ○ Sometimes ○ Rarely ○ Not at all ○

Comment

17. Do you have a desire to integrate technology in your classroom?

Always ○ Sometimes ○ Rarely ○ Not at all ○

Comment

18. Do you experience anxiety or stress related to the use of technology?

Always ○ Sometimes ○ Rarely ○ Not at all ○

Comment

Cause Analysis Survey

19. Do you think you can learn what is expected to successfully integrate technology in your classroom?

Always ◯ Sometimes ◯ Rarely ◯ Not at all ◯

Comment

20. During your recruitment and subsequent hiring, were you informed that teachers are expected to integrate technology into their instructional practices?

Always ◯ Sometimes ◯ Rarely ◯ Not at all ◯

Comment

21. Do you have any physical disabilities or limitations that impede your ability to integrate technology in the classroom?

Always ◯ Sometimes ◯ Rarely ◯ Not at all ◯

Comment

22. Do you believe that your ability to effectively integrate technology in the instructional process will positively impact student achievement ?

Always ◯ Sometimes ◯ Rarely ◯ Not at all ◯

Comment

23. Do you have the necessary knowledge to successfully integrate technology in the classroom?

Always ◯ Sometimes ◯ Rarely ◯ Not at all ◯

Comment

Cause Analysis Survey

24. Do you have access to a training program to enhance your knowledge and skills of technology?

Always ○ Sometime ○ Rarely ○ Not at all ○

Comment

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