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CREATING AND IMPLEMENTING THE USE OF VISUAL METAPHORS TO TEACH NEW MEDIA USING VIRTUAL REALITY AND AUGMENTED REALITY

THE RESOURCES UTILIZED IN THESE TEACHING STRATEGIES WERE PROVIDED BY "THE WEDDING CHAMBER," PROJECT THAT IMPLEMENTS THE VIRTUAL DECONSTRUCTION OF THE EMINENT FRESCO OF ANDREA MANTEGNA LOCATED AT THE SAINT GIORGIO CASTLE, IN MANTUA, ITALY.

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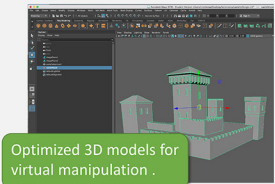
THE IMPLEMENTATION OF AUGMENTED REALITY AS A LEARNING AND TEACHING EXPERIENCE

3D models with texture information.

A metaphor that epitomizes a direct augmented reality experience is the "image target." 3D content is glued to a physical object or image to be overlaid or displayed digitally in the real world.
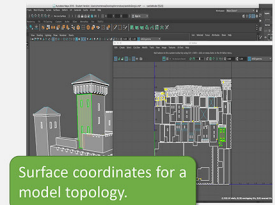
3D models emerge when a device camera or sensor spots the image target.

"THE IMAGE TARGETS"

Augmented reality requires 3D models. In order to produce a meaningful experience, the user has to manipulate the model. The model must have a low poly count in order to display an effective interaction.

Optimized 3D models for virtual manipulation .

"THE OVERLAY." 3D MODELS

The most important component for a dynamic visualization in augmented reality is the texturing and UV mapping deployment. AR interaction creates a compelling experience due to the realism of the models.

Surface coordinates for a model topology.

"THE SURFACE." MAPPING AND TEXTURING

Augmented reality allows the use of multiple "subtext," and its organization can be displayed through a hierarchical order.

TEACHING RESOURCES UTILIZED: IMAGE TARGET AND ANIMATION

Teaching new media such as Virtual Reality and Augmented Reality involves the use of a number of computing abstract definitions and processes that are not always easy to grasp. This work expose how visual metaphors can help to understand this language, and how those can be implemented for an effective teaching methodology.

THE USE OF VIRTUAL REALITY AS A LEARNING AND TEACHING EXPERIENCE

The virtual reality project "The Wedding Chamber" is a research/creative endeavor instance where teaching has obtained a direct benefit from the active deconstruction of its components. A number of metaphors have surfaced as a result of the application of 3d modeling and mapping to display the content of the fresco. The more outstanding ones are: "The open room," "The Vaulted Ceiling," "The Small Models," "The Piazza," and "The Inspector."

These metaphors have a double value:

- Facilitate the understanding of the historic context of the fresco.
- Enable the configuration of a virtual space to teach the composition of the fresco.

A virtual reality immersive experience can be implemented through these metaphors as building blocks of meaningful experience. The students then will approach a future project or content by:

- Laying out the conceptual and abstract artistic language into a 3D space.
- Using concrete objects to convey complex computing language and functions.

THE IMPLEMENTATION OF METAPHORES TO ACHIEVE LEARNING EXPERIENCES

Viewers are used to manipulating intuitively common computing metaphors such as Window, Desktop, or Recycle Bin among others. However, the creation of brand new metaphors will customize learning experiences through a hierarchy of navigation. In this specific case the contact with the subject is very close, in which then the object will display call outs, tooltips, roll overs, and visual cues as hypertext.

TEACHING RESOURCES UTILIZED: INTERACTABLE OBJECT AND HAPTICS
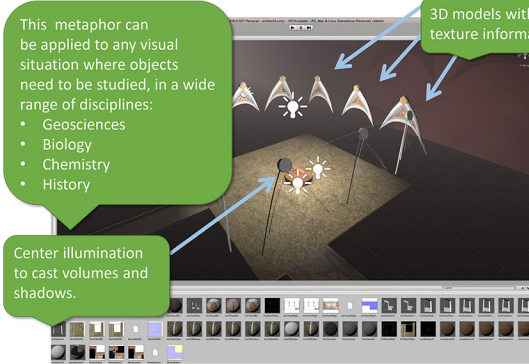
This metaphor can be applied to any visual situation where objects need to be studied, in a wide range of disciplines:
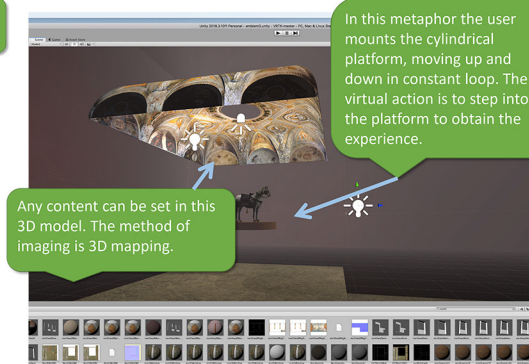- Geosciences
- Biology
- Chemistry
- History

3D models with texture information.

Center illumination to cast volumes and shadows.

"THE OPEN ROOM"

This metaphor was conceived to understand the architectural component of the myth narrative associated with the events taking place in the main fresco.

This can be understood as a teaching device where the 3D models can be studied in an immersive space. In the open room the user can move or teleport to study each element.

TEACHING RESOURCES UTILIZED: TELEPORTING AND PHYSIC ANIMATION


3D models with texture information.

In this metaphor the user mounts the cylindrical platform, moving up and down in constant loop. The virtual action is to step into the platform to obtain the experience.

Any content can be set in this 3D model. The method of imaging is 3D mapping.

"THE VAULTED CEILING"

This is the deconstruction of the ceiling of the fresco. In this specific case, the immersive experience of exploring from below, facilitates the understanding of a complex geometric layout.

This can be understood as a teaching device where the ceiling can be studied through accurate observation.

TEACHING RESOURCES UTILIZED: RAYCAST, TELEPORTING AND ANIMATION
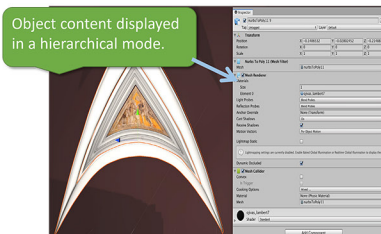
Object content displayed in a hierarchical mode.

"THE INSPECTOR"

This is a standard user interface metaphor in computer graphics, however, it can be used in multiple functions to display levels of content.
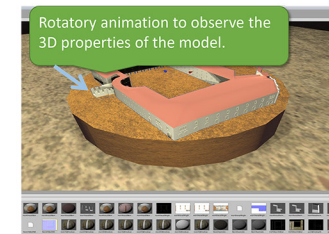
Rotatory animation to observe the 3D properties of the model.

"THE PIAZZA"

In this case the metaphor is based on a rotary action. Users can appreciate precise details.

Models set for grabbing and closer manipulation using hand controllers or hand tracking sensors.

"THE MINIATURES"

In this case the metaphor is activated by the interactive object status of the small models.

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Beyond Constructivist Pedagogies

Exploring Phenomenological Teaching Methods

Brett D. Wilkinson, Ph.D., LMHC – Assistant Professor of Counselor Education

MENTAL MODELS / **EXPERIENTIAL INSIGHT**

DIFFERENTIATION	INTEGRATION
Assimilate/Accomodate	Bracket preconceptions
Explanation-focused	Curiosity-focused
Coherence of constructs	Deconstruct coherence
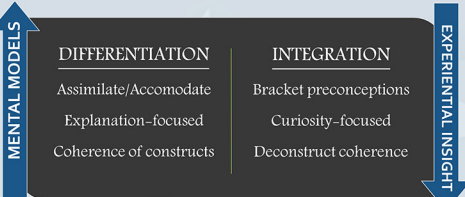
Cognitive Complexity: Differentiation/Integration

Differentiation and integration are aspects of problem solving:

- *Differentiation* involves expanding a mental model to capture more data. It grows via exposure to multiplicity, or the broadening of conceived possibilities for any given construct.

- *Integration* involves contracting a mental model to distill differentiated data into a suitable solution. It grows via exposure to specificity, or the use of abductive reasoning to identify essential themes in evidence.

- Integration requires well-articulated constructs, wherein the evidence is assessed using mental models that reflect foundational elements of experience rather than abstract renderings of experience.

- Poorly articulated constructs lack complexity, serving as abstract placeholders in a theoretical context; pure abstractions sans practical relevance beyond their conceptual relationship to other abstractions.

- A well-articulated construct is conceptually meaningful because it is phenomenologically accessible, which makes it subjectively germane.

Constructivism promotes *exposure to multiplicity:*
Discover alternative interpretations to increase the breadth of conceived possibility (i.e.; differentiation).
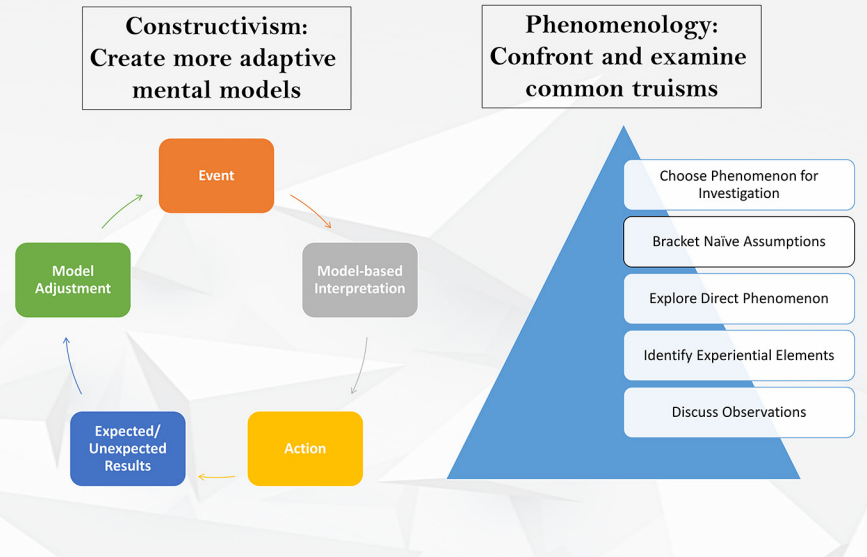
Phenomenology promotes *exposure to specificity:*
Eliminate abstract interpretations to discover essential features of psychic experiences (i.e; integration).

Constructivism & Phenomenology

Constructivism and phenomenology pedagogies both stem from cognitivist and progressivist learning theories, centralize subjective experience, and encourage responsibility, autonomy, and self-directed learning. Yet their philosophical differences make each uniquely suitable for growing differentiation and integration, respectively.

For **constructivism**, *knowledge acquisition involves meaning making and interpretation*. Constructivist learning is a selective process of constructing robust mental models while preserving coherence of beliefs. This epistemological stance is based upon coherentism, or the notion that beliefs can be justified if they are logically consistent, or viable. People naturally seek to confirm established beliefs rather than alter beliefs according to the best available evidence. Any shift from dualistic to multiplistic thinking requires a confrontation with this confirmation bias:

- *Constructivist teaching confronts dualistic thinking via exposure to multiplicity, helping students discover new ideas or frames of reference that grow complex mental models. Such practices destabilize the coherence of dualistic mental models by supporting the assimilation of previously omitted concepts. Multiplistic thinking is thereby facilitated as naïve mental models expand, or gain differentiated complexity, to include a broader array of factors.*

Phenomenology *is the study of the structures of consciousness*. It involves examining how phenomena are experienced in conscious awareness. The epistemological stance of phenomenology aligns with foundherentism, or the notion that beliefs are justified when a knowing subject directly observes essential aspects of conscious experience through immediate apperception and compares those observations with the findings of other knowing subjects. The process is descriptive and deconstructive, teaching learners to identify and question preconceptions, engage in deconstructive analysis, and give detailed descriptions of phenomena. **Theories and constructs are viewed as naïve abstractions that can lead students to oversimplify complex and richly interconnected processes.**

- *Phenomenological teaching helps students learn how to ground naïve abstractions in phenomenal awareness using a process of direct and verifiable investigation. Phenomenological practices view any shift from multiplicity to relativism as requiring exposure to specificity, which destabilizes differentiated mental models by identifying the experiential concomitants of abstract constructs. This reflects the notion of integration as an abductive reasoning process that supports the development of well-articulated mental models.*

Constructivism: Create more adaptive mental models

Event → Model-based Interpretation → Action → Expected/Unexpected Results → Model Adjustment → Event

Phenomenology: Confront and examine common truisms

- Choose Phenomenon for Investigation
- Bracket Naïve Assumptions
- Explore Direct Phenomenon
- Identify Experiential Elements
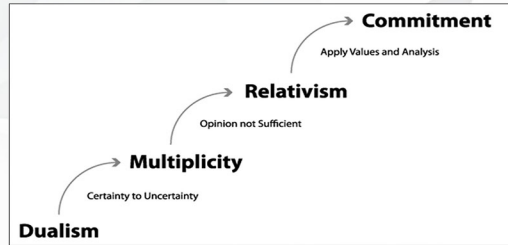- Discuss Observations

Call & Response Assignment

A format devised to introduce learners to the phenomenological reduction as a learning method is the "call and response" writing assignment.

The exercise involves posing questions as to the meaning of certain concepts, answering those questions, identifying presuppositions within the answers, and developing new questions to clarify ongoing interpretations.
.
The semi-structured exercise has three progressive stages: *deconstruction, contextualization, and application*. The deconstruction stage guides student thought beyond naive assumptions and grounds abstractions within phenomenal experience. The contextualization stage reengages the constructivist emphasis on personal narratives while the application stage applies the newly deconstructed concept in a relevant scenario.

Three Stages: Applied in Counselor Education Course

Deconstruction Stage: posing questions about the meaning of a specific psychological or theoretical concepts, answering those questions, identifying presuppositions within the answers, and then posing new questions to further clarify the ongoing interpretation.

Contextualization Stage: examining the finalized interpretation from the deconstruction stage in terms of a particular situation in one's own life, or in the life of a hypothetical client.

Integration Stage: translating the now contextualized understanding of a deconstructed concept into an actual clinical scenario, using a fictional transcription to apply new knowledge in terms of a practical training.

Commitment — Apply Values and Analysis
Relativism — Opinion not Sufficient
Multiplicity — Certainty to Uncertainty
Dualism

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HOW DO COLLEGE STUDENTS WITH DISABILITIES DO?:
FOCUSING ON INFLUENTIAL FACTORS FOR SUCCESSFUL COLLEGE EXPERIENCES

Kate Jones and Jeong il Cho , School of Education, Purdue University Fort Wayne

Abstract

This survey study investigated the level of understanding of college students with disabilities on **laws, self-advocacy, self-determination, and campus and community resources** related to their education. The study also explored students' evaluations on their own actions regarding these five reported factors influencing the successful college experiences. Findings indicated that 32% of college students with disabilities reported that they knew how to advocate for themselves before beginning college. College students with disabilities displayed a strong understanding of self-determination for their education and showed an understanding of self-advocacy and campus resources, but reported a lack of understanding about the laws and community resources. College students with disabilities rated somewhat positively on their actions regarding self-determination, self-advocacy, and campus resources. The lowest rated action item was "I speak out to make sure my legal rights are followed."

Survival Guide for Beginning College Students with Disabilities

By: Kate Jones

Survival Guide
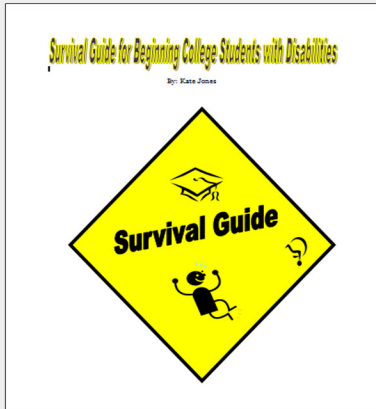
Literature Review

- **Laws**
  - ✓ Recent laws have enhanced rights of students with disabilities and given them optimistic reasons for attending college (Hadley, 2007).
- **Self-advocacy**
  - ✓ Mamiseishvili and Koch (2012) reported that meeting with academic professors was one of the factors positively related to persistence.
- **Self-determination**
  - ✓ Several studies have found this to be a predictor of success (Herbert et al., 2014).
- **Campus Resources**
  - ✓ Due to the ADA Amendments Act of 2008 more students qualify for accommodations in college.
- **Community Resources**
  - ✓ Having a connection with the community is important for success (Gillies, 2007).

Method

- **Participant:** 31 students with disabilities registered at the office for Students with Disabilities
- **Setting:** Midwestern state university
- **Measures:** Online survey with 23 questions
  - ✓ 12 rating questions using 5-Likert scale
  - ✓ 11 open-ended questions
- **Procedure:**
  - ✓ The Director of the office for students with disabilities sent out emails (recruitment and reminder emails) with an online survey link to about 200 students registered to their office.
  - ✓ Participants could skip any questions or stop the survey at any time and their participation was voluntary.

Discussion

- College students with disabilities were generally determined with their own education and equipped with some necessary skills. But a very important success skill (law) lacked and so did their actions.
- College students with disabilities need to learn specific skills (e.g., how to speak up for their needs/rights) that protect their rights in college.
- Transition services in high school and college need improvements.

Result

Table 1. *Level of Understanding of College Students with Disabilities*: *Laws, Self-advocacy, Self-determination, Campus Resources, and Community Resources*

Survey Questions (Category)	1 Weak	2	3	4	5 Strong	Mean	SD	N
Understanding of my own disability (Self-determination)	10.00% (3)	0% (0)	3.33% (1)	26.67% (8)	60.00% (18)	4.27	1.23	30
Self-esteem or self-confidence (Self-determination)	23.33% (7)	3.33% (1)	16.67% (5)	10.00% (3)	46.67% (14)	3.53	1.66	30
Academic strategies that help you succeeded in your college courses (Self-advocacy)	13.33% (4)	10.00% (3)	23.33% (7)	20.00% (6)	33.33% (10)	3.50	1.41	30
Accommodations or services available on campus (Campus Resources)	10.00% (3)	23.33% (7)	16.67% (5)	13.33% (4)	36.67% (11)	3.43	1.45	30
Making decisions about your accommodations or talking to your instructors about your disability (Self-advocacy)	16.67% (5)	10.00% (3)	27.67% (8)	20.00% (6)	26.67% (8)	3.30	1.42	30
I knew how to advocate for myself before beginning college. (Self-advocacy)	32.00% (8)	16.00% (4)	20.00% (5)	24.00% (6)	8.00% (2)	2.60	1.38	25
College students with disabilities rights under Americans with Disabilities Act (Law)	56.67% (17)	23.33% (7)	10.00% (3)	3.33% (1)	6.67% (2)	1.80	1.19	30
Community resources for the successful university experience for students with disabilities (Community Resources)	75.86% (22)	17.24% (5)	3.45% (1)	0% (0)	3.45% (1)	1.38	.86	29

Table 2. *Actions of College Students with Disabilities*: *Laws, Self-advocacy, Self-determination, and Campus Resources.*

Survey Questions (Categories)	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	Mean	SD	N
I consider my strengths and weaknesses before I make goals for my career. (Self-determination)	0% (0)	4.17% (1)	41.67% (10)	33.33% (8)	20.83% (5)	3.71	.86	24
I am comfortable talking to my professors. (Self-advocacy)	8.00% (2)	4.00% (1)	28.00% (7)	32.00% (8)	28.00% (7)	3.68	1.18	25
I seek out services on campus if I am struggling in class. (Campus resources)	12.00% (3)	20.00% (5)	36.00% (9)	16.00% (4)	16.00% (4)	3.04	1.24	25
I speak out to make sure my legal rights are followed. (Legal Rights)	37.50% (9)	12.50% (3)	25.00% (6)	4.17% (1)	20.83% (5)	2.58	1.56	24

- College students with disabilities reported an understanding on self-advocacy, self-determination, and campus resources. But they lacked understanding in laws and community resources (Table 1).
- College students with disabilities were somewhat confident with their actions regarding self-determination, self-advocacy, and resources. But more than 50% of college students with disabilities did not speak out when their rights were violated (Table 2).

Limitation and Implication

- Generalization issues due to a small sample size from one university and an anonymous nature of the survey.
- The findings have implications for both transition services in high school and support services at the college level for the college students with disabilities.

Conclusion

- College students with disabilities need to improve their understanding of laws and resources that support their learning and academic success.
- Students need to learn specific steps they need to follow to protect their rights in college.
- Colleges need to create an environment that allows students with disabilities to feel more comfortable and safe to speak up.

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Mamiseishvili, K., & Koch, L.C. (2012). Students with disabilities at 2-Year institutions in the United States; Factors related to success. *Community College Review*, 40(4),320-339. Doi 10.1&002/abc.225

# Using Concept Mapping to Enhance Critical Thinking Skills

Melanie Gall, MSN, RN; Jamie Rausch, Ph.D., RN

INTRODUCTION

- Critical thinking is not intuitive for new nursing students; it must be taught.

- The nursing profession requires its members to utilize critical thinking skills in various situations: assessments, interventions, interpreting laboratory values, and patient education, to name a few.

- Several studies indicate that concept mapping is successful in teaching the necessary critical thinking skills that students require to be successful.

- According to Bloom's taxonomy, concept mapping is a creative, visual, and valuable tool in the highest level of learning, making it an ideal teaching strategy for more advanced courses.

- Teachers may feel overwhelmed when trying to use concept mapping for the first time.

- A quasi-experimental study by Jaafapour et al. (2016) proves the effectiveness of concept mapping related to nursing students' learning outcomes.

  ○ Results proved that those who constructed concept maps scored higher on their exams than the control group of students who only learned by traditional lectures and quizzes.

  ○ This study also proved scores of concept maps could significantly predict scores of future tests.

  ○ Concept maps are a way in which educators can effectively evaluate students' performance.

- A qualitative study by Chan (2017) resulted in evidence suggesting concept mapping is a solid educational tool used to enhance learning and creativity.

- Daley et al. (1999) described a study where senior nursing clinical groups designed three concept maps over one semester. With each concept map, scores increased significantly between the first and last map created, proving the increase in conceptual and critical thinking.
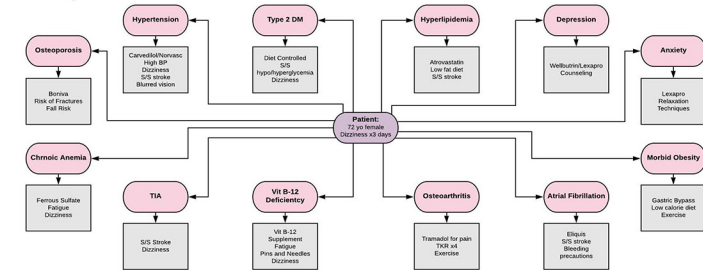
INDIANA UNIVERSITY FORT WAYNE
SCHOOL OF NURSING
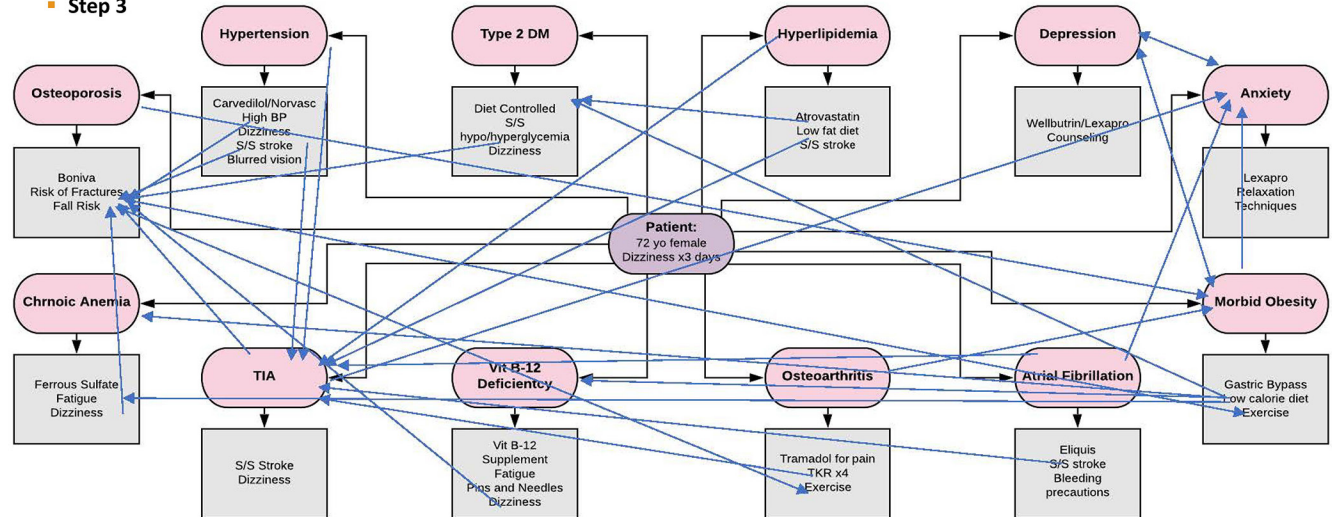
STEPS OF THE PROCESS

- **Step 1**
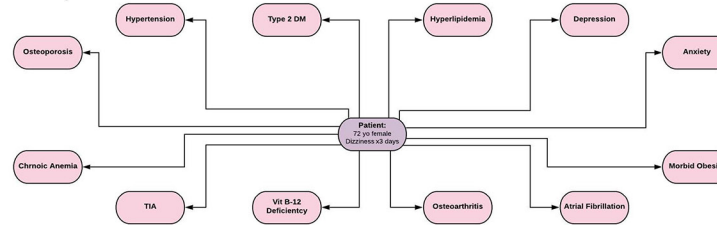
- Step 1 consists of starting with a main idea or a patient and add supporting or related topics (or diagnoses, interventions, etc.) from the main idea.

- **Step 2**

- In Step 2, add subtopics beneath each of the topics.

- **Step 3**

- For Step 3 Draw arrows that connect topics and subtopics together. Please note that arrows can be one way when one of the topics causes or affects the other or can be bi-directional when both topics or subtopics can cause or affect each other.

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Rhizomatic Spaces

AN ALTERNATIVE WAY TO STRUCTURE MEETINGS

Rhizomes, like ginger, are plants that grow horizontally underground with shoots that pop up in various places.

As a metaphor, a rhizome represents process, collaboration, equity, inclusion, and co-creation.

Student Affairs Committee members reflect upon the unique positivity and productivity of a year's meetings and work. In reflection, members surmised that several features of the bi-monthly meetings contributed to the overall success:

- Shared responsibility through a non-linear agenda
- Shared authority
- Participatory process
- Articulated commitment to student mental health
- Personal meeting spaces

A parallel was drawn to Rhizomatic learning as opportunities emerged during meetings:

- Faculty-student conversation spaces
- Essay review insights
- Reading the Rainbow faculty student book talks
- Student awards construction

Definition of Rhizomatic Process: "A rhizome has no beginning or end; it is always in the middle, between things, interbeing, *intermezzo*" (Deleuze & Guattari, 1978, p. 25).

Contributors: Donald Ohlinger, Sharon Parnin, Joel Givens, Benjamin Kearl, Elizabeth Christian
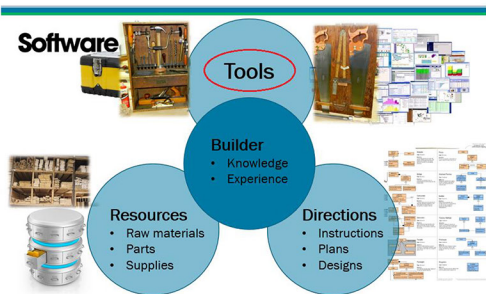
For More Information:
Trees, Rhizomes, and All the Spaces Between (Givens & Kimble, 2020)

PROJECT BASED LEARNING - ROLE OF TOOLS IN SOFTWARE DEVELOPMENT LIFE CYCLE(SDLC)

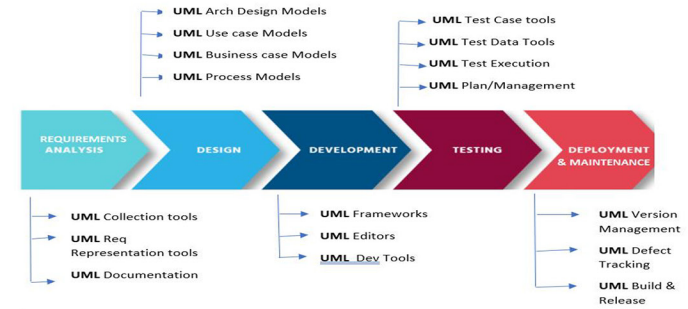Venkata N Inukollu, Ph.D., CS Department, Purdue University –Fortwayne

PURDUE UNIVERSITY®
FORT WAYNE

Building Software Projects

Software

Tools

Builder
- Knowledge
- Experience

Resources
- Raw materials
- Parts
- Supplies

Directions
- Instructions
- Plans
- Designs

Project Based Learning

Authentic Student Engagement, a critical element of student learning (Gettinger & Ball, 2007) is a byproduct of effective instruction and meaningful development/construction of projects/products. While instruction plays a key role in the initial weeks of classes, project development shall engage students in continued and deeper learning process while preparing students with advanced skills for workplace scenarios.

Arch Design Models
Use case Models
Business case Models
Process Models

Test Case Generation
Test Data Generation
Test Execution
Test Plan/Management

REQUIREMENTS ANALYSIS | DESIGN | DEVELOPMENT | TESTING | DEPLOYMENT & MAINTENANCE

Req Collection
Req Representation
Req validation/testing
Req Document/ Maintenance

Dev Frameworks
Dev Editors
Dev Compliers
Dev Debuggers

Version Management
Defect Tracking
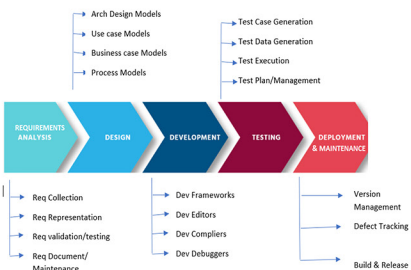Build & Release

Role of Tools in SDLC

Tools are required for effective administration and implementation of software projects/products that not only offer high-quality products, but also complete them on time and on budget.

- "Tools … intended to assist the software development process."
- "Tools allow repetitive, well-defined actions to be automated, thus reducing the cognitive load on the software engineer."
- Tools are "intended to make development more systematic…"
- Tools "vary in scope from supporting individual tasks to encompassing the complete lifecycle."

UML Arch Design Models
UML Use case Models
UML Business case Models
UML Process Models

UML Test Case tools
UML Test Data Tools
UML Test Execution
UML Plan/Management

REQUIREMENTS ANALYSIS | DESIGN | DEVELOPMENT | TESTING | DEPLOYMENT & MAINTENANCE

UML Collection tools
UML Req Representation tools
UML Documentation

UML Frameworks
UML Editors
UML Dev Tools

UML Version Management
UML Defect Tracking
UML Build & Release

Unified Modeling in SDLC

The Unified Modeling Language (UML) is a modeling language that was developed to support system and software engineers in specifying, visualizing, developing, and documenting the artifacts of software systems, as well as business modeling and other non-software systems.

- The UML generally utilizes graphical notations (Independent of any computer languages)
- UML is an open-source project that has been developed by a number of organizations (extensions to support)

- UML and its extensions make it easier for project teams to communicate and collaborate.
- UML and its extensions provide scalability
- UML and its extensions explore potential designs and validate the architectural design of the software.
- UML and its extensions can be applied to a broad range of applications
- UML and its extensions support documentation

Study Outcomes

- By using a visual/modeling-based language, it is simple and straightforward for all types of learners.
- Various phases of the SDLC can be addressed with a single tool.
- Each phase/topic/activity can be presented in practice by using a project as an example.
- Has an impact on long-term learning results
- Within student teams and teachers, there has been a significant improvement in student interactions.

RECONNECTING STUDENTS AND FACULTY VIA HYBRID ASSESSMENT
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Assessment vs. Testing??

"Any **method** used to better understand the current knowledge that a student possesses". [Dietel, Herman, and Knuth (1991)]

vs.

"Single-occasion, **Unidimensional**, Timed Exercise, usually in multiple choice or short-answer form." [Mitchell 1992, in Law and Eckes, 1995, p. 29]

Assessments

Assessments, a key element of educational practice, enable learners and instructors to deliver evidence of the value imparted in the course. To ensure high academic standards and accountability, assessment is critical. Students are now empowered to select from different pedagogies to cater to their specific styles and requirements of learning Strategies to enhance student engagement should focus not only on instructional methodologies, but also methods of assessment and feedback [1]. Most of the instructors rely on traditional assessment forms such as tests and final exam and sometimes projects [2].

Autonomy to customize the assessment regime (hybrid assessment bundle) is rarely allowed to the students despite studies suggesting that autonomy to choose an assessment regime impacts student engagement in learning, and student satisfaction [3, 4].

WHY ARE ASSESSMENTS IMPORTANT

Assessments Assist In Understanding :

❑ Are we teaching what we think we are teaching?

❑ Are students learning what they are supposed to be learning?

❑ Is there a way to teach the subject better, thereby promoting better learning?

Traditional vs Hybrid Assessments

- To assess different kinds of learning processes,
- To cater for differences in students' learning preferences and styles .
- To cater for differences in proficiency levels.
- The need to enhance learners' psychological approaches to learning
- To ensure relevance and authenticity to future workplaces.
- Comprehensive , Accurate & Holistic Measurements.
- Critical thinking, reasoning, reflection

Research outcomes

As a result of the research, I was able to create two sets of assessments for my classes, which I refer to as a **Hybrid Assessment** Bundle. One set of assignments is required for all students in the classroom, while the second set can be customized by the student to meet his or her own learning goals and needs.

Standard Set of Assessments (SAA) is the abbreviation we use to refer to the required set that is the same for all learners, while **Customized Set of Assessments**(CSA**)** is the acronym, we use to refer to the assessment set that can be customized .

WHY MULTIPLE ASSESSMENT METHODS?
Scenarios

Scenario 1: What if in order to receive your driver's license, all you needed to do was pass a written test? The road would be a very dangerous place. Through multiple measures (a written test, driver education course, required minimum hours of driving experience, and final road test) to assess driving skills before receiving a permanent driver's license is safe and comprehensive and prepares the drivers accordingly.

Scenario 2: Most distance education programs address a highly diverse group of learners in terms of age, race, socioeconomic status etc. Instructors need to be aware of the fact that besides enriching the socio-cultural interactions among learners, diversity might cause some problems as well. For example, while younger adults might perceive alternative assessment strategies useful, older adults might find traditional assessment tools more effective (Simonson et al., 2000).

Standard vs Hybrid Assessments

Standard Set of Assessments (SSA):

The **primary goal of SSA** is to ensure that the course learning objectives, the department learning objectives and the degree learning objectives are achieved by testing the learners on the content of the **instructional material**. Within the SSA, the instructor is always at liberty to provide a choice to his students.

Preliminary SSA includes the following:

- Topic Wise Quizzes (Remote Quizzes) + labs
- Topic Wise Quizzes + 1 Mid Term (In class) + labs
- Topic Wise Quizzes + 1 Mid Term (Remote) + labs
- Topic Wise Quizzes + 1 Final (In class) + labs
- Topic Wise Quizzes + 1 Final (Remote) + labs

How do we define Hybrid Assessment?

- A **Hybrid Assessment Bundle** is a combination of 2 sets of assessment tasks.
- 1 set of tasks is **mandatory** for all the learners in the classroom,
- The second set can be **tailored by the student** per student learning objectives and needs.

For the sake of convenience, we denote the mandatory set that is standard across all learners with the acronym **Standard Set of Assessment (SAA)**, and the assessment set that can be customized as **Customized Set of Assessments (CSA).**

Research Implications

- A student with an **objective of employment** can concentrate on **projects and guest lectures**.
- A student focused on **higher education** can choose elements related to **research study**.
- Projects done under the guidance of alternative instructors of the department will **empower students** in application development across various domains.
- Having a choice-based evaluation method facilitates **inclusive learning** rather than disadvantaging one individual or groups of individuals in a class with the prescribed evaluation package.

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