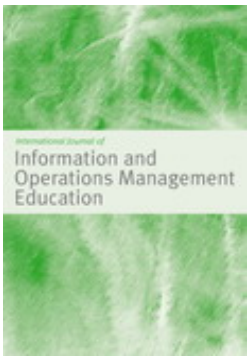

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Harm-Jan Steenhuis, Lindsey A. Gibson, Tolga Ulusemre

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Exploring business students' Perry cognitive development position and implications at teaching universities in the USA

Harm-Jan Steenhuis*

Hawaii Pacific University,
900 Fort St. Mall, Suite 600,
Honolulu, HI 96813, USA
Email: hsteenhuis@hpu.edu
*Corresponding author

Lindsey A. Gibson

Department of Management,
David Eccles School of Business,
University of Utah,
Office: SFEBB, Room 7228, 1655 East Campus Center Dr.,
Salt Lake City, Utah 84112-8939, USA
Email: lindsey.gibson@eccles.utah.edu

Tolga Ulusemre

Craig School of Business,
Missouri Western State University,
4525 Downs Drive, St. Joseph, MO 64507, USA
Email: tulusemre@missouriwestern.edu

Abstract: In the context of US universities where student evaluations of teaching play an important role in the retention and promotion of faculty, it is important to understand what a student expects in the classroom. This study took the perspective of Perry's cognitive development scheme with the following research question: what is the Perry level of cognitive development of business students? An established survey was used at two different universities. It was found that the median was position 3, and that there was large variation in three dimensions. First is the variation across program levels. Second, there was variation across universities. This becomes an issue when instructors move to a different university and questions the possibility to transfer 'best practices'. Third, variation was found within a specific program level. This means that instructors are faced with students who, from a cognitive perspective, have different demands which are unlikely to be simultaneously met.

Keywords: cognitive development; Perry scheme; business students; learning environment.

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Biographical notes: Harm-Jan Steenhuis is a Professor of Management, International Business in the College of Business at Hawai'i Pacific University. He previously worked at Eastern Washington University, North Carolina State University, and the University of Twente in Enschede, the Netherlands. He received his MSc in Industrial Engineering and Management and PhD in International Technology Transfer from the University of Twente. His research areas relate to the scholarship of teaching as well as technological and economic development related issues such as clusters, technology transfer and diffusion, and innovative technologies

Lindsey A. Gibson is an Associate Professor (Lecturer) in the David Eccles School of Business at the University of Utah. She is currently serving as the Faculty Director for the undergraduate management major. She has more than a decade of teaching experience; specifically, she teaches introductory organisational behaviour as well as upper-division management and leadership courses. Her research interests include workplace incivility, influence tactics, organisational change and experiential management education.

Tolga Ulusemre is an Assistant Professor at Missouri Western State University. He holds a PhD from the University of South Carolina and an MSc from the University of Bath, England. Prior to joining the Missouri Western State University, he held a Faculty positions at Hawaii Pacific University and Georgia Southern University. His research was featured in 3dprint.com and published in *Journal of Business Ethics*, *Asia Pacific Management Review*, *Asia Pacific Viewpoint, Technology Analysis & Strategic Management*, *International Journal of Innovation & Technology Management*, and *International Journal of Information & Operations Management Education*.

1 Introduction: the customer view in education

University education has been viewed, perhaps increasingly and more so in the United States than in other countries, from a business perspective. Under that perspective universities have come up with ideas such as being student-oriented. This typically means that the student is viewed as a customer (Alberts et al., 2010; Rehling and Bjorklund, 2010; Knepp, 2012; May and Tenzek, 2018; Bantha et al., 2020). This view is in-line with the non-ownership perspective and definition of services: in exchange for money, time, and effort, service customers expect value from access to goods, labour, professional skills, facilities, networks, and systems; but they do not normally take ownership of any of the physical elements involved (Wirtz and Lovelock, 2022). In this service perspective, the customer/student is asked about their experiences with the service that the university provides, i.e., the education, and their satisfaction with this process. This is, for example, accomplished through the use of student evaluations of teaching (Simpson and Siguaw, 2000; Titus, 2008; Farhat, 2010; Johnson, 2011). There are at least two problems with this student-oriented approach by universities.

First, it is questionable whether a student can accurately evaluate whether, for instance, they learned the material or whether the right material was introduced. In service operations there is a principle known as 'everyone thinks they are an expert' (Sampson, 2001). This occurs in service operations because in contrast with manufacturing where few people know how something is made, in service operations customers have extensive involvement in the service process (Sampson and Chase, 2022) which makes customers think that they are experts (Sampson, 2001). Customer involvement is because either the customer self is part of the process, or customer belongings or information (Sampson, 2001; Sampson and Froehle, 2006; Wirtz and Lovestock, 2022). Generally though, even in situations where the customer is processed, there are often things that the customer is unaware of so there is variation in terms of how much expertise can be expected from customers.

For example, the service situation of a restaurant where a customer, due to the experience and knowledge they have with cooking and food, is in a position to determine whether the food they ordered was cooked right and whether it had flavour. In those situations, the customer not only has knowledge of what the final product is or should look like, e.g., a steak, but also of the process of getting to that final product, i.e., the cooking of the steak. Although, in a restaurant situation the customer usually does not witness the cooking process.

Another example is airlines where there is a 'false' sense of expertise because although it may look similar to the restaurant situation there are differences. For example, consumers purchase a ticket and after the trip might receive an evaluation survey asking how the trip was. The consumer knows enough about air travel that they can evaluate certain things such as on time departure and arrival, friendliness of staff, etc. However, the variables that impact a high evaluation are often out of the hands of the airline crews such as weather delays, unruly passengers, turbulence, mechanical issues, etc. The consumer typically does not know Federal Aviation Authority regulations, they do not know if the rules were followed correctly, if the air traffic controllers were obeyed, and so on. The consumer feels they are in a position to evaluate the 'experience' yet do not fully understand all of the processes that come into play to deliver the flight experience.

Another situation is that of a hospital. On the one hand this is a similar category of service as restaurants and airlines because people are processed and it involves tangible actions on people (Wirtz and Lovestock, 2022) but on the other hand it is different due to the level of expertise that is involved. If a patient gets operated upon, e.g., a knee replacement, then the patient typically does not know what the end product should exactly look like nor has knowledge of the exact process. For instance, if there is some swelling after the operation, is this normal? And if the operation takes several hours, is this normal? A typical patient does not know this because in contrast with the restaurant example where customers having experience with cooking food or cooked food, they do not have experience with knee replacements. Furthermore, they do not know whether if they had been operated upon by a different surgeon the process (operation) and the outcome of that process (knee replaced) would have been somewhat different for example with less scarring, swelling or pain. However, in hospital situations customers typically recognise their limited level of expertise.

The situation in education is on the one hand different than the above examples because it involves intangible actions (mental stimulus) whereas the above examples involve tangible actions to the person (Wirtz and Lovestock, 2022). On the other hand, it is similar to that of the hospital where despite a different level of expertise involved

customers perceive the service as being similar to restaurants and airlines. This is because the customer/student has experience with educational processes such as through primary and secondary education and based upon that may have thoughts about the educational process. However, this experience is limited in terms of being able to evaluate the teaching process because the latter involves the ability to evaluate for instance pedagogy used in the classroom compared to alternatives and the effectiveness of the specific approach. A typical student has limited knowledge about pedagogy and thus is not really in a position to evaluate it. Furthermore, since the outcome is to learn something but the something is not known by the student, it is also difficult or impossible for the student to evaluate the outcome of the learning process. This is different from let's say evaluating whether a car (outcome) that was purchased is a good car as it can for instance be evaluated that a spare tire is missing from the car.

The second problem with the student-oriented approach is that it assumes that the student does not play that much of a role in the process of education as well as it assumes that the student can be satisfied. Meaning, the implicit assumption is that every student can be taught and that if a student did not learn what he/she was supposed to learn then this is the sole responsibility of the instructor. In other words, it assumes that if the student did not learn something then it must be the fault of the instructor. For instance, there is literature on intellectual styles which encompasses style constructs such as learning styles, cognitive styles and thinking styles (Fan et al., 2021; Kuan and Zhang, 2022). Styles are different from an ability. Ability refers to what one can do, whereas a style refers to how one prefers to uses one's abilities (Zhang, 2002). The learning styles relate to a student's preferred way of acquiring and using information (Entwistle and Tait, 1990; Tait and Entwistle, 1996). Thus, if a student did not learn something then university administrators might blame an instructor for not sufficiently targeting different learning styles in the classroom. However, the literature on learning styles is not conclusive. First, there are different methods of identifying learning styles, see for example Sternberg and Grigorenko (1995), Lawson and Johnson (2002) and Loo (2002). Second, contradicting conclusions exist about whether the learning style plays a role (Sternberg and Grigorenko, 1997; Lawson and Johnson, 2002; Beaudry et al., 2005; Dembo and Howard, 2007; Pashler et al., 2008; Zhang, 2008; Gu et al., 2012; Rohrer and Pashler, 2015; Newton, 2015; Yazici, 2016).

The implicit assumption that every student can be taught and that if a student did not learn what he/she was supposed to learn is the sole responsibility of the instructor is interesting for a couple of reasons. First, it is interesting that in an analogy with sports there is an aspect of talent. If an athlete does not have enough talent then it is quite an acceptable idea that the athlete is not going to 'make' the team. In other words, the blame is not put solely on the coach or trainer but it is an accepted idea that there are some characteristics of the athlete/customer that play a role in whether a certain level of performance or outcome can be achieved. Second, to stick with this analogy for a moment, in sports there may be team try-outs. During this try-out an interested athlete demonstrates their skills and a coach or trainer evaluates these and based on that short experience the potential of the athlete is evaluated. To say that differently, an experienced coach is assumed to have an 'eye' for spotting talent and be able to select athletes that will enhance the performance of the team and that are expected to be coachable. Again, this points to characteristics of the athlete that play a role in the process of coaching and training the athlete further to reach higher performance.

This aspect of student characteristics is typically ignored in the customer-oriented university setting and all students are assumed to be teachable to the same level. Yet, many university instructors have similar experiences as the trainer or coach at try-out day. For instance, after the first class two students may come up to the instructor and both may be asking questions. For one student the instructor may immediately realise that due to the questions asked this student is likely to get an A in the course while for the other student due to the questions asked the instructor will already have a sense that this student is going to have difficulty in the course. In some extreme cases the instructor may even conclude that this student is not ready for the course or college. For example, in the context of teaching operations management there is a heavy dependence on applied mathematics. It may involve financial calculations to compare different machines, expected value calculations, etc. and the ability of students to do those calculations will depend upon their grasp of the underlying mathematics such as algebra, the concept of percentages, etc. These points are some type of 'talent' aspect or 'readiness' to be taught.

The purpose of this paper is to explore this issue of 'readiness' further in a broad context by looking at student characteristics and how these characteristics may play a role in the educational process. This is following the perspective of being learning-oriented rather than the perspective of being customer-oriented.

2 Literature review: student readiness

The literature on primary education provides clear indications that there are student characteristics which play a role in the educational process. In particular, it points to certain steps in learning that influence the ability to move on to other topics. For instance, Kamii (2000) describes the assessment of the conservation-of-number task for kindergartners and first graders. Conservation of number refers to the ability to deduce, through logical reasoning, that the quantity of a collection remains the same when its spatial arrangement and empirical appearance are changed. The procedure involves the interviewer making a row of 8 blue counters at equal distance and asking a child to put the same number of red ones where the child has access to 20 red counters. Three levels are found for students. Children at level 1 cannot make a set that has the same number. For instance, some children put down all the red counters. At level 2, children can make a set that has the same number, but they cannot conserve the equality, i.e., the distance between counters is not equal among the eight. At level 3, children are conservers. They are not swayed by counter suggestions and are able to explain why the two rows have the same quantity. While these are the three main levels there are also some sublevels [Kamii, (2000), p.7]. Thus, there are distinguishable stages of development that children go through. Kamii (2000) relates this to Piaget's theory of cognitive development of children, see e.g., Ginsburg and Opper (1988) and Piaget (1972). Kamii (2000) discusses Piaget's three levels of knowledge according to their ultimate sources and modes of structuring: physical and social which are external to the individual, and logical-mathematical knowledge that consists of mental relationships which is internal to the individual. Logico-mathematical knowledge requires constructive abstraction, i.e., making mental relationships between and among objects such as hierarchical inclusion and order. The levels found in children regarding the conversation-of-number task is, therefore, explained by the mental structures that children gradually develop and that relate to hierarchical inclusion and order by constructive abstraction [Kamii, (2000),

p.12]. What this means is that children are at different stages of cognitive development. Therefore, moving on to some topics may work for some children but not for other children depending upon where they are at.

There are numerous studies on educating at the primary school level, not in the least because there are academic programs for primary school teaching, i.e., to become a teacher. At the university level this is a bit different and there are not specific programs for becoming a university-level teacher. Instead, university professors and instructors are generally hired for their content knowledge and expertise (Chory and Offstein, 2017; Barney, 2019). That means, what they know about the topic rather than what they know about teaching. Nevertheless, similar to Piaget, Perry (1981, 1999) provides a scheme for intellectual development at the university level that can provide insight into student characteristics that influence the educational process. Similarities between Piaget and Perry have been pointed out in several studies (Mellon and Sass, 1981; Perry et al., 1986; Wankat and Oreovicz, 1993). Perry's stages of intellectual development relate to the way of thinking of students and the expectations they have from, and in, the educational process (Chowning and Campbell, 2009; Yassour-Barochowitz and Desivillia, 2016; Johnson et al., 2017). Consequently, this influences the teaching process, the evaluation of this teaching process, and the outcomes of this process. Lawson and Johnson (2002) demonstrated that it is not learning styles that matter, but rather the developmental level.

Table 1 First five positions of Perry's scheme

Stage	*Title*	*Rough description*
Position 1	Basic duality	There is right and wrong. Right answers exist for everything and the authority (instructor) knows them. The authority has to teach them.
Position 2	Multiplicity prelegitimate	When multiplicity occurs (e.g., complexity) then this is either a sign that the authority is poorly qualified or that the authority creates this so that the student can learn to find the answers by themselves
Position 3	Multiplicity subordinate	Multiplicity is perceived with some of its implications such as that if even the authority does not know yet all the truths then the student must settle for less, at least for now.
Position 4	Multiplicity correlate or relativism subordinate	In multiplicity correlate students conclude that there are no absolutes or right answers and this means that everybody is entitled to their own opinion. Consequently, the authority does not have a right to say that the student is wrong.
		In relativism subordinate the authority is perceived to have valid grounds grading in areas of uncertainty. For students the issue now becomes about the way the instructor wants you to think.
Position 5	Relativism	Relativism is perceived as a way of perceiving, analysing and evaluating and not because 'they want us to think this way'. The authority is considered an authority in this relativism where the world is divided into areas where the authority has the answers versus those in which relativism must be used.

Perry (1981, 1999) studied students at Harvard University and based on his findings developed a scheme of cognitive development that consists of nine different stages. Students who move from one position to the next reflect an increasingly complex epistemology in which students are generators of their own knowledge, actively

processing information and changing the cognitive structure, and becoming aware of their personal and professional identity (Badger, 2019). These stages can be separated in 5 + 4 stages. In the first five stages students develop from a position of dualism to a position of relativism. In the last four stages students develop commitment in relativism (Taber, 2020). These nine stages are separated by transition stages. Table 1 provides an overview of the first five stages as this is where the major intellectual development to relativism occurs.

Perry's scheme has been validated in situations outside of Harvard (Burnham, 1986; Moore, 1989; Orona, 2022) and similar to Piaget there is a strong learning connotation, i.e., students cannot understand or answer questions which are in a developmental sense too far above them (Wankat and Oreovics, 1993) and "if we reach too far beyond where they currently are, they will not hear us" [Torreano, (2021), p.13]. This has implications for teaching and Perry's scheme has for instance been used in course design (Ricke, 2018). What it means is that the learning environment matters, see also (Cayubit, 2022; Hemmati and Mahdie, 2020), and connected to this are student perceptions of teaching and learning. For instance, Ricke (2021) found that students in the lowest Perry cognitive positions had negative perceptions about service-learning methods of teaching. Wankat and Oreovicz (1993) provide an insightful discussion oriented on teaching engineering students and how the cognitive development positions relate to classroom expectations of students. This is summarised in the following paragraphs.

- Position 1, basic duality: The professor is supposed to teach correct answers, failure to do so means that the teacher is a bad teacher. The student expects that hard work and obedience will be rewarded.
- Position 2, multiplicity – pre-legitimate: It is possible for the professor to be wrong and some professors are smarter than others. Students expect to solve closed-end problems. Students in this position struggle with design classes where problems have multiple answers. A student in position 2 wants the professor to be the source of correct knowledge and deliver that knowledge without confusing the issues. A good professor presents a logical, structured lecture and gives students chances to practice their skills. From the student's viewpoint a fair test should be similar to the homework where a student can demonstrate that he/she has the right knowledge. Hard work presumably leads to the correct answers.
- Position 3, multiplicity subordinate and early multiplicity: There is still one right answer, but it may be unknown to the professor. The student realises that in some areas the knowledge is 'fuzzy'. This has built-in procedural conflicts. If the professor does not yet know the answer, then how can the professor evaluate the student's work? Honest hard work is no longer guaranteed to produce correct answers and good grades seem to be based on 'good expression'. The big question students ask is 'what do they want?' The methods for evaluation become a very important issue and students want the amount of effort put into something to count. From a student's perspective, a good professor clearly explains the methods used for determining the right answer even if he/she does not (temporarily) know the right answer, and the good professor presents very clearly defined criteria for evaluation.
- Position 4, complex dualism and advanced multiplicity: The student tries to retain a dualistic right-versus-wrong position but realises that there are areas of legitimate uncertainty and diversity of opinion. Students react to position 4 in one of two ways.

They may conform to what the professor seems to want and learn the forms of independent intellectual thought. These students learn that independent-like thought will earn them good grades. The second reaction is that the student may oppose what the professor wants in areas where multiplicity is important. The student may raise this multiplicity of opinions to a pervasive viewpoint that "anyone has a right to their own opinion."[1] This raises areas of multiplicity and uncertainty to equal status with areas of dualism. The danger is that a bland 'anything goes' attitude may prevail. The student may refuse to think since he/she believes that everything can be solved by intuition. An engineer in position 4 can solve problems cleverly and creatively. The task of solving problems becomes a game. Unfortunately, he/she cannot see that some problems are much more important than others.

- Position 5, relativism: A student in position 5 sees everything as relative. Not because the professor wants it that way but because that is the way he/she sees the world. There is a revolutionary switch from position 4 to position 5. In position 5, relativism becomes the common characteristic of everything and absolutes are a special case. One must then determine if complexity is not necessary. In position 4 the position was the reverse (dualism the general principle and relativism a special case). The person in the relativistic position can get beyond the statement 'all opinions are equal' by using the laws of evidence to develop positions which are more likely. From the student's perspective, a good professor acts as a source of expertise, but does not know all the answers since many answers are unknowable. This professor helps students become adept at forming rules to develop reasonable and likely solutions or solution paths. It is important for the professor to show that good opinions are supported by reasons. The student has become much more comfortable with being evaluated in a relativistic world and realises that the evaluation of his/her work is not of him/her.
- Summarised briefly: Dualist students want to receive information, multiplicity students want to learn how to think and relativism students want to exercise their ability to think (Myers, 2010).

Perry's cognitive positions are not the same as student performance. Marra and Palmer (2004) provide an example of two students in the same cognitive position but with substantially different grade point average, i.e., 2.26 versus 3.66. Furthermore, Wankat and Oreovicz give an example in engineering where "students who are academically very good but are struggling with moving to a multiplicity position can often hide from the challenges of multiplicity through competence (their design is likely to have fewer technical errors and they receive good grades)" [Wankat and Oreovics, (1993), p.272]. Heikkiläa and Lonka (2006) looked at why some intelligent students fail while seemingly less capable students do well in their studies. They found that approaches to learning, regulation of learning, and cognitive strategies were related to each other, and further, to study success. Cognitive development stage is also different from learning styles which relate to a student's preferred way of acquiring and using information (Murrell, 2004). With the above in mind, the goal of this study is to explore this topic more and look at Perry's cognitive development levels of students to get insight into the situation at a particular university. The main research question is: what is the Perry level of cognitive development of business students?

3 Methodology

An established and validated research instrument was developed by Moore (1989) to determine Perry's stages of intellectual development and this is available through the Center for the Study of Intellectual Development (CSID) in the State of Washington. While other validated instruments exist, see for example Zhang (2004) and Ghosh (2021), since this instrument was already established it was adopted in this study as has also been done by others, e.g., Marra and Palmer (2004). After collecting the surveys they were sent to the CSID where an independent scorer processed them, leading to a Cognitive Complexity Index (CCI) score for each student. The CCI reflects a single numerical index along a continuous scale of intellectual development roughly analogous to position 2 to position 5. The CSID then sent these scores back including an indication of how the scores relate to the Perry positions. For instance, a CCI score of 200 to 240 equates with position 2.

The survey was deployed in three different situations. At University A the survey was deployed in a regular fall term at both the undergraduate (65 students) and graduate (38 students) level in the College of Business so that it could be determined whether differences in intellectual development stages existed. The 65 undergraduate students were mostly 3rd year students in the Bachelor of Science in Business Administration and the 38 graduate students were a mix of Master's of Business Administration students and students in a Master's Program of Organizational Change. The survey was also deployed at University B at the undergraduate level, during a regular fall term and a summer term, also for 3rd year business students (113 students), to determine whether the patterns found in one context were also apparent in a different context. University A is a private, teaching-oriented university in the US with roughly 4,000 students and indicated as selective in terms of student admissions. University B is a public, regional teaching-oriented university in the US with roughly 10,000 students and indicated as less selective in terms of student admissions by US News and World Report.

4 Findings

Figure 1 shows the overall distribution of the sample where the CCI scores have been translated into Perry positions based on indications from the CSID. This shows that the business students at these regional and teaching-oriented universities show variety in their stage of intellectual development where the median is position 3. None of the students are in position 1 or the transition from stage 1 to stage 2, and none or in stage 5.

The findings show that for the overall sample the median value is position 3. In fact, 57% of the students are in position 3 or less. This means that, at least for these regional and teaching-oriented universities, there is a significant portion of students that are still struggling, cognitively, with the concept of multiplicity.

Figure 2 shows the undergraduate students from University A compared with the undergraduate students from University B. For comparison purposes the number of students in each position has been translated into a percentage of the total.

Figure 2 shows that the median value for University A is the transition from position 3 to position 4 while for University B the median value is position 3. In order to determine a statistical difference, a two-sample t-test was conducted using the CCI scores. The 113 undergraduate students from University B had lower CCI scores

(M = 306.92, SD = 45.47) compared to the 65 undergraduate students from University A (M = 328.25, SD = 51.88), t(176) = 2.86, p = 0.004. It should be noted that the mean CCI score of 306.92 for University B and the mean CCI score of 328.25 for University A both represent position 3.

Figure 1 Total distribution of the sample

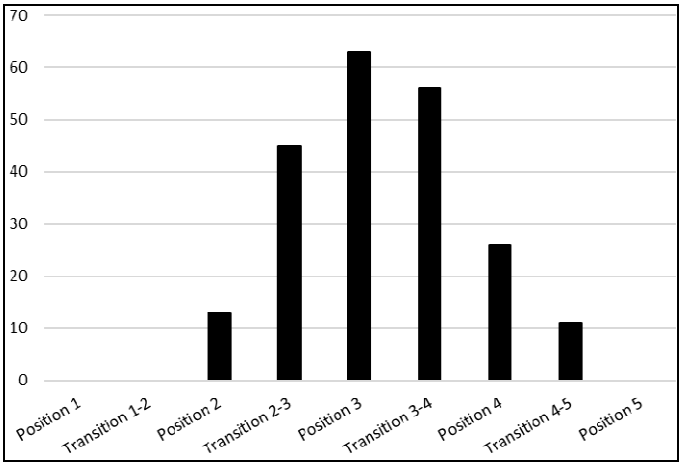


Figure 2 Comparing undergraduate students at different universities

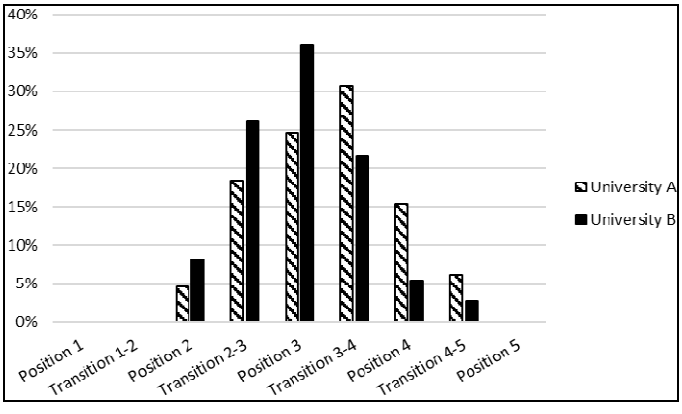
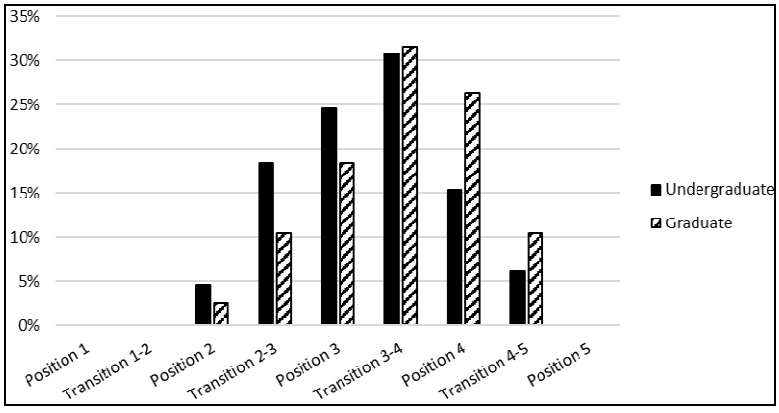


Figure 3 shows the undergraduate students at University A compared to the graduate students at University A. The absolute numbers of students has been translated into a percentage to ease the comparison between these two groups of students.

Figure 3 shows that the median value at University A for undergraduate and graduate students is the same, i.e., the transition from position 3 to 4. However, Figure 3 also shows that graduate students overall tend to be at a higher stage of intellectual development. In order to determine a statistical difference, a two-sample t-test was conducted using the CCI scores as these are more detailed than the position scores as the latter means grouping students. The 38 graduate students had higher CCI scores (M = 350.03, SD = 52.20) compared to the 65 undergraduate students (M = 328.25,

SD=51.88), t(101) = 2.05, p = 0.043. It should be noted that the CCI score of 350.03 for the graduate students represents the transition from position 3 to 4 whereas the CCI score of 328.25 for undergraduate students represents position 3.

Figure 3 Comparing graduate and undergraduate students



5 Discussion

Based on the results presented in Section 4, three types of variation were found: variety across program levels (Subsection 5.1), variation across universities (Subsection 5.2), and variation within a program level (Subsection 5.3).

5.1 Variety across program levels

The comparison of undergraduate and graduate students from Figure 3 reveals that the graduate students are generally at higher positions in terms of cognitive development stage than the undergraduate students. Nevertheless, some students were still observed in position two, i.e., basic duality.

Observing that graduate students are at higher positions in terms of intellectual development is intuitively not surprising. One would expect that students cognitively develop as they get older and move through academic programs. Instructors may also implicitly or explicitly adjust to this because they know courses are at different levels. Furthermore, the material may also be different. For example, a graduate level course on a new topic is different from a core lower-division business core in a well-developed topic area. The latter may lean more towards dualism with clear right and wrong answers where a new topic in a developing field may lean more towards relativism as there will be ambiguity in the theories and explanations. Nevertheless, some studies have shown that this general notion of hierarchical and sequenced progress is not always correct (Hofer, 2020). Wise et al. (2004) found no statistically significant change in Perry position for students in their 1st and 3rd years while Zhang (2004) found that the cognitive-development pattern was reversed for students in China. Lee and McAdams (2019) found no improvement in cognitive position in the context of experiential learning. Furthermore, Kennan et al. (2018) found no statistical relationship with age and

found that adult students in online environments connected with Perry's lower levels of development (e.g., dualism), where the instructor is viewed as the authority with all of the answers.

The implication for teaching is that higher (lower) program levels may require instructors to design a classroom learning environment that fits with higher (lower) cognitive development stages. For instance, in lower level courses with more students in early stages of cognitive development it may be more appropriate to target dualism and work on activities that could help to develop students cognitively towards multiplicity whereas at higher level courses it may be more appropriate to create a learning environment around relativism and working on cognitive development towards commitment. Marra et al. (2000) provide an example of a first-year engineering design course where students who completed the course on average were rated at nearly one half a position higher than their counterparts who had not completed the course while Burns et al. (2016) demonstrated how targeted discussion helped capstone psychology students to a higher cognitive development position.

Another implication for teaching is that a broad-brush approach to teaching across an institute is probably inappropriate. For instance, some universities may tell their instructors to have standardised syllabi, clear directions, or have certain explicit grading criteria, etc. However, the demands from students in different cognitive development stages vary. Positions 1 and 2 students will look for explicit grading rules but position 5 students will understand that context can play a role. In that regard it would make sense for universities to work on helping students achieve higher cognitive development positions by following a coordinated approach across different program levels. Additionally, it should also be noted that the cognitive development level may depend upon the area of study, meaning that how this is accomplished may differ by field. For instance, Wankat and Oreovicz (1993, p.273) note that many engineering graduates with both baccalaureate and advanced degrees seem to be in positions 3 and 4, i.e., regardless of the level of the program, and that graduate work in engineering and the physical sciences is similar to undergraduate work in the humanities in the sense that both confront the student with multiplicity and uncertainty [Wankat and Oreovicz, (1993), p.272].

5.2 Variety across universities

When comparing these two teaching-oriented universities it is observed that the students at University A tend to be at a slightly higher position of intellectual development, see Figure 2. While these universities are located in different parts of the country and many different reasons can exist for this difference it is interesting to note that University A is more selective in its admissions than University B. Note further that Perry (1981, 1999) came up with nine different positions in the context of Harvard University, i.e., a private research university with most selective admission requirements, whereas in many other studies it has been found that students typically are not in the highest cognitive development levels (Wankat and Oreovics, 1993; Burns et al., 2016). In addition, a study by Marra et al. (2000) at Penn State University Park, i.e., a large public research university with more selective admission, found that 77% of (freshman) engineering students were in a position of multiplicity while in another study they found that the low end of their senior (engineering) students are in position 4 (Marra and Palmer, 2004).

What this means is that the context of the learning environment, i.e., the teaching, at different universities can be quite different. Based on this it may mean that more selective universities end up getting students that are further along in cognitive development which facilitates even more cognitive development. For instructors, it will be important to get a sense of the cognitive development levels of students at the university where he/she is teaching. What will complicate matters is when an instructor moves to another university which falls in quite a different category. The country and culture in which the university is located are also important (Zhang and Watkins, 2001; Zhang, 2004). Course materials may play a role as well. Harvard course materials such as Harvard Business School cases may have a lot of appeal among instructors and they may be suitable for Harvard students' cognitive development level but that does not mean they are 'the best' or suitable for other schools. The Harvard case study method generally includes ambiguity and class discussion may be oriented on developing commitment to a particular position. This may work very well at Harvard, but may not be suitable at schools where students are at lower positions in cognitive development. This was also shown by Ricke (2021) who found that using service-learning may be more valuable to students at higher cognitive development levels. What this also indicates is that there may not be a 'best practices in teaching' approach and that teaching may have to be adjusted to the cognitive development position of students in a particular university.

Also, the type of program is related to the cognitive development position and this relationship can go both ways. For instance, students in position 2 may prefer engineering classes to humanities classes because the problems fit their dualistic mode of thought [Wankat and Oreovicz, (1993), p.271]. And, if, as Wankat and Oreovicz (1993, p.272) observe graduate work in engineering and the physical sciences is similar to undergraduate work in the humanities as both confront the student with multiplicity and subjectivism, then this might mean that universities in the liberal arts tradition may be in a better position to help students with their cognitive development.

5.3 Variety within a program level

Both universities show a wide variety of cognitive development for undergraduate business students varying from stage 2 to the transition of stage 4 to stage 5 as can be seen from Figure 2. This potentially leads to difficult teaching situations where the learning environment can create a mismatch for certain students. This will influence the student's evaluation of the situation.

However, it is not clear what the exact consequences are of this variety in terms of learning or progress in cognitive development positions or how it relates to certain teaching elements.

Schrader (2004), in looking at how safe students felt in the classroom, noted that in an environment where the professor designs unstructured experiences, some students' responses (in low Perry positions) might be discomfort, fear, or anxiety yet for other students (in high Perry positions), such an environment would be the most welcoming to them and they would relish the opportunity to explore ideas as an equal participant with a professor and other students, feeling intellectually challenged and empowered. Thus, creating a situation of mixed student satisfied in the classroom.

Myers (2010) found that class participation varied depending upon the cognitive development position. In particular, multiplicity students ask more questions than dualist students, and contextual relativist students are more involved in classroom interaction

than multiplicity students. Cognitive development stage can also influence the perception of collaborative learning, such as occurs in flipped classroom designs. For instance, for students in low Perry positions collaborative learning can be viewed as a waste of time because peers are not seen as a credible source of knowledge (Stover and Holland, 2018). Marra and Palmer (2004) looked at four themes: teaching and learning, problem solving processes, group work, and the 'whole' college experience. They found that students in high and low Perry positions had similar views on teaching and learning, and group work but had different perspectives on the 'whole' college experience and problems solving. For the latter, lower cognitive position students struggled with ill-structured problems (ambiguity). The college experience was perceived differently as well where students in higher cognitive development positions view knowledge as relative and contextual and therefore consider exposure to experiences and different contexts both inside and outside the classroom as valuable whereas for students in lower cognitive development stages, in a world of right and wrong, knowledge of context is unnecessary (Marra and Palmer, 2004).

Interestingly, Marra and Palmer (2004) found that students in various cognitive development positions held similar views on group work. That means students were mostly positive about group work although they had different reasons. High cognitive position students focus on the experience that helps make them aware of multiple perspectives while students in lower cognitive positions focus more on practical aspects. For students in the lower cognitive position it matters for example that group members contribute their fair share and students view group work as something that they will experience in future work environments. Lovell and Nunnery (2004) had slightly different findings on perceptions of group work in their study where they created homogeneous and heterogeneous groups of students in terms of cognitive position. Students in position 3 and lower were more satisfied with homogeneous groups whereas for students in position 4 and higher their satisfaction level did not differ based on whether they were in homogenous groups or not. This can be explained because in homogeneous groups there are shared experiences and less ambiguity so that it easier to deal with for students in lower cognitive development positions. For students in higher cognitive development positions it does not matter that much whether groups are homogeneous or not and while group work is not necessarily viewed as a waste of time, it is often considered a means to an end. They want to make sure that individuality is respected (Lovell and Nunnery, 2004).

In terms of the variance that occurs within a program level, this creates a challenging situation for instructors because they have to deal with students of different cognitive development levels. Students at low cognitive development levels may not be able to handle tasks at higher development levels whereas students at high cognitive development levels may get disappointed as they are for example asked to learn in a dualism learning environment. Variation of student cognitive development positions may in particular occur for universities that have fairly open admission standards as they will recruit a large variety of students.

6 Conclusions

While some studies have argued that learning styles matter for student learning as they indicate a preference for certain methods of learning (Sternberg and Grigorenko, 1997), and while some have argued that what matters for student learning is the type of activity that the instructor designs for students to engage in (Biggs, 1999), this study finds that the learning environment may be more or less suitable for a student depending upon Perry's cognitive development positions.

Let's return to the analogy of the sport try-out that was introduced earlier in this article and add some nuance to the situation. If a potential athlete does not meet the requirements for the team, this does not mean that the athlete is not capable of doing the sport. What it means is that there is a mismatch between where the team and coach are versus where the athlete is. Perhaps the athlete is at an early stage of development in terms of the skills in the sport. The gap between the athlete and the team is too big and the athlete might not be able to progress with the team as for example certain drills would be beyond the current capabilities of the athlete. However, there might be another team that would be more appropriate for the athlete. In other words, there is an issue of fit between the athlete and the team.

Similarly, Perry's cognitive development positions provide a measure of fit between where students are at and the learning environment. However, in this study, variations were found in terms of cognitive development levels for

a different universities

b different program levels within a university

c at the same program level.

6.1 Implications

For students, variety at the program level means that dependent upon the course materials and for example the level of ambiguity or complexity in the course there may or may not be a fit. A consequence of this fit is that for students that do not have a fit with the learning environment the learning process may become a frustrating experience. This is logically more so for students that are in a lower cognitive development stage than the learning environment than those that are in higher cognitive development stage than the learning environment. For instance, a student that is in position 1 but is in a learning environment that operates in position 5 will have a frustrating experience because the black and white answers do not exist. Consequently, the fit between the position of the student and the learning environment will influence the outcome of the educational process as well as the evaluation of this process by the student.

For instructors, it is important to become aware of the cognitive development stages that students are in. It can also help to interpret student course evaluations at the end of the course. Instructors can use the Perry scheme to help them to teach. For instance, this study and other previous studies have shown that undergraduate students tend to be around position three. However, the variety that occurs in programs and courses means that instructors have a challenging task because students are expecting different things from instructors. Furthermore, where for example the discussion on learning styles advices instructors to teach to a variety of learning styles, it is unlikely that this will work

for the cognitive development level because these students are in a different stage and require quite different things. However, what may be possible is use specific scaffolding activities (Saunders and Budd, 2020) and to bring in specific course elements that help students to move to higher cognitive development levels such as indicated by Marra et al. (2000), Burns et al. (2016) and Li and Zhu (2020).

For universities and administrators, it is important to recognise that the view of education as a service is different from that of many other service situations because it involves intangible actions, that is, mental stimulus (Wirtz and Lovestock, 2022) which means that the service itself is linked to the mental capabilities of the customer, that is student. Since there is variety of student cognitive development positions in courses and programs, this influences the student experience. Universities should provide information on the overall distribution of cognitive development to its instructors and discuss them in order to help instructors and in order to make the teaching more effective. Certain approaches that are generally promoted across a university may not be effective for certain groups of students. Based on the variety of cognitive development positions found in this study, both within and across different program levels, means that the customer-oriented approach is a challenging proposition because different positions require different things from education. What may be a potentially interesting approach for universities is to design programs with specific cognitive development progress in mind across the different years. Universities usually have general learning objectives about communication, critical thinking, etc. and adding cognitive development would be helpful for students as well.

6.2 Limitations and further research

A limitation of this study is that it is mostly exploratory and descriptive in nature and only involved a few comparisons these are limited in nature and it is not clear whether this applies more generally. Hence it is recommended that this study be expanded and to have additional comparative studies that measure student cognitive development level at similar programs and courses across multiple universities. It is also recommended to explore the potential link between admissions standards and the cognitive development stage of incoming students. Furthermore, Perry's scheme seems to be beyond its peak in terms of research attention even though it may provide great insight into the academic learning environment. We recommend more research in general to spread this insightful scheme. For example, there are some indications that thinking styles may be related to Perry's scheme (Zhang, 2002; Zhang and Sternberg, 2006; Kasapoglu, 2020) which deserves more research. Last, while Perry's work and the cognitive development stages is primarily oriented on the student side and measuring what students prefer, it would be interesting to look more at the instructor side in a similar context. For example, do instructors have a preferred approach that fits more with certain cognitive development stages? Some instructors might be more comfortable with teaching black-and-white course material while others might be more comfortable teaching a case study approach that relies on students in the relativism stage. Another potential avenue for more research is the relationship of cognitive development with the service marketing concept. In particular, one category of service is that of intangible actions on people and since, for example in the case of education, this can involve mental processing it would be good to

do more research on how the mental state of the customer, such as their cognitive development stage, influences the service process.

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Notes

1 Which can lead to frustration from instructors who want students to back up their opinions with facts (Mellon and Sass, 1981).