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Teaching the Syllabus Through the Work: A Two-Case Design Study of Practice-Mapped Courses for Undergraduate and Graduate Learners

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Abstract: Employers report a widening gap between what graduates learn in class and what work requires. They trust graduates' subject knowledge but find them less prepared to solve unstructured problems, work in teams, communicate results, and use current tools such as artificial intelligence. Courses delivered as chapters, homework, and examinations cover content without developing those capabilities. This article, the first part of a two-part study, argues that closing the gap is a course-design task for the instructor. It reports a two-case design study of a practice-mapped approach in which the official syllabus is kept intact, and every outcome is taught through a cumulative project for a decision-maker outside the classroom. Case A is a required undergraduate business statistics course at Morgan State University, in which teams serve one organization all semester. Case B is a graduate Lean and Agile project management course at Georgetown University, in which self-organized teams of professional master's students plan one technology project. Andragogy supplies the theoretical frame. The article specifies a seven-move design model, describes each case using its course documents, and compares the cases against Knowles's six assumptions. The comparison shows which moves hold and which change: graduate students can choose their project and organize themselves, while undergraduates need assigned cases, worked demonstrations, and more individual assessment. The approach matters because students leave a required course with workplace capabilities and a portfolio artifact, with nothing added to the syllabus. No student-outcome data are reported; the second part will survey students in both courses.

Keywords: Andragogy, Adult Learning, Practice-Based Teaching, Project-Based Learning, Authentic Assessment, Employability, Agile, Business Statistics, Project Management Education, Higher Education

1. Introduction

The default architecture of many university courses remains a march through content: a chapter is assigned, exercises are completed, and an examination certifies that the chapter was covered. Biggs (1996) named the underlying problem as a failure of constructive alignment, in which intended outcomes, teaching activities, and assessment drift apart until coverage is mistaken for evidence of learning. Wiggins and McTighe (2005) made the same point as a design sequence: desired results should be specified before acceptable evidence, and acceptable evidence before instructional activity. In much of higher education, that sequence is inverted. The textbook chapter becomes the unit of planning, homework becomes the evidence, and the examination becomes the course.

The cost of that inversion is paid at graduation. Employability, in Yorke's (2006) widely used definition, is the set of achievements, understandings, and personal attributes that make graduates more likely to gain employment and succeed in their chosen occupations. It is not a list of topics covered. Jackson (2015), studying work-integrated learning, found that students develop employability skills when they apply what they have learned to authentic work, and that the quality of the experience's design and supervision affects how much they develop. Kuh (2008) listed collaborative assignments and projects among the high-impact educational practices for the same reason: they demand sustained effort, substantive interaction with peers, and frequent feedback. The evidence that students learn more when they do the work is strong: a meta-analysis of 225 studies found higher examination scores and lower failure rates in undergraduate courses taught with active learning than in courses taught by lecture alone (Freeman et al., 2014). A course can cover every chapter and still leave a student unable to show an employer a single piece of work.

We argue that institutions teaching undergraduate and graduate courses are more effective when instructors map syllabus content onto practical, industry-level work that students will remember and use, and that this can be done without giving up the syllabus. The primary obligation of an instructor is still to teach the material the catalog promises. The design question is what students do with that material—in the approach reported here, which we call practice-mapped course design, the official outcomes, the assigned readings, and the academic calendar stay where they are. What changes is the assessment spine: each outcome is pursued through an increment of one cumulative project, produced by a team, for a named decision-maker other than the instructor.

Andragogy is the natural theory for this claim and also its hardest test. Knowles (1980, 1984) held that adults need to know why a learning task matters, bring experience into the room, direct their own learning, and orient toward problems instead of subject coverage. Zemke and Zemke (1984) observed that adults pursue learning around use, and Chan (2010), reviewing applications of andragogy across disciplines, reported the same pattern: learners value knowledge they can put to use. If these assumptions are right, a practice-mapped course should suit graduate students who already work in the field. The harder question is whether the same design serves undergraduates, who are legally adults but may have little work experience and little practice in directing their own learning.

This article answers that question with two cases taught by the same instructor at two universities. Case A is Business Statistics, a required undergraduate course in the Earl G. Graves School of Business and Management at Morgan State University. Case B is Lean and Agile with Scrum and Kanban, a graduate course in the Master of Professional Studies in Project Management at Georgetown University's School of Continuing Studies. The cases differ in level, discipline, term length, and learner experience. They share one design model. Neither institution is the subject of the paper; each is a setting in which the model can be examined.

The article addresses four questions. First, what design moves let an instructor keep a specified syllabus while teaching it through practice? Second, how were those moves realized in an undergraduate course and in a graduate course? Third, where do Knowles's assumptions hold in each case, and where do they strain? Fourth, how should the design be evaluated with the students who took the courses?

Two limits belong in the open. This is the first part of a two-part study, and it is a design study, not an outcomes study. We report no grades, no survey results, and no comparison group; the second part, outlined in Section 7, will survey students in both courses. Moreover, the evidence is documentary. The cases are described from syllabi, project guides, and course materials, not from observation of students.

The remainder of the article is organized as follows. Section 2 reviews the literature, beginning with the gap between what is taught and what work requires and ending with the

evidence and institutional guidance on active learning and curriculum mapping. Section 3 describes the method. Section 4 states the design model. Section 5 presents the two cases. Section 6 compares them. Section 7 outlines the planned evaluation, Section 8 draws implications, and Section 9 concludes with limitations.

2. Literature Review

2.1 The Gap Between What Is Taught and What Work Requires

The case for practice-mapped teaching begins outside the university. Employer and industry research over the past several years describes a consistent gap between what graduates learned in class and what they are asked to do at work, and the gap is widening as the skills themselves change.

The first finding is the pace of change. The World Economic Forum (2025), surveying more than 1,000 employers that together employ over 14 million workers, reported that employers expect 39 percent of workers' core skills to change by 2030, and that 63 percent of employers regard skill gaps as the main barrier to transforming their businesses. Analytical thinking is the core skill employers most often call essential, followed by resilience, flexibility and agility, and by leadership and social influence. In contrast, technology skills, including technological literacy, are the fastest growing. A syllabus written around a fixed inventory of content cannot keep pace with a target that moves this quickly; a syllabus that teaches students to apply content to new problems has a better chance.

The second finding is that employers and students disagree about how ready graduates are. In the annual survey of the National Association of Colleges and Employers (2024), employers rated communication, critical thinking, and teamwork as the most important career-readiness competencies, and nearly 90 percent said they look for evidence of problem solving on a new graduate's resume. Students rate the same competencies as important. The disagreement is about proficiency: students consistently rate themselves as more proficient than employers rate them, with the widest differences, approaching 30 percentage points, in professionalism and leadership (Gray, 2025). A national survey of 1,010 executives and hiring managers for the American Association of Colleges and Universities found the same pattern from the employer side. Eight in ten employers agreed that higher education prepares graduates for the workforce, yet for specific skills the shortfall was large: 64 percent called oral communication very important, and only 34 percent judged recent graduates very well prepared in it (Finley, 2023). Peer-reviewed research agrees with the surveys. Succi and Canovi (2020), comparing students and employers, found that employers weigh soft skills more heavily than students do and that the two groups rank them differently.

The third finding concerns tools. Microsoft and LinkedIn (2024) reported that 66 percent of business leaders would not hire a candidate without AI skills and that 71 percent would prefer a less experienced candidate who has them, while only 39 percent of employees who use AI at work had received any training from their employer. Skills that did not exist when most current syllabi were written have become hiring criteria, and employers are not supplying the training themselves.

Read together, these sources locate the gap precisely. It is not mainly a gap in disciplinary knowledge. Employers remain broadly confident that graduates know their subjects. The gap is in what graduates can do with that knowledge: solve an unstructured problem, work in a team, explain a result to someone who must act on it, and use current tools with judgment. Those are capabilities that lectures and examinations describe but do not exercise.

Who should close the gap is contested, and this article's argument depends on the answer. Tomlinson (2012) cautioned that employability is not solely a property of the graduate or a product of the curriculum; it is also shaped by labor markets, employer practices,

and social position, and universities cannot guarantee outcomes they do not control. That caution is fair. It does not remove the responsibility that is within the university's control. Yorke (2006) argued that employability is developed through the curriculum, in the way subjects are taught and assessed, and not through services added beside it. Jackson (2015) found that students develop employability skills when they apply disciplinary learning to authentic work, and identified the design of the experience, supervision, and feedback as conditions that help or hinder that development. The employer research reaches a similar conclusion, recommending that curricula themselves be designed to build workforce preparedness (Finley, 2023).

If the gap is one of application and it closes through curriculum, then the responsibility falls first on the person who designs the course. An institution can set graduate attributes and fund career services, but only the instructor decides what students do with Tuesday's chapter. We therefore treat bridging the gap as an instructor's design task with three parts: know what the field currently asks of new professionals; identify where the course's official outcomes already touch those demands; and build the assessment so students practice the demand while they learn the outcome. The two cases in this study follow that logic. A statistics course that requires teams to brief an executive and verify machine output is exercising communication, teamwork, and AI judgment on the way to regression. A project management course that requires a self-organized team to plan a client's project is exercising the same competencies on the way to Scrum and Kanban. Neither adds a topic to the syllabus. Both change what the syllabus is used for.

2.2 Andragogy and Its Limits

Knowles (1980, 1984) proposed that adults learn differently from children and that teaching should follow from the difference. In its mature form, the theory rests on six assumptions: adults need to know why they are learning something; their self-concept is that of a self-directing person; they bring accumulated experience that is a resource for learning; they become ready to learn when life or work requires it; they are oriented toward problems and tasks, not subjects; and their strongest motivation is internal (Knowles et al., 2015). Zemke and Zemke (1984) translated these assumptions into practice: adults seek learning they can use, prefer single-concept, application-focused courses, and integrate new ideas more readily when those ideas connect to what they already know.

The theory has well-known limits, and they matter for this study. Merriam (2001) reviewed three decades of debate and concluded that andragogy is better understood as a set of assumptions about learners and a guide to practice than as a tested theory of adult learning, and that the pedagogy-andragogy distinction is a continuum on which a learner's position depends on the situation, not only on age. Knowles himself came to this view. The implication is direct: an undergraduate with a job and a family may be more "adult" as a learner than a graduate student encountering a field for the first time. Chan (2010) reported applications of andragogy in undergraduate and professional programs across disciplines, and Roe (2023) applied it to graduate service-learning, treating master's students as adults preparing for careers. Blaschke (2012) described heutagogy as a further step in which learners determine not only how but what they learn and how it is assessed. Neither course in this study does that; both have fixed outcomes and instructor-set assessments. We use andragogy diagnostically. For each of Knowles's assumptions, we ask what the design does to satisfy it and what the design must supply when the learner cannot.

2.3 Experiential, Problem-Based, and Project-Based Learning

Activity is not experience. Dewey (1938) assigned the educator the work of arranging worthwhile experience and warned that not all experience is educative. Kolb (1984) described learning as a cycle of concrete experience, reflective observation, abstract conceptualization,

and active experimentation; Boud et al. (1985) treated reflection as the organized turning of experience into learning; and Schön (1983) distinguished reflection-in-action from reflection-on-action. A project that is never reflected on is homework with a longer deadline.

Problem-based learning supplies the problem structure. Savery (2006) and Hmelo-Silver (2004) described it as inquiry into complex, ill-structured, authentic problems with the instructor as guide. Project-based learning organizes that inquiry around an artifact produced over an extended period; Helle et al. (2006) found the post-secondary literature on project work rich in description and thin in theory and evaluation, a caution this study takes seriously. The evidence is real but conditional. Meta-analytic work has found positive effects on skills and the application of knowledge, with weaker or mixed effects on short-term recall (Dochy et al., 2003; Strobel & van Barneveld, 2009).

The strongest critique comes from cognitive load theory. Kirschner et al. (2006) argued that minimally guided instruction is less effective for novices than instruction with direct guidance, because novices searching for a solution carry a load that crowds out the learning the problem was meant to produce (Sweller, 1988). Hmelo-Silver et al. (2007) answered that well-designed problem-based learning is not minimally guided; it is heavily scaffolded. Scaffolding, in Wood et al.'s (1976) sense, controls the elements of a task that are beyond the learner's current capacity and is withdrawn as competence grows, within what Vygotsky (1978) called the zone of proximal development. This exchange predicts the central difference between our cases: the less experienced the learner, the more of the problem the design must structure in advance.

2.4 Authentic Assessment and Employability

Authentic assessment asks students to perform tasks that replicate the challenges and standards of practitioners (Wiggins, 1990). Gulikers et al. (2004) specified five dimensions along which an assessment can be more or less authentic: the task, the physical context, the social context, the form of the result, and the criteria. Villarroel et al. (2018) synthesized the literature into realism, cognitive challenge, and evaluative judgment, and argued that authenticity can be designed into a course blueprint. Lombardi (2007) listed among the elements of authentic learning a polished product that has value in its own right and is not only an exercise for a grade (see also Herrington et al., 2010). A product written for an audience other than the teacher changes what counts as a good answer.

This is where the employability literature and the assessment literature meet. Yorke (2006) argued that employability is developed through the curriculum, not beside it, and Jackson (2015) found that such skills develop through authentic work that is well designed and supported. A deliverable written for a chief risk officer or a county client is at once an assessment of a course outcome and a rehearsal of professional work. Feedback is what turns the rehearsal into learning: Hattie and Timperley (2007) showed that feedback is powerful when it tells the learner where they are going, how they are going, and where to go next.

2.5 Teams, Agile, and Generative AI as Working Methods

A project carried out by a team is a bet on teams, and groups do not become teams by assignment. Oakley et al. (2004) recommended written team expectations, taught conflict resolution, and peer ratings; Kaufman et al. (2000) described peer ratings that adjust individual grades so that contribution is visible inside a shared grade; and Hall and Buzwell (2013) warned that non-contribution has causes other than laziness. Felder and Brent (2016) named the failure modes of active classrooms, including the unexplained plunge into student responsibility, and Deslauriers et al. (2019) showed that students in active conditions may learn more while feeling they learned less.

Agile supplies a working method. The Agile Manifesto valued individuals and interactions, working product, customer collaboration, and responding to change (Beck et al.,

2001), and the Scrum Guide operationalized those values through accountabilities, events, and artifacts (Schwaber & Sutherland, 2020). Kanban adds visual management of work in progress and a focus on flow (Anderson, 2010). Krehbiel et al. (2017) proposed an Agile manifesto for teaching and learning, and Sharp and Lang (2018) set out a research agenda for Agile as pedagogy. In this study, Agile appears twice: as the subject matter of Case B and as the team routine of Case A.

Generative AI is the newest working method and the least settled. Bearman and Ajjawi (2023) argued that because such systems are black boxes, the pedagogical task is to develop students' evaluative judgment of their output. Perkins et al. (2024) proposed that each assessment state its permitted level of AI use. Only one of our two cases has built AI into its design, a difference the cross-case analysis treats as a finding.

2.6 Active Learning, Constructivist Design, and Curriculum Mapping

The practices this study combines are among the most widely recommended in university teaching, and the evidence for them goes beyond employability research. Chickering and Gamson (1987) named seven principles of good practice in undergraduate education, among them cooperation among students, active learning, prompt feedback, and time on task. The largest test of the active-learning principle is the meta-analysis by Freeman et al. (2014) of 225 studies of undergraduate science, engineering, and mathematics courses, which found that examination scores were about 6 percent higher in sections with active learning and that students in traditional lecture sections were 1.5 times more likely to fail. Prince (2004), reviewing the engineering education literature, found broad but uneven support for the core elements of active, collaborative, cooperative, and problem-based learning. Evidence from a course close to Case B points the same way. Do et al. (2023) redesigned a project management course as a constructivist learning environment built on workshops and, based on questionnaires completed by 193 students, reported gains in intrinsic and extrinsic motivation and learning strategies. That study relied on students' self-reports, a limitation the second part of the present study will share.

University teaching centers have turned this research into guidance for instructors, and their recommendations converge on features of the two courses described here. Georgetown University (n.d.-a) advises giving class time to case analysis, real-world simulations, and problem-based learning, in which students work on a complex problem resembling one they would meet outside the classroom, over a single session or a whole semester. The Harvard Graduate School of Education (n.d.) describes simulations as exercises that place students in situations they are likely to encounter in professional work, and stresses that preparation beforehand and debriefing afterward matter as much as the activity. The University of California, Berkeley (n.d.) lists the one- or two-page memorandum or briefing, and the presentation a professional consultant would give, among alternatives to traditional tests. Cornell University (n.d.) recommends planning peer review into a course, with defined tasks for the reviewer, an explanation of why it is used, and clear criteria if it is graded. These are statements of recommended practice, not research findings, and we cite them as such. They show that the design moves in Section 4 are consistent with what universities already ask of their instructors.

Curriculum mapping supplies the method. A curriculum map is a table that sets a program's learning outcomes against its courses and records, at each intersection, the level at which students meet the outcome: encountered, practiced, or mastered in one common scheme (Pennsylvania State University, n.d.), and introduced, reinforced, or mastered in another (University of North Carolina at Charlotte, n.d.). Its first value is diagnostic. A map can show that students are asked to master an outcome they were never given the chance to practice, or that they meet an outcome too late or only once (Pennsylvania State University, n.d.; University of Illinois Springfield, n.d.). Its second value is communication: a map gives

students, faculty, administrators, and future employers a picture of the intended path (University of North Carolina at Charlotte, n.d.). At the scale of a single course, Fierro (2021) described the course map as an outline built by backward design and argued for sharing it with students, because it answers the question students ask of any assignment: what is this for? Practice mapping, as we use the term, keeps the logic of the curriculum map and changes one axis. Outcomes are set not only against courses or weeks but against the work that employers ask of new professionals, and the empty cells show an instructor where a course covers an outcome without exercising a capability.

One further framework applies to the hybrid course in Case B. Garrison et al. (2000) described online learning as a community of inquiry sustained by social presence, cognitive presence, and teaching presence, and Thompson et al. (2017) showed how instructors can choose technology by asking which of the three a tool's features support. A team that plans its project on a shared board and backlog between class meetings is using tools in that sense: the tool carries the team's working presence when the room does not.

3. Methodology

3.1 Design

This is a multiple-case design study. A design case is a description of a real designed artifact, here a course, written in enough detail that other designers can judge it and borrow from it; its contribution is precedent, not proof (Boling, 2010). We combine that genre with the logic of multiple-case research, in which cases are selected so that a pattern can be examined under contrasting conditions (Yin, 2018). The unit of analysis is the course design: its outcomes, assessment structure, project, team arrangements, and working routines.

3.2 Case Selection

The cases were selected for contrast on the dimension the theory cares about most, the learner's position on the pedagogy-andragogy continuum (Merriam, 2001), while holding the designer constant. Case A is an undergraduate requirement taken mostly by juniors in a 15-week semester at a public historically Black university. Case B is a graduate elective-sequence course for professional master's students in a 7.5-week hybrid term at a private university. Both were designed and are taught by the author. If the same model can be specified in both, and if the differences between the specifications line up with Knowles's assumptions, the model is more credible as a general approach than either case alone could make it.

3.3 Sources of Evidence

The evidence is documentary. For Case A, we used the course syllabus, the semester team project guide, the five case guides and their workbooks, the project workflow, and the department's teaching guidelines. For Case B, we used the course syllabus and the group project list and deliverables guide. Each case followed a common template: setting and learners; outcomes kept; project and audience; assessment structure; team arrangements; and working routine. The cross-case analysis then compared the cases against the seven design moves (Section 4) and against Knowles's six assumptions. The comparison follows the logic of curriculum mapping (Pennsylvania State University, n.d.; University of North Carolina at Charlotte, n.d.): design features and capabilities are set against the graded artifacts of each course, and gaps are read from the empty or thin cells. Tables 4 through 6 are maps of this kind.

3.4 Author's Position and Ethics

The author designed and teaches both courses. That position gives access to design reasoning that documents alone do not show, and it creates an obvious interest in the designs appearing

sound. We respond in three ways: claims about the cases are limited to what the course documents specify; each case section names where the design is weakest; and no claim is made about student learning. In assessment terms, the graded artifacts these designs specify are meant to yield direct evidence of learning, and the planned survey will yield indirect evidence (Georgetown University, n.d.-b); this article analyzes neither. No student work, names, grades, or responses appear in this article. The planned survey (Section 7) will be submitted for institutional review at each university before any data are collected.

4. The Design Model: Seven Moves

Practice-mapped course design can be stated as seven moves. Figure 1 shows the logic of the model, and Table 1 lists the moves with the reason for each. The moves are not a sequence of lessons; they are properties a course either has or lacks, and they can be checked against a syllabus.

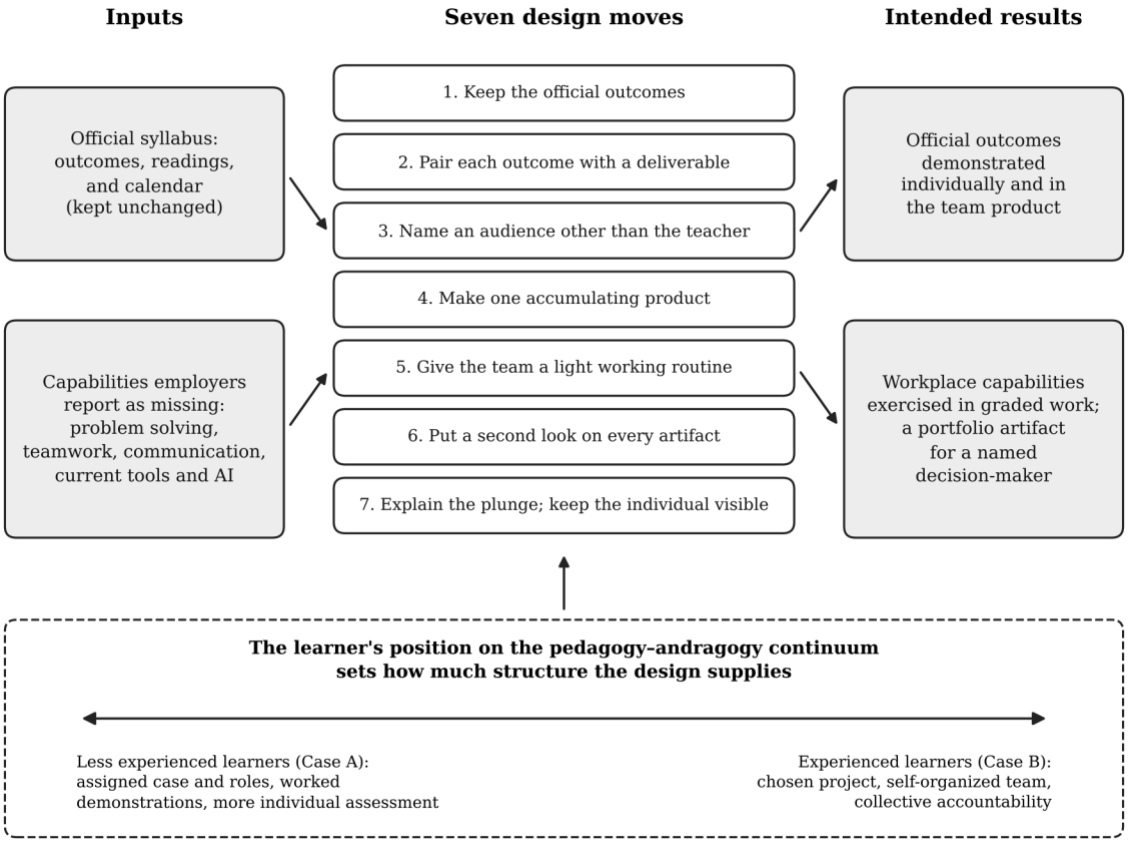

Figure 1. The Practice-Mapped Course Design Model

Note. The model takes two inputs, the official outcomes of the course and the capabilities employers report as missing, and joins them through seven design moves. The learner's position on the pedagogy-andragogy continuum determines how much structure the design must supply. Arrows show design logic, not measured effects.

Table 1. The Seven Moves of Practice-Mapped Course Design

Move	What it requires	Warrant
1. Keep the official outcomes	The catalog outcomes, readings, and calendar are not rewritten.	Backward design; constructive alignment (Wiggins & McTighe, 2005; Biggs, 1996)
2. Pair each outcome with a deliverable	Each unit of content is taught in the week a project increment needs it.	Need to know; readiness (Knowles, 1984; Zemke & Zemke, 1984)
3. Name an audience other than the teacher	Each deliverable is written for a decision-maker in an organization.	Authentic assessment (Lombardi, 2007; Gulikers et al., 2004)

Move	What it requires	Warrant
4. Make one accumulating product	Earlier work stays in the product and must be reused.	Experiential cycle (Kolb, 1984); working increment (Beck et al., 2001)
5. Give the team a light working routine	Charter, roles, regular check-in, and a correction cycle.	Team formation (Oakley et al., 2004); Agile pedagogy (Krehbiel et al., 2017)
6. Put a second look on every artifact	Feedback that must be acted on; review by someone who did not write it.	Feedback (Hattie & Timperley, 2007); reflection (Schön, 1983)
7. Explain the plunge and keep the individual visible	Students are told why the course works this way; individual evidence is preserved.	Felder and Brent (2016); Kaufman et al. (2000)

Note. The moves were derived from the author's course designs and are stated here as a design specification, not as an empirical result.

The first move is the discipline of the model. An instructor who rewrites the outcomes has designed a different course and will lose the argument with a curriculum committee. The second and third moves carry the andragogical claim: content arrives when the work needs it, and the work is for someone. The fourth move is what separates a practice-mapped course from a course with a term project attached; when earlier work must be reused, errors remain visible, and reflection has an object. The fifth and sixth moves supply the routines without which teams of novices stall. The seventh is defensive. A course that shifts responsibility to students will feel harder, and a team grade can hide a non-contributor, so the design must explain itself and keep evidence of what each individual can do. Sharing the map of outcomes and deliverables with students at the start of the course is one way to do the explaining (Fierro, 2021).

5. The Cases

5.1 Case A: Undergraduate Business Statistics at Morgan State University

Setting and learners. Business Statistics is a core quantitative requirement in the Earl G. Graves School of Business and Management at Morgan State University, a public historically Black university in Baltimore, Maryland. Students are mostly juniors, with a few seniors. The course runs for a 15-week semester in two weekly sessions and is taught in multiple sections. Introductory statistics is widely experienced as intimidating; a substantial literature documents statistics anxiety and attitudes that do not improve over a traditionally taught first course (Onwuegbuzie & Wilson, 2003; Ramirez et al., 2012).

Outcomes kept. The catalog entry, the ten official learning outcomes, and the assigned textbook (Donnelly & Haddad, 2026) were not changed. The outcomes run from descriptive displays and probability through sampling distributions, interval estimation, and hypothesis tests to simple and multiple regression. Microsoft Excel remains the analysis tool. The redesign is consistent with what statistics educators have asked for since Cobb (1992): more data and concepts, fewer recipes, and active learning (GAISE College Report ASA Revision Committee, 2016).

Project and audience. Teams of four or five are formed by the instructor in the first week and work all semester as the analytics unit of one of five organizations: a community bank, a regional hospital, an online retailer, a professional sports club, and a consumer-goods supplier. Each case comes with a synthetic workbook of about 500 records, supporting time-series sheets, and a named executive, such as a chief risk officer, to whom every report is addressed. Cases are assigned, not chosen.

Assessment structure. The team project carries 45 percent of the course grade, against a departmental reference weight of 7 percent for an optional project. It consists of ten cumulative deliverables (Table 2). Two individual assignments carry 25 percent, and an individual midterm and final examination carry 15 percent each. Individual work is therefore 55 percent of the grade. Every deliverable is graded on the same five criteria: accuracy (30), method (20), interpretation (25), communication (15), and AI use and verification (10).

Table 2. Case A: Ten Cumulative Deliverables (45 Percent of the Course Grade)

Deliv.	Weight	Content	Artifact for the executive
D1	3%	Introduction; data types	Team charter, unit mandate, data inventory, ethics guardrails
D2	4%	Descriptive displays	Data snapshot with a one-sentence takeaway under each chart
D3	4%	Descriptive measures	Population profile: center, spread, outliers, correlations
D4	4%	Probability	One-page manager card of risk signals
D5	4%	Discrete and continuous distributions	Thresholds built from the team's own earlier estimates
D6	4%	Sampling and estimation	Sampling plan, thirty visible samples, interval estimates
D7	4%	Hypothesis tests	One-page Evidence Table of tested policy claims
D8	4%	Analysis of variance	Segment memo: which groups differ
D9	4%	Correlation and simple regression	Prediction with confidence and prediction intervals
D10	10%	Multiple regression	Decision rule reusing earlier thresholds; final report; briefing in which every member speaks

Note. Weights sum to 45 percent. Each deliverable adds a tab to one workbook that is kept all semester. The table is a design specification, not a grade distribution.

Team arrangements. A written charter assigns five roles, each with a backup: Project Manager, Data Analyst, Interpretation Lead, AI and Tools Lead, and Communications Lead. Roles are accountabilities, not exemptions; every member does statistics every week. Each deliverable lists who did what and must be reviewed by a member who did not write it. Peer evaluation is formative at the midpoint and graded at the end, producing a contribution factor between 0.80 and 1.05 applied to each student's project score.

Working routine. For each deliverable, the first session teaches the textbook chapter and demonstrates the method on a slice of case data; the second is a coached workshop with a 15-minute stand-up. The instructor acts as product owner. Teams must review rubric feedback within 48 hours and record corrections for the final report. Generative AI is permitted for specified tasks only; every AI-supplied number must be reproduced in Excel, each use is recorded in an AI Log, and no AI is permitted on examinations.

A worked example: the hypothesis-testing week. The official outcome for this unit is the ability to conduct z and t tests. In a chapter-based course, the evidence would be a set of textbook exercises. In the studio, the same outcome is pursued through Deliverable 7. In the bank case, the team is given a short list of policy claims the chief risk officer wants checked: an underwriting assumption about a population mean, tested on a random sample of 40 applications; the same hypotheses rerun as a z test using a population standard deviation the team recorded two deliverables earlier; a comparison of mean credit scores at two branches; and a paired comparison of scores before and after a financial-coaching program. The first session teaches the chapter and demonstrates one test on a slice of the bank file. In the workshop, the team sets up the remaining tests in Excel. The specified AI task is to have the assistant state the hypotheses and interpret a pasted output, which the team must then judge as correct and complete or not; the rubric penalizes familiar errors such as "accepting" the null hypothesis or reading a p-value as the probability that the null is true. The product is not a stack of test outputs. It is a one-page Evidence Table for the executive: which claims survive, at what significance level, what a Type I or Type II error would cost the bank, and what the unit will not claim. The statistics are the textbook's. The work is a risk analyst's.

Where the design is weakest, the data are synthetic, so the authenticity is in the audience and problem structure, not the workplace. Students do not choose their case or their methods. Moreover, a 45 percent team project can still hide a member if the peer factor is never used.

5.2 Case B: Graduate Lean and Agile Project Management at Georgetown University

Setting and learners. Lean and Agile with Scrum and Kanban is a three-credit graduate course in the Master of Professional Studies in Project Management at Georgetown University's School of Continuing Studies in Washington, DC. The author developed the course and has taught it for more than seven years. It runs in an 8-week hybrid term, with four required in-person sessions and the remaining work online across seven modules plus an orientation. A prior course in Agile project management fundamentals is a prerequisite or co-requisite. The program is a professional master's degree; the syllabus and grading scale assume students who can draw on their own work experience.

Outcomes kept. The course has eight published learning objectives: explain the foundations of Scrum, Kanban, and Scrumban; apply multi-level Agile planning and value-driven delivery; define user stories and acceptance criteria; apply Agile estimating and prioritizing; explain the roles of the Agile team; use Agile metrics to monitor progress; manage continuous integration, deployment, and risk; and integrate Scrum and Kanban in a group project. The required texts are standard practitioner references (Anderson, 2010; Cohn, 2006; Reddy, 2016; Rubin, 2013). The eighth objective is the design in miniature: the project is itself a published outcome.

Project and audience. Students form teams of three or four and choose one project from a list of twenty. Each is a short client scenario: a county replacing an outdated school bus tracking system for 2,500 buses, a teaching hospital building a document management system, a multinational integrating its human resources and supply chain systems, a motor vehicle administration improving a business process, and more recent options such as an e-health portal and a recycling management platform. The team plans one project for the whole term, and the final document must be suitable for an executive or client audience.

Assessment structure. Nine graded components carry 85 percent of the course grade (Table 3). Eight are team deliverables worth 70 points; the ninth is an individual paper worth 15 points analyzing an annual industry report on the state of Agile practice. Each deliverable has its own published rubric. The remaining 15 percent is assigned to other module activities.

Table 3. Case B: Graded Components (85 Percent of the Course Grade)

Component	Points	Module content	Artifact
1. Team charter	5	Scrum and Kanban foundations	Vision, values, roles, communication, decision, and conflict rules
2. Multi-level planning	10	Planning and value-driven delivery	Vision, roadmap, release, sprint, and daily plans, aligned
3. User stories	10	Requirements and user stories	20 to 25 stories with testable acceptance criteria
4. Estimation	10	Agile estimation and prioritization	Duration and cost estimates and schedule derived from the stories
5. Agile team and servant leadership	10	The Agile team	Roles, collaboration practices, and leadership behaviors
6. Monitoring and evaluation	10	Agile metrics	Selected metrics and tools, with corrective actions
7. Quality and risk management	10	Continuous integration, deployment, and risk	Definition of done, risk identification and mitigation
8. Final compilation	5	All modules	One integrated document for an executive or client
9. Individual paper	15	Industry practice	Analysis of an annual state-of-Agile industry report

Note. Points follow the group project guide. Components 1 through 8 are team deliverables (70 points); component 9 is individual. The table is a design specification, not a grade distribution.

Team arrangements. Teams are self-organized. The project guide states that roles are not strictly delineated and that the team has the freedom and the responsibility to decide who does what. The first deliverable is a team charter covering vision, mission, values, roles, communication protocols, decision-making, and conflict resolution, and the guide tells students the charter is a commitment to one another, not paperwork. Collective accountability is explicit: the guide says that a member's difficulty reflects on the whole team.

Working routine. Each module opens in sequence; its readings and lectures supply the method, and the team applies it to the chosen project that week using standard templates. Students are expected to use the tools of the trade as they work: a Kanban board, product and sprint backlogs, and Agile monitoring and risk tools. Later deliverables depend on earlier ones. Estimates must be derived from the team's own user stories, and the final compilation is graded on consistency across artifacts and on evidence that earlier instructor and peer feedback was incorporated. The course teaches Agile by having teams work in an Agile way.

A worked example: from user stories to an estimate. The official objectives for these two modules are to define user stories with acceptance criteria and to apply Agile estimating and prioritizing. A chapter-based course would assess them with a quiz on story formats and estimation techniques. Here, they are assessed through two consecutive deliverables on the team's chosen project. For example, a team that selected the school bus tracking project must first write 20 to 25 user stories covering the system's core functional and non-functional requirements, each with acceptance criteria clear enough to test, and show that the stories serve the project vision set out in its earlier planning deliverable. The following week, the team estimates the project's duration and cost from those same stories. It must choose and justify an estimation technique, such as story points, planning poker, or velocity-based forecasting, and produce a schedule that is feasible given the capacity and dependencies it has assumed. A weak set of stories therefore produces a weak estimate a week later, and the team sees the consequence in its own work. In the final compilation, the team is graded on whether stories, estimates, metrics, and risks are consistent with one another and on whether earlier feedback was acted on. The readings supply the techniques. The work is a project team's.

Where the design is weakest, seventy of the 85 project points are team points, and the course documents describe no peer-rating mechanism, so individual contribution is less visible than in Case A. The scenarios are written, not live; teams plan a project but do not build the product. The term is short, which limits the number of correction cycles. Moreover, the course documents say nothing about generative AI.

6. Cross-Case Analysis

6.1 What Holds in Both Cases

Table 4 sets the two cases against the seven moves. Five of the seven are present in both in recognizably the same form. In each course, the published outcomes were left intact, and every unit of content is paired with a deliverable due when that content is taught. In each, the deliverables form one product that accumulates, and later work must draw on earlier work: Case A's decision rule must reuse thresholds set weeks before, and Case B's estimates must come from the team's own user stories. In each, the first deliverable is a team charter, and in each, feedback is something the team is graded on using, not only receiving.

Table 4. The Seven Moves in the Two Cases

Move	Case A: undergraduate statistics	Case B: graduate Lean and Agile
1. Keep the outcomes	Ten catalog outcomes, textbook, and examinations unchanged	Eight published objectives and required texts unchanged; the project is itself an objective
2. Pair outcome and deliverable	Ten deliverables, each tied to the week's chapter	Eight team deliverables, each tied to the week's module
3. Name an audience	A named executive in one of five assigned organizations	A client organization in a scenario the team chooses from twenty
4. One accumulating product	One workbook and report; earlier numbers must be reused	One project plan; estimates derive from stories; final compilation graded on consistency
5. Light working routine	Assigned roles with backups; weekly stand-up; instructor as product owner	Self-organized roles; charter; Kanban board and backlogs as working tools
6. Second look	Same rubric weekly; 48-hour feedback review; review by a non-author; AI verification	Rubric per deliverable; final compilation graded on responsiveness to feedback
7. Explain the plunge; keep the individual visible	55 percent individual work; peer factor of 0.80 to 1.05; individual examinations	15-point individual paper; no peer-rating mechanism documented

Note. Entries summarize the course documents described in Section 5.

Two moves differ. The third move, the audience, is specific and assigned in Case A and chosen and more loosely drawn in Case B. The seventh move, individual visibility, is strong in Case A and thin in Case B. Both differences are explained by who the learners are, which is the subject of the next section.

6.2 Andragogy Across the Two Cases

Table 5 applies Knowles's six assumptions to the two cases. The pattern is consistent. Where an assumption concerns the task, the design satisfies it in both courses. Where an assumption concerns the learner, Case B can rely on it, and Case A must build a substitute.

Table 5. Knowles's Six Assumptions in the Two Cases

Assumption	Case A: mostly juniors	Case B: professional master's students
Need to know	Designed: every deliverable is a memo that names a decision; the first has no formulas	Designed: every deliverable is a planning artifact a project team would produce
Self-concept and self-direction	Supplied: teams, cases, roles, and AI tasks are assigned	Relied on: teams form themselves, choose the project, and divide the work
Experience	Supplied: a shared case workbook stands in for work history	Relied on: the grading scale rewards input from personal experience
Readiness	Calendar-driven: the chapter appears the week the memo needs it	Career-driven: a professional program with a prerequisite in Agile fundamentals
Problem orientation	Designed: each method answers an executive's question	Designed: each module answers a stage of one client project
Internal motivation	Hoped for; countered by individual examinations and a peer factor	Assumed; collective accountability stated in the project guide

Note. Assumptions follow Knowles (1984) and Knowles et al. (2015). The table is a design comparison, not a finding about students.

Need to know and problem orientation can be designed into a course at any level. Neither depends on the learner's age or history; each depends on whether the work is for someone and whether content arrives when the work requires it. This is the part of andragogy that travels.

Self-direction and experience cannot be designed in; they can only be relied on or substituted for. In Case B, the substitution is unnecessary. Students choose their project, organize themselves, and are graded partly on what they bring from their own practice. In Case A, each of those is replaced by structure: the instructor forms the teams, assigns the case, names the roles, specifies the AI task, and demonstrates the method before the team attempts it. That is the scaffolding the cognitive load critique demands for novices (Kirschner et al., 2006; Hmelo-Silver et al., 2007), and it confirms Merriam's (2001) point that pedagogy and andragogy are ends of a continuum. The shared case workbook does for juniors what work history does for a graduate student: it gives the room an experience to argue with.

The contrast in individual assessment follows the same logic. An instructor can extend more trust to self-directed graduate students working under collective accountability than to juniors working under a grade, so Case A keeps 55 percent of the grade individual and adds a peer factor. Whether that trust is warranted in Case B is an empirical question, and the absence of any peer-rating mechanism there is the clearest improvement the comparison suggests.

6.3 From Employer Demands to Course Work

Section 2.1 identified the capabilities employers most often report as underdeveloped in new graduates. Table 6 sets those capabilities against the work each course requires. The table does not claim that students acquire the capabilities; it shows that each one is exercised by a graded artifact, which is the precondition for acquiring it.

Table 6. Capabilities Employers Report as Missing and Where Each Course Exercises Them

Capability	Case A: undergraduate statistics	Case B: graduate Lean and Agile
Problem solving and analytical thinking	Every deliverable answers an executive's question; Evidence Table; decision rule	Multi-level plan, user stories, and estimate for one client project
Communication for a decision-maker	Memos for a non-statistician; one-page manager card; briefing in which every member speaks	Final compilation written for an executive or client; individual analytical paper
Teamwork	Charter, named roles with backups, weekly stand-up, peer evaluation	Self-organized team, charter, stated conflict-resolution rules
Leadership and professionalism	Project Manager role; submission standards and deadlines; review by a non-author	Servant-leadership deliverable; collective accountability
Technology and AI judgment	Excel throughout; AI Log; every AI-supplied number reproduced by the team	Kanban board, backlogs, and Agile metrics tools; AI not addressed
Adaptability and use of feedback	Forty-eight-hour feedback review; corrections carried into the final report	Final compilation graded on responsiveness to feedback

Note. Capabilities are drawn from the employer research reviewed in Section 2.1 (Finley, 2023; National Association of Colleges and Employers, 2024; World Economic Forum, 2025). Entries name graded artifacts in the course documents.

Two observations follow. First, neither course added a unit on communication, teamwork, or professionalism. Each capability is exercised as a by-product of how a disciplinary outcome is assessed, which is what Yorke (2006) meant by developing employability through the curriculum. Second, the one empty cell is instructive. The capability employers now screen for most explicitly, judgment in the use of AI (Microsoft & LinkedIn, 2024), is designed into the undergraduate course and absent from the graduate one. Mapping a course against current employer demands is how an instructor finds such a gap before a graduate does. This is the diagnostic use of a curriculum map (Pennsylvania State University, n.d.) applied to a single course.

6.4 Four Tensions

Guidance versus self-direction. The more the design structures the work, the less the learner directs it. Case A sits at the guided end by necessity. The cost is that undergraduates rarely choose a method or a problem; the design teaches practice without yet teaching autonomy.

Team weight versus individual evidence. Both courses place the largest share of the grade on a team. Case A answers with examinations and a peer factor; Case B answers mainly with trust. Hall and Buzwell (2013) note that non-contribution often has causes other than free riding, which argues for mechanisms that reveal it early in both courses.

Authenticity versus control. Synthetic data and written scenarios let the instructor guarantee that every outcome is exercised, which a live client could not. They also stop short of the workplace. The claim both courses can make is authenticity of audience, task, and product (Gulikers et al., 2004), not of placement.

Generative AI. Case A treats AI as an object of verification, with a log and a rubric criterion (Bearman & Ajjawi, 2023). Case B is silent. A graduate course whose students use these tools at work is, if anything, the more urgent place for a stated policy (Perkins et al., 2024).

7. Planned Evaluation

The second part of the study will examine whether students who took these courses report and demonstrate the ability to apply what they learned, and whether the design moves operated as intended. It will use a convergent mixed-methods design (Creswell & Plano Clark, 2018). An end-of-course survey in both courses will ask about understanding of the course outcomes, practical applicability and perceived readiness for work, team experience, and which design features helped or hindered learning. Because no pretest was administered, self-reported change will be measured in a retrospective pretest-posttest format (Howard, 1980). Open-ended responses will be analyzed thematically (Braun & Clarke, 2006).

The survey will measure five constructs, each tied to an argument in this article. The first is perceived mastery of the official course outcomes, given the design's claim that practice does not cost content. The second is self-rated growth in the capabilities listed in Table 6, with items modeled on published career-readiness competencies (National Association of Colleges and Employers, 2024). The third is perceived readiness for work, including whether students have used or expect to use the project artifact in a job search or in their current job. The fourth is perceived helpfulness of each of the seven design moves, allowing the moves to be compared with one another. The fifth is the learner's position on the continuum described in Section 2.2: prior work experience, preference for choice or structure, and whether the degree of guidance felt too little, about right, or too much. Collecting the fifth construct in both courses will replace the program-level description of learners used in this article with measured characteristics and allow the central claim of Section 6.2 to be examined within each course and between them.

Because the instructor is also a researcher, the survey will be voluntary and anonymous, administered by someone other than the instructor after final grades are posted, and approved by the institutional review board at each university before any data are collected. Three threats are named in advance. Perceived learning is not demonstrated learning. Active designs can lower students' sense of having learned (Deslauriers et al., 2019), so satisfaction will not be read as a verdict in either direction. Moreover, without comparison groups, no causal claim can be made.

8. Implications

8.1 For Instructors

The first implication is that an instructor does not need permission, a new course, or a new budget to begin. The seven moves operate within an existing syllabus. A practical starting sequence is to list the official outcomes; identify, from current employer research and one's own professional experience, what new entrants to the field are asked to do; choose an organization and a decision-maker for whom the outcomes would be used; and rewrite the assessments, not the content, so that each outcome produces one increment of a single product. The second implication is that the amount of structure should be set by the learners, not by the instructor's preference. For students with little experience in the field, assign the case, name the roles, demonstrate the method first, and keep most of the grade individual. For experienced students, let teams choose and organize, and add a mechanism that makes individual contributions visible. The third is to treat current tools as part of the content. If professionals in the field use generative AI, the course should state what use is permitted and grade students on checking what the tool produces.

8.2 For Departments and Programs

Departments shape what instructors can do through teaching guidelines. A guideline that sets a fixed, small reference weight for projects is written for a chapter-based course; one that lets instructors set and publish a different weight leaves room for practice-mapped designs without changing the catalog. Departments that want to compare designs fairly need some common individual evidence across sections, such as shared examination items, so that outcomes can be compared even when assessment structures differ. Programs can also use the mapping in Table 6 at the program level: set the capabilities employers report against the required courses and see which capabilities no required course addresses. Because such a map describes what is actually taught, it is best built by instructors together (Pennsylvania State University, n.d.; University of Illinois Springfield, n.d.).

8.3 For Institutions

The employer research reviewed in Section 2.1 places part of the responsibility for the gap on higher education, and institutions typically respond with services beyond the curriculum: career centers, internships, and co-curricular credentials. Those matter, but they reach students unevenly, and students with the least professional experience and the fewest connections are often the least likely to use them. A required course reaches everyone enrolled in it. Institutions that want every graduate to leave with evidence of applied capability can support practice-mapped teaching directly: recognize course redesign in workload and promotion decisions, give instructors access to current employer data and to practitioners in their fields, and ask of each required course not only what it covers but also what a student can show an employer at the end of it.

9. Conclusions

This article has argued that a course can keep its syllabus and still be taught through the work, and has shown what that looks like in two courses that differ in almost everything except their designer. The seven moves of practice-mapped design were specified in an undergraduate statistics requirement and in a graduate project management course. Five moves appear in both in the same form. Two differ, and they differ in the direction andragogy predicts: professional master's students choose and organize their own work, while undergraduates are given a case, roles, demonstrations, and a larger share of individual assessment. The parts of andragogy that concern the task, need to know, and problem orientation can be designed into

any course. The parts that concern the learner, self-direction and experience, must be supplied by structure until the learner can supply them.

For instructors, the practical implication is that the choice is not between covering the syllabus and preparing students for work. The outcomes can stay; the assessment spine is what changes. For programs concerned with graduate employability, the cases suggest that a required course can produce a portfolio artifact, a decision report or a project plan written for a client, without a new catalog entry.

The limitations are substantial. This is a design study with no student-outcome data. Both courses were designed and are taught by the author, who also wrote the descriptions. The evidence is documentary and drawn from one version of each course. The description of the graduate learners rests on the program type and the course documents, not on measured student characteristics; the second part of the study will collect them. The two cases differ in discipline, term length, and level, so the contrasts attributed to learner maturity may have other sources. Case A's data are synthetic, and Case B's scenarios are written. The comparison nonetheless identifies specific improvements, including a peer-contribution mechanism and an AI policy for the graduate course, and a path toward student choice for the undergraduate course, that the second part of the study can test with the students themselves.

Declarations

Ethics. This article reports no data from students. No student names, work, grades, or survey responses are included. The follow-up study described in Section 7 will be submitted for institutional review board approval at each university before any data are collected.

Data and materials availability. Course design materials (syllabi, project guides, and case materials) are available from the corresponding author upon reasonable request.

Conflict of interest. The author designed and teaches both courses described. No other conflicts are declared.

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