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Using Digital Badges
in Competency-Based Degree Programs

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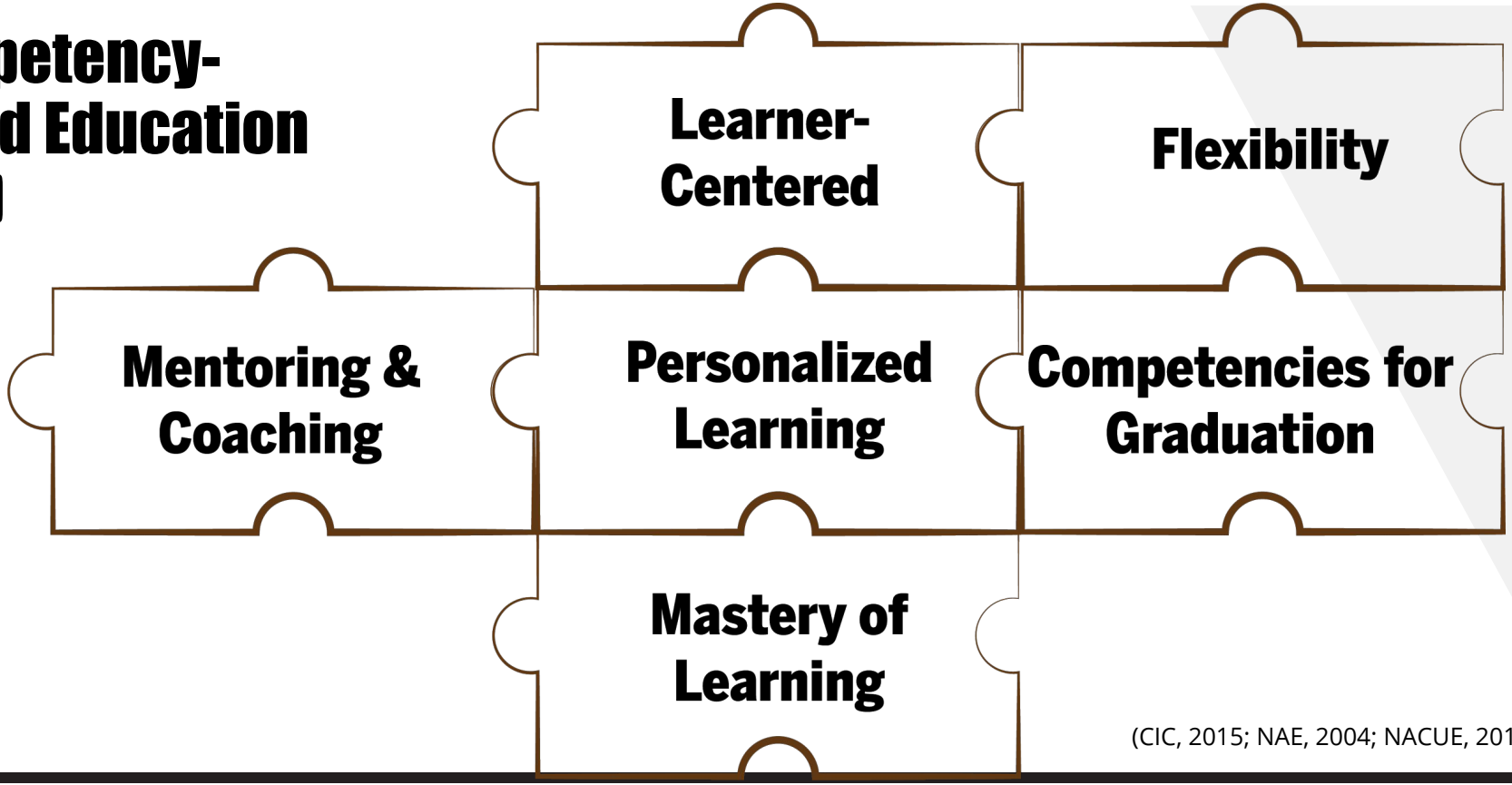
Competency-Based Education & Micro-Credentialing

Competency-Based Education (CBE)



(CIC, 2015; NAE, 2004; NACUE, 2014)

History of Competency-Based Education

1960s

Began based on outcome-based education

1970 - ~ 1990

1st wave of CBE

~ 1990 – Today

2nd wave of CBE

1st Wave of CBE	2nd Wave of CBE
Competencies are defined by institutions	Competencies are defined by academic and industry knowledge experts and program faculty
Performance levels are described by institutions	Self-paced learning
Knowledge and skills acquisition and application are applied different situations	Learning resources are available any time
	Credit for prior learning

CBE Models

Direct Assessment vs.Course-Level CBE

Direct Assessment

- Achievement of competencies **without regard to courses or credit hours**
- Proof of mastery of individual competencies through **summative assessments** (e.g., exams, simulations/ demonstrations, and portfolios)
- **Prior learning assessment**

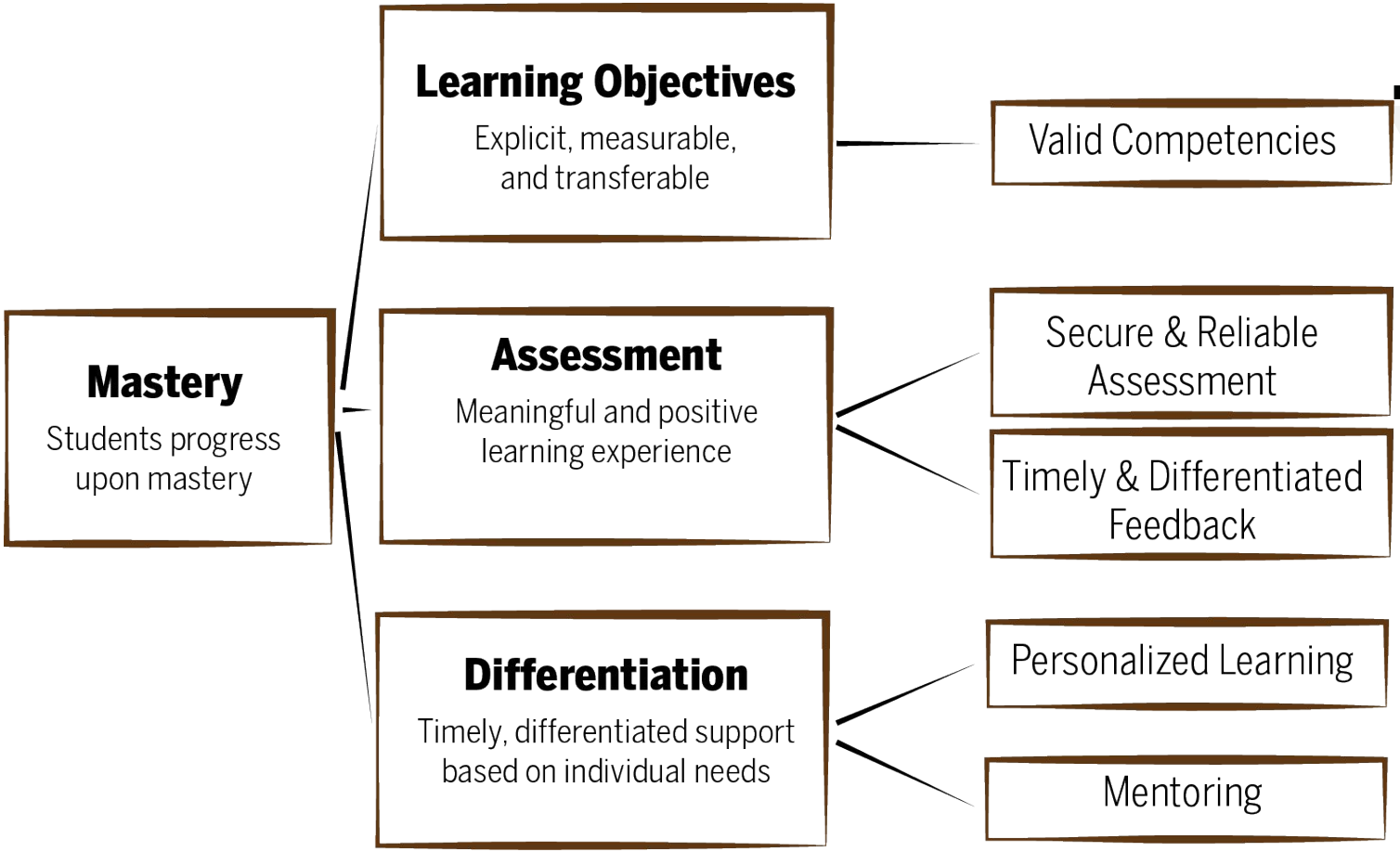
Course- Level CBE

- Demonstration of competencies **embedded into a conventional curriculum** (i.e. courses to be completed to earn credits toward a degree or credential)
- Students enrolled in **traditional academic terms** and award **credits** for courses **successfully completed**

(Council of Regional Accrediting Commissions, 2015)

	More Conventional	Middle of the Road	Less Conventional
Educational Model	•Competencies embedded in courses •Faculty and textbooks	•Some classes •Unbundled content •Competencies and assessments	•No formal classes •Reference to open education resources •Prior-learning assessment
Faculty Role	•Vertically integrated roles: Designing and teaching assessing and advising	•Partially disaggregated roles: Designing and/or teaching and/or assessing/ and/or advising	•Disaggregated roles: Designing or teaching or assessing or advising
Learning Support	Faculty-based advising	High level of coaching and mentoring at the institution or through a contracted service	•Online mentoring •Informal learning groups
Technology	Web enhancements to classroom-based course	Online delivery	Adaptive learning
Students	•More traditional students •Maybe employed part time		•Non-traditional •Some postsecondary experience but no degree or work experience
Fee Structure	•Time-based •Pay per term or credit hour	•Fully CBE or Hybrid •Title IV eligible with special approval	•Subscription model (all you can learn within a given time) •Direct assessment •Not Title IV eligible

Design Considerations


Learning Objectives
Explicit, measurable, and transferable
Valid Competencies
Mastery
Students progress upon mastery
Assessment
Meaningful and positive learning experience
Secure & Reliable Assessment
Timely & Differentiated Feedback
Differentiation
Timely, differentiated support based on individual needs
Personalized Learning
Mentoring

Assessment in Competency-Based Education

Competency-based assessment (CBA)

- involves **observation and judgment** of each learner's **performance**
- diagnoses **entry-level competence** of new learners
- provides **immediate feedback** during the learning process
- assesses **learner's mastery** of each task
- allows students to **progress** at their **own pace**
- provides information for the instructors to see **where a learner is** in the learning process

(Blank, 1992; Freeland, 2014; Johnstone & Soares, 2014; Schmitz, 1994; Velasco et al.,2014)

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Badges

Badges as Micro-Credentialing

- **Capture, showcase, and legitimize** competencies within individualized learning paths;
- Validate a **wider variety** of experiences, knowledge and/or achievements; and
- Aid students in building a **stronger professional identity**

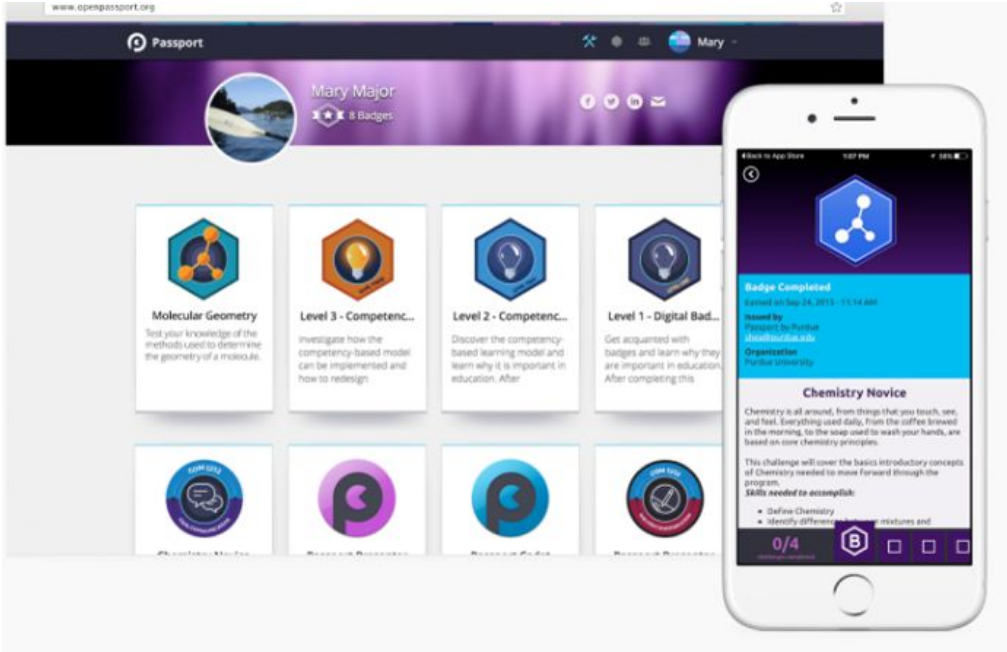
Competency Attainment & Badges

Process of gaining badges resembles real-world skill development:

- **Gap identification**: independently or with faculty support
- **Progressive competency attainment** (from basics to complex): multiple challenges/badge hierarchy with progressive complexity to showcase mastery
- **Collaboration with mentors:** ongoing feedback, scaffolding of work
- **Ongoing revision**: badges can be returned until the specified level of mastery achieved; in some cases, revisions may be initiated by learners to showcase advanced skills
- **Proof of competency attainment**: e-/badge portfolios

Difficult to attain without **self-directed learning** and **self-regulation skills**

Passport at Purdue University



- Learning & e-portfolio system
- Create, deliver, assess, & award badges:
  - Flexible outcome-based assessment
  - Scorecards
- Compatible with Mozilla Backpack, LinkedIn, & Facebook

www.openpassport.org

CBE Implementation at Purdue

Transdisciplinary Studies in Technology (Bachelor's)

Learning Design and Technology (Master's)

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Transdisciplinary Studies in Technology (Bachelor's)

CREATE YOUR FUTURE

MAKE YOUR OWN MAJOR

"IF YOU WANT SOME CAREER ADVICE FROM A FUTURIST ... PREPARE FOR CHANGE."

- JACK HANSON

polytechnic.purdue.edu/degrees/transdisciplinary-studies-technology

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Overall program design

- Competency-based program
- Competency evaluation (badges, non-course degree requirement)
- Transdisciplinary
- Tie-in between school, program, and other experiences
- Focus on authentic experiences
- Project/problem-based learning, hands-on

Design of learning experiences

- Seminar: focus on integration of humanities
- Design Studio: focus on design principles
- Assessment **for** learning: feedback, iterative design
- 21st century skills: teamwork, problem-solving, etc.

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Identification of core competencies

Based on:

- University Foundational Outcomes
- AAC&U value rubrics
- Model universities (e.g., Alverno, Lipscomb)
- Industry (focus group & literature) & faculty

Categories:

- Developing ➡ Emerging ➡ Proficient

Badge design

- Badges represent competencies
- 1 challenge per badge: artifact(s) and reflection
- Focus on transdisciplinarity

Student Profile

- On-campus
- Full-time
- Traditional-age, though plans for returning/adult students
- Interest in transdisciplinary courses (technology & humanities)
- Pilot with 33 students, though the number went down by Year 3 due to preferences of other majors/traditional environment

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TST Competency Development Timeline

2013

Program design

Badges considered a good model for self-directed and self-paced learning

Badge (competency) details not defined until summer before pilot

2014

Program pilot

Badges (competencies) on the course level + specific disciplinary badges, self-paced

Assessed by course instructors

In-classroom formative assessment

Ongoing program evaluation

2015

Program pilot 2

Adjustments based on new program design

Program-level competencies as non-course degree requirement

Assessed by a mentor

Instructor-provided course grades and in-class assessment distinct from badges

2016

Program-level competencies as non-course requirements

Assessed by 2 mentors

Stronger tie-in between competencies and course objectives

Competency Redesign

Transdisciplinary Bloom's Taxonomy

Competency Level	**Proficient**	**Emerging**	**Developing**	**Foundational**
Bloom's Taxonomy	• **Integrate** (cross-domain synthesis and creation) • Create • Evaluate	• **Transfer** (Apply in other domain(s)) • Analyze • Synthesize	• Analyze • Apply	• Be aware • Remember • Understand

Definitions	Foundational	Developing	Emerging	Proficient
Readability: HS Simple sentences that have subjects (accessible)	*Readability:* HS	*Readability:* Higher than HS		
Audience: - Prospective students - Parents - Employers (also references to badges in the next column) - HS advisers		***Audience:*** - Instructors - Current students - Mentors - Advisers - * Badges: Assessment information and I-statement for competency assessment		

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Competency Chart

1 DESIGN THINKING [7/3/2]

any 3 at Emerging — any 2 at Proficient

1.1	1.2	1.3
Problem framing & research	Idea fluency	Design options assessment
P E D	P E D	P E D

1.4	1.5	1.6
Managed & iterative design with reflective design thinking	Links knowledge from multiple disciplines to analyze & solve a problem	Aesthetic engagement
P E D	P E D	P E D

1.7
Unstructured problem solving
P E D

2 SYSTEMS THINKING [2/1/1]

1 at Emerging — 1 at Proficient

2.2	2.3
Ability to define the overall system appropriately	Ability to see relationship
P E D	P E D

3 EFFECTIVE COMMUNICATION [5/3/2]

any 3 at Emerging — any 2 at Proficient

3.1	3.2	3.3
Written communication	Oral communication	Audiovisual communication
P E D	P E D	P E D

3.5	3.6
Reading	Information literacy
P E D	P E D

4 ENVISION & EXECUTE INDEPENDENTLY [2/2/2]

4.1	4.2
Lifelong learning	Ensuring proper time management
P E D	P E D

TOTAL BASELINE OF COMPETENCIES | D:29 | E:17 | P:12

5 SOCIAL INTERACTION & TEAMWORK [4/3/2]

any 3 at Emerging — any 2 at Proficient

5.1	5.4	5.5
Teamwork	Working with clients and users	Give, receive, and act on critique
P E D	P E D	P E D

5.8
Mentoring of team and team members
P E D

6 ETHICAL REASONING [2/1/1]

1 at Emerging — 1 at Proficient

6.1	6.2
Ethical awareness (developing a global perspective)	Ethical analysis and reflection (moral reasoning)
P E D	P E D

7 INNOVATION & CREATIVITY [4/2/1]

any 2 at Emerging — any 1 at Proficient

7.1	7.3	7.4
Creative thinking	Integrative thinking	Taking risks
P E D	P E D	P E D

7.5
Embracing contradictions
P E D

8 DISCIPLINARY KNOWLEDGE [3/2/1]

1 at Emerging — 1 at Proficient

8.1a
Disciplinary knowledge
P E D

8.1b
Disciplinary knowledge
P E D

1 at Emerging

8.2	8.3
Scientific reasoning (foundational science)	Quantitative reasoning
P E D	P E D

Issuer:
Passport by Purdue

Organization:
Purdue University

Created by:
Anuja S Rayarikar, Sep 28 2015

Learning Outcomes

Completes coursework and shows an interest in pursuing additional knowledge and skills based on material already learned.

4.1 Lifelong Learning (Developing)

☆ Get started

Lifelong learning is "all purposeful learning activity, undertaken on an ongoing basis with the aim of improving knowledge, skills, and competence." An endeavor of higher education is to prepare students to be this type of learner by developing specific dispositions and skills described in this rubric while in school. (AAC&U value rubric, lifelong learning).

Challenges

4.1 Lifelong Learning (Developing)

- 1 challenge per badge
- Complexity based on level
- Outline of potential artifacts - not necessarily tied with coursework

Badges

Emerging Level
Competency: 1.1 Problem Framing
Developing level expectations + Recognizes all or many stakeholders and articulates their needs.

Reflection Example

1.Competency identification:

The author clearly stated the name and level of the competency that he/she pursues.

[(1) To satisfy the emerging level of the problem framing competency], [(2) I am submitting the design document and a 3D prototype of a lightweight carabiner. The problem statement is highlighted on page 1 of the design document. I wanted to design and prototype solutions that could improve some of my daily experiences. Since I am a seasoned rock climber, I decided to focus on improving my experience carrying a chalk bag and other gear.]

2.Artifact identification.

The author describes the artifact(s) or specific portion(s) of an artifact submitted as evidence for this badge. You can use artifacts that come from one of your classes as well as experiences outside of your coursework.

3. Artifact alignment with competency and objectives

The author summarizes the purpose of the artifact and how it aligns with the competency and outcomes. You can use the terminology of the competency/ outcomes to strengthen such alignment.

[(3) Traditionally, regular carabiners are used that also match the safety gear. However, they are expensive and only come in limited colors. Since I would use them just for attaching my chalk bag, the real goal is to do so cheaply and in a lightweight way. For effective design, I needed to focus on the problem itself, before I move towards the solution or what I needed my gear to do and not the solutions currently available. As such, I framed my problem as follows. To attach a chalk bag to my harness, I need to use a carabiner that has the following constraints: it should be cheap and lightweight, but can still carry the weight. I also needed to make sure that in addition to being effective, my solution should also have a resemblance of the traditional gear to help other climbers easily understand the purpose and potentially adopt my design for their daily needs.] [(4) My approach mirrors what Amy mentioned in our Studio class last week, namely, that

4. Competency alignment with prior experience/ knowledge

The author

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- Summary + reflection
- Encourage reflection on work within and outside of formal coursework
- Standardize expectations and assessment

Reflections

Formative Assessment & Badges: Pro's and Con's

- **Pros:**
  - Hands-on authentic learning experiences for students
  - Ongoing individual and group feedback
  - Assessment **FOR** learning
- **Cons:**
  - Takes time to **get used** to no-quiz, no-exam environment
  - **Lack of interest in acquiring badges**, focused more on "real" homework

Program Level (Hybrid): Pro's and Con's

- **Pros:**
  - Increase of awareness of **non-traditional learning environments** and **competency model**
  - More **time with students**
  - Seen by college-level leadership as a reasonable **"transitionary step"** for university and for employers
  - Ongoing **incorporation of student feedback** at all levels of the program

- **Cons:**
  - Challenges of working within an existing infrastructure
  - Learning about CBE as we go
  - Faculty overload

Future Directions

- Scaling up (250+ people)
- Returning/adult students
- Further fine-tuning of competency details

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Learning Design & Technology (Online Master's)

online.purdue.edu/ldt/learning-design-technology

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Overall program design

- Competency-based program
- Competency evaluation (badges, non-course degree requirement)
- Project/problem-based learning
- Focus on authentic experiences

Design of learning experiences

- 8-week long classes
- Assessment **for** learning: feedback, iterative design
- Combination of theory/design and application
- High level of interaction with peers and instructors
- Mandatory peer review of badge submission

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Identification of core competencies

Based on:

- International Board of Standards for Training, Performance & Instruction (IBSTPI)
- Faculty
- Related professional literature

Badge design

- Badges represent competencies
- Multiple challenges per badge: artifact(s) & reflection

Student Profile

- Online
- Part-time
- Mainly mid-career adult students with diverse background & experience
- CBE Pilot with 16 students (of ~200-250)

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LDT Competency Development Timeline

2014	2015	2016	2017
Initial Discussions	**Detailed Design**		**Program pilot**
Initial concept proposed	IBSTPI competencies (published professional ID competencies) chosen as underlying model	Competencies reviewed in greater detail	Pilot program initiated (class time used to explain badge model; peer- and instructor-review)
Existing competency models, research, and other resources reviewed	Specific competencies reviewed for inclusion	Ensured that one or more course projects *could* be used to match each competency	Initial data collected and revisions planned
Options for scale-up considered & proof of concept illustrated before proceeding	Specific options for scale up discussed	Badges created for competency hierarchy	

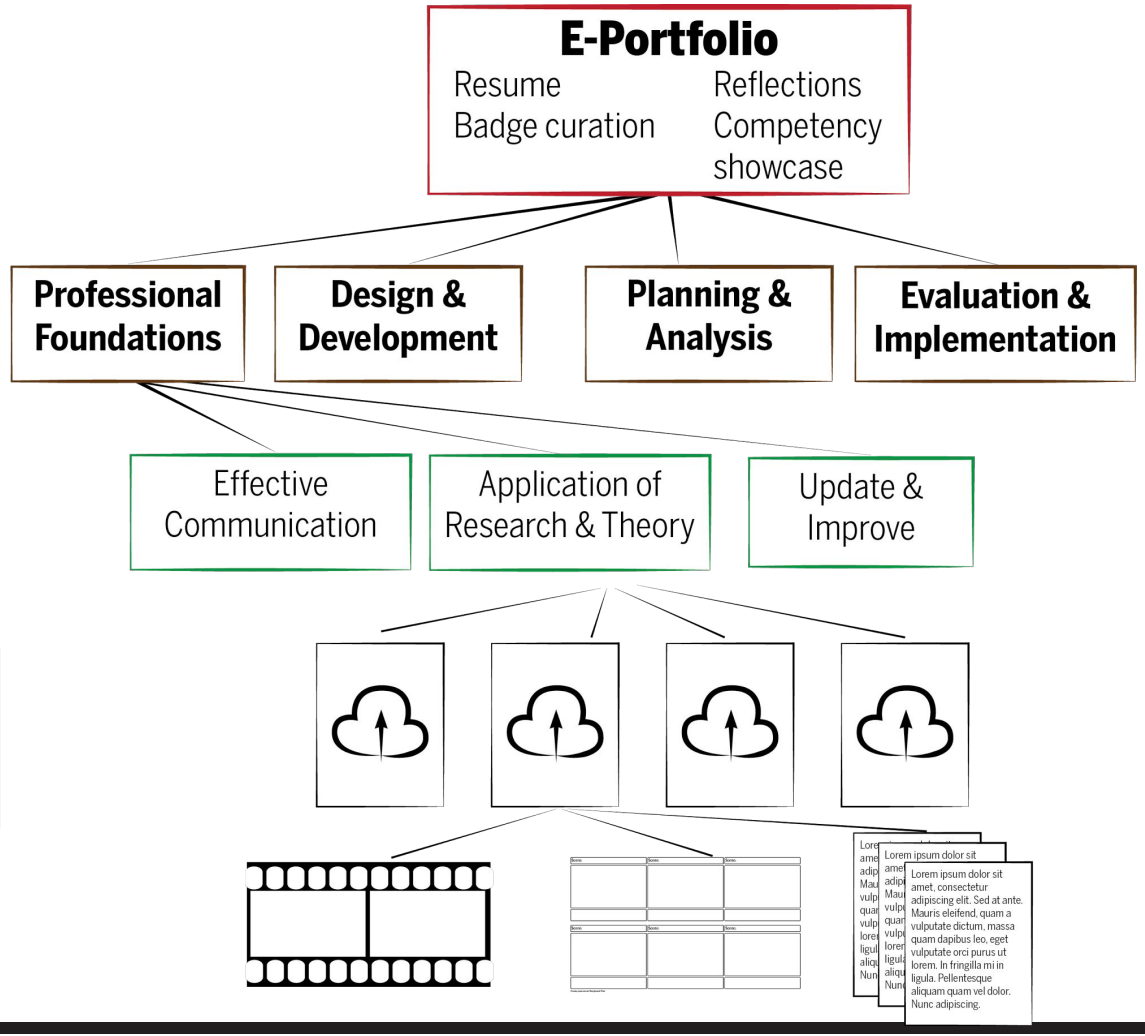
E-Portfolio
Representation of a student as a whole person

Supra-badges
Competency level
Awarded when sub-badges are acquired

Sub-badges
Awarded when all challenges are completed

Challenges
Artifact & reflection on how meets criteria

Artifacts
Videos, online and on-site training documentation, etc.



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Assessment

- Students **curates their work**, select artifacts that may exemplify competence in one or more areas
- 16 sub-badges with **34 challenges** worked on across **4 terms, 5th term portfolio review**

Evaluate Instructional and Noninstructional Interventions

☆ Get started

Evaluate Instructional and Noninstructional Interventions

Issuer:
Passport by Purdue

Organization:
Purdue University

Created by:
Bill Watson, Nov 27 2016

Learning Outcomes

1. Plan for implementation of formative evaluation plans
2. Implement summative evaluation plans

Challenges

Plan for implementation of formative evaluation plans

Submit evidence of planning the implementation of a formative evaluation plan.

- Examples: The Evaluation Plan (EDCI 577), Learning Module (EDCI 575), eLearning Project (EDCI 569), artifacts showing strategies for implementation of an evaluation plan (design, performance, workplace, educational, other).

Attached Resources

/Reflection Instructions.docx
31.8KB

/660 Badge Challenge Peer Review Form.docx
60.5KB

Learning Outcomes

Implement summative evaluation plans

- Multiple challenges
- Instructions
- Suggested artifacts align with coursework

Scaling Up with Peer Review: Pro's and Con's

- Instructor time dedicated to guiding students and assessing competence - is this realistic?
- Peer review & linear timeline to keep load reasonable on instructors

Peer Review: Pro's and Con's

- **Pros:**
  - Students obtain experience with giving and receiving feedback
  - Students help peers improve their work
  - Students improve their future work and understanding of material

- **Cons:**
  - Incoming students weary to give "critical" feedback, don't know how to accept & use (worried about being "punished" by peers)

Linear Timeline: Pro's and Con's

- **Pros:**
  - Student complete on time
  - Easy to keep track of and manage student progress

- **Cons:**
  - Doesn't meet CBE ideal of individualization of learning pathways and self-paced learning & badge acquisition
  - High-stakes repercussions for students not following timeline

Future Directions

- Scaling up: Program-wide CBE (up to 250 people)
- (Far future ideal) Direct Assessment (self-paced, badges, degree or professional development)

Main Takeaways

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Key Considerations and Takeaways

- **No single recipe** to establish a CBE program
- It is an **iterative and collaborative process** that requires **significant time and effort** at each stage of design, implementation and testing
- Assessments should be **meaningful** and **transparent**
  - **Measurable** and written in a **clear language** for students and assessors
  - **Aligned** with **competencies** and learning activities
  - Combine **assessment *of*** and **assessment *for* learning**
- **Wide support network** including **mentors**, **1-1 interaction with instructors**, **formative feedback/critique, student community**

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Q&A

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