Price Elasticity Concept in Pricing and Non-Pricing Contexts: Learning Activity

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Purpose of Study: The primary goal of the present activity is to transform students into active learners by soliciting their ideas about the application of the elasticity concept in a variety of non-pricing contexts.
This is in line with knowledge transfer principle - application of a target concept in a variety of different contexts helps in developing procedural knowledge.

Method/Design and sample: Assessment of the learning activity is based on both student self-perceived learning and exam performance (direct measure). 148 students attended the class, participated in the activity, and completed the surveys. Next, performance of student participants on price-elasticity related portion of exam was compared with that of student non-participants (who missed class when the activity was introduced).

Results: The learning activity was found to be useful in deepening students' understanding of the price elasticity of demand and increasing their confidence in applying this concept in a variety of non-pricing contexts. Student perceptions of the learning activity and their comments were very positive. In addition, the results suggest that learning activity positively affects students' performance on exam.

Value to Marketing Educators: Consumers' price sensitivity affects many decisions in the retail industry. It is essential for retail managers to have an in-depth knowledge of price elasticity concept to design successful marketing strategies. However, this topic, like other pricing topics, presents a great challenge for students. Despite such challenge literature review reveals that only a few authors introduce price-related learning activities. The present learning activity helps students move away from a dry memorization toward mindful learning by engaging them with the subject matter and developing a procedural knowledge of the elasticity concept.

Keywords: Retailing Education, Price Elasticity, Learning Activity, Knowledge Transfer Principle.

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In the retail industry, pricing and promotion strategies are often developed based on consumers' price sensitivity (Mulhern, Williams, & Leone, 1998). Price sensitivity affects many important decisions, including identifying merchandise that can withstand regular price increases, selecting profitable markdowns, determining stock levels and assessing the success of differential pricing across stores or retail market areas (Mulhern et al., 1998; Fernie, Fernie & Moore, 2014).

Although demand tends to be inelastic in oligopolistic and monopolistic markets "where consumers have nowhere else to shop" (Fernie et al, 2014, p. 95), there is a different way for retailers to make their customers less price sensitive, which is beneficial to both parties: developing unique merchandise that is distinctive and attractive to consumers (Elliott & Rider, 2007) and introducing limited edition items and achieving differentiation and a superior profit margin (Fernie et al, 2014). A value-based (vs. cost-based) pricing approach allows retailers to maximize revenues and secure customer loyalty and future sales by capturing consumers' willingness to pay more for value (Mills & Treen, 2016).

Knowledge of price elasticity is also important to develop promotion strategies that are a prominent feature of the retail industry. Most retailers offer some type of promotion throughout a year, but the heaviest promotion period is before Christmas: "…for nearly all retailers, the three months leading up to Christmas are their most important in terms of customer demand" (Fernie et al., 2014, p. 183). Price promotions also help to provide immediate cash, generate demand for slow-selling products, and move excess stock at the end of a designated sales period (Fernie et al, 2014).

However, "…mark-downs can have a detrimental impact on margin targets if these are not managed carefully" (Fernie et al, 2014, p. 174). To successfully predict sales, managers need to know not only their merchandise and price structure of the items but also a "connection" between these two factors – price elasticity of demand.

Despite the importance of price elasticity, retail textbooks cover this topic in a very technical manner that does not appeal to students or enhance their motivation to learn (Dickinson, 2002). Moreover,

pricing topics in general were found to present great challenges for students (Pilling, Rigdon & Brightman, 2012) due to their complexity and insufficient class time devoted to these topics (Marshall & Pearson, 2007). Based on the authors' experience, students who have already taken some economics classes continue to encounter difficulties in estimating and interpreting the price elasticity coefficients.

Although there is a great need to strengthen students' quantitative skills and such skills "can be emphasized through the design of specific quantitative exercises" (Pilling et el., p. 180), a literature review reveals that only a few authors introduce price-related learning activities (Abernethy & Padgett, 2001).

The primary goal for developing this learning activity was to move students away from a dry memorization process toward mindful learning by engaging them with the subject matter and developing a procedural knowledge of the elasticity concept. The conceptual framework for this activity is Ramocki's (2007) knowledge transfer principle, which represents a bottom-up learning process. The author suggests that the application of a target concept in a variety of different contexts during the actual learning process helps in developing procedural knowledge. The further a concept is applied from the domain in which it was originally learned, the better its retention and the easier its retrieval in other situations in which the concept may also be helpful (for example, application of the perceptual mapping technique to display Shakespearian characters**;** see Ramocki, 2007). In a similar vein, Diamond, Koernig, & Iqbal (2008) suggest that the application of strategic marketing tools in different contexts increases the breadth and depth of understanding. Although the logic of the elasticity concept is the same regardless of the application context, the transition from one context to another provides students with opportunities to "test" the concept from a novel perspective. Students can thus organize facts and ideas in a conceptual framework that becomes a basis for procedural knowledge (Bransford, Brown, & Cocking, 2000).

LEARNING ACTIVITY

The learning activity begins with a description of the law of demand, which discusses the inverse relationship between price and quantity demand. This relationship is intuitive: when price falls, demand increases because more people are willing to buy a product (and to buy larger quantities of said product), and vice versa. The instructor should note that prestige pricing demand with an upward-sloping function will not be considered in this activity.

To further clarify the rich and dynamic relationship between price and demand, the instructor should discuss the cause-and-effect relationship between these factors and the loci of control. Changes in market demand may or may not affect a firm's decision to change its price, whereas noticeable price changes a firm makes will always affect the demand for its products. Because marketers do not control aggregate demand in a market, they must conduct research both to determine changes in market conditions and predict future demand if a product's price changes.

The price elasticity concept and formula for estimating price elasticity coefficient, which is a further extension of this discussion, are subsequently introduced. This concept not only relates price and demand but also indicates whether demand is more or less sensitive to price changes. The numeric value of the price elasticity coefficient represents the percentage of the change in demand that will occur with each 1% change in price. When students realize that the effect of price on demand can be quantified regardless of unit differences (dollars vs. quantity of products), it will be easier for them to understand how markets can be divided into elastic and inelastic. The rule is simple: if demand changes by more than 1% (less than 1%) for each 1% change in price, the demand in the market is elastic (inelastic).

After completing the "percentage" part, the instructor should re-emphasize that this measure is theoretically applicable in many areas as it is unit free measure. A couple of examples from different areas are advertising elasticity of demand and tuition elasticity of education.

Before inviting students to provide their own examples, the instructor should check if they have understood all "ingredients" of the concept and their relationships. In the first unrelated factors example, the instructor should ask if it is possible to measure the furniture weight elasticity of demand in a store. Although technically this is possible, students may question if furniture weight actually affects store sales. Then, the instructor may introduce a better factor: store interior design. When students agree that interior design may have strongly affect sales, the next question to ask is how changes in interior design can be measured. Is it possible to measure changes in colors of walls, shapes of displays, furniture styles, and so on? The next step is to give the right example. For example, shelf-space elasticity measure relates sales to the space allocated to an item in a store and is an important marketing tool in retail (Eisend, 2014).

As price elasticity depends on a macro environment, it is also useful to illustrate such a relationship before asking for students' examples. For example, the instructor may suggest discussing the competition's (number of competing stores in the neighborhood) elasticity of demand. If only one store exists in the area, consumers' price sensitivity should be low. However, consumers may become very price sensitive with a significant increase of stores in the neighborhood. Next, the instructor can introduce some factors that decrease consumers' price sensitivity regardless of competition, such as unique merchandise, outstanding customer service, or established brand and reputation.

Now, students should be ready to explore other areas and generate their own interesting applications. At this point in the exercise, the class is divided into

three-member groups (with four or more members, face-to-face communication may become less efficient). Each group needs to generate three examples – one for each member – and all members should help each other during this process. Group interaction helps to create a comfortable psychological environment, which is critical for conversational learning. According to Kolb & Kolb (2005), people "make meaning from their experiences through conversation" (p. 207), but traditional class format highly restricts genuine conversations among students on subject topics.

When students start presenting their examples, the instructor should ask questions about all elasticity ingredients and the name of a specific elasticity. The naming rule is easy: start with the cause, then insert the word *elasticity*, and add the effect at the end.

Students may list different factors, ranging from packaging to competitive actions, all of which may affect demand for a particular product but may be frozen at the beginning to provide interesting examples. If students are unable to provide such examples, then the instructor should take the lead. For example, outside temperature may theoretically affect demand, especially in certain product categories (e.g., outdoor goods and clothing). Interestingly, neither temperature nor demand is under the firm's control in this example. In addition, these factors may have a non-linear relationship. However, measuring such strange elasticity may possibly provide useful insight for sales forecasts.

"One more example may illustrate the impact of macro environment in a funny way. For example, it is possible to measure altitude (floor level or number of stairs) elasticity of demand in a particular store. While students may list such factors as unique merchandise, customer loyalty, and so on, they may overlook such factors as elevators. Broken elevators may significantly increase customers' altitude sensitivity."

Typically, numerous interesting examples can be discussed in class. What about gift (number of) elasticity of asking (frequency) or food (pounds) elasticity of pets' happiness? We also discussed snowfall (inches) elasticity of skiers, talkativeness (the number of words per minute a shop assistant "produces") elasticity of demand; in-store music (loudness) elasticity of consumers' mood, and cat (number of) elasticity of owner's craziness, to mention a few. In the social spheres, we discussed friend (number of) elasticity of happiness, personal-efforts elasticity of success, workout-time elasticity of life satisfaction, and many others.

One useful feature of this assignment is that every student's suggestion is open to criticism from an instructor and other students. According to Fowler & Bridges (2012, p. 161), immediate feedback "prompts immediate reflection" that helps to further enhance students' understanding. The instructor should plan to give students some time for discussions not only at the beginning of the activity but also at the end of class to vote for the craziest example and share their experiences with and thoughts and ideas about the activity (Black & Wingfield, 2008). Giving students an opportunity to individually reflect on and make meaning of their current experiences will further improve learning outcomes (Bunker, 1999; Keeton, Scheckley, & Griggs, 2002). Entering into "a fearless communication with each other" results in significant "conversational learning" (Kolb & Kolb, 2005, p. 207).

Next, to reinforce the learning, the instructor should give students a brief in-class assignment for a few extra-credit points (see Appendix A). The instructor should ask students to write down their additional examples with all "operational" details that were not discussed in class.

ASSESSMENT

The assessment of learning activities is typically based on students' perceived learning (Karns, 2006; Sitzmann, Brown, & Bauer, 2010), which may not be a good indicator of actual learning outcomes (Bacon, 2011). Nevertheless, grades "may not be indicative of the separate effects of specific learning activities" (Karns, 2005, p. 165). Thus, student self-reports on how a learning activity contributed to their learning may constitute a compromise approach (Karns, 2005). For the assessment of the learning activity, both qualitative and quantitative data were collected and analyzed.

A total of 148 students participated in the survey (56.1% males, 21.3 y. o. average age, 71.5% juniors). The questionnaire items were borrowed from Pearson, Lawrence, & Hickman (2007) and Vander Schee (2012) and then were topically modified (see Table 1). At the end of the survey, students could leave comments, and they were assured that their responses would remain confidential.

Table 1. Bonferroni Paired Comparison of the Scale's Items (n=148)

NN	*Questions/Items*	*Mean (M)**	*Standard deviation (SD)*
1.	Recognize that the concept of elasticity may be applicable in different areas.	5.41	1.38
2.	Recognize the importance of the price elasticity of demand as a diagnostic tool.		1.32

		5.04	
3.	Gain a greater understanding of the price elasticity of demand.	4.80	1.36
4.	Overall, I would rate this assignment as a good learning activity.	4.75	1.44
5.	Overall, I would rate this assignment as an enjoyable classroom activity.	4.48	1.71
6.	Clarify all of my questions about this concept.	4.47	1.41

*Level of agreement mean rating with Likert-type scale where 1=*strongly disagree* and 7=*strongly agree*.

The written comments from students were favorable, as shown in these typical examples: "I took economics for a whole semester, and in just 40 minutes, you have explained it better than I learned in the econ class" and "This was a fun, creative exercise, and it kept my attention. Got to think outside the box" (see Appendix B for other comments).

The results of the one-sample t-tests (with Bonferroni adjusted $p = 0.05/6 = 0.00833$) showed that the means of all items were significantly higher than the midpoint, which indicates that student perceptions of the learning activity were on the positive side of the scales. The highest rated statement was that pertaining to the students' recognition of the applicability of the concept in different areas ($M = 5.41$), and the lowest rated statement was that pertaining to the students' perception that the activity clarified all of their questions about the concept ($M = 4.47$).

The data were then analyzed in a series of paired t-tests in an attempt to assess different outcomes of this learning activity. The p value was adjusted using the Bonferroni method to account for multiple comparisons (Bonferroni adjusted $p = 0.05/15 = 0.00333$). There were eight significant differences of 15 possible comparisons. Most of the observed differences were intuitive.

Not surprisingly, the respondents' recognition of the wide applicability of the concept was rated significantly higher than all other items. The respondents' understanding of the essence of the concept was rated significantly lower than their recognition of the wide applicability of the concept. The positioning of this item is not unexpected, as any newly acquired knowledge requires time to be fully "digested." The lowest mean group of items measured the respondents' perceptions of the activity as good and enjoyable and their perceptions that the activity clarified all of their questions regarding the concept. The latter factor was rated significantly lower than the respondents' understanding of the essence of the concept. The respondents' rating of the activity as enjoyable was significantly lower than their rating of the recognition of the importance of price elasticity as a diagnostic tool and their recognition of the wide applicability of the concept.

Interestingly, these results reveal that enjoyment of the activity was not the top-rated item, as is typically found in many other learning activities. It is likely that the demanding learning context and the "painful" thinking process did not allow the students to completely relax during the activity. Regarding the clarification of all questions related to the elasticity concept, it was too early for this statement to move to a higher position. One learning session could not clarify all questions.

Next, the effectiveness of the learning activity was assessed using direct measures. In the fall of 2015, two weeks before the second exam (covering the price elasticity topic), this learning activity was conducted in a large six-section undergraduate marketing class. Although the total registered number of students was 236, only 148 students attended the class, participated in the activity, and completed the surveys immediately after the activity. This approach was the only feasible means of dividing the large class into two groups: treatment and control. The rate of student attendance (approximately 63%) during the treatment day did not differ greatly from the rate on other days. To prevent an increase in attendance, this activity was not announced in advance. To determine whether a treatment group contains better-performing students (who always attend lectures), a t-test for samples with unequal variances was conducted and did not show any significant differences in student performance on the first exam ($M_c = 75.37$ vs. $M_t = 75.34$, $p = 0.979$).

Six questions on the concept of price elasticity were incorporated into the second exam. The effectiveness of the activity was assessed by comparing the grades that the students received on all six price-elasticity questions. The students' answers to these questions were converted into a corresponding percentage grade. For example, if a student answered all six questions correctly, he or she was assigned 100% as a grade. The results of one-tailed t-tests revealed significant differences in the mean scores (see Table 2). The treatment group scored significantly higher on the price elasticity portion of the exam ($n = 148$, $M = 71.9$) compared with the control group ($n = 86$; $M =$

66.0; *t* (232) =-1.907; *p* = 0.029; one-tailed, Cohen's *d* = 0.259). These results suggest that learning activities actually affect students' performance on exams.

Table 2. Direct Measure Assessment.
Independent Samples T-test Results for Exams 1 and 2.

Outcome: Exam Score	Control Group			Treatment group			95% CI for Mean Difference	t	Sig. (2-tailed)	df	Cohen's d
	M	SD	n	M	SD	n					
Exam One	75.37	8.77	86	75.34	11.05	148	-2.55, 2.61	0.026	0.979	210.54	
Exam Two Six Questions on Price Elasticity	66.00	24.04	86	71.95	21.91	148	-11.94, 0.19	-1.907	0.058*	232	0.259

* p < .05, one-tailed.

CONCLUSIONS

The learning activity was found to be useful in deepening students' understanding of the price elasticity of demand and increasing their confidence in applying this concept in a variety of non-pricing contexts.

In addition to good learning outcomes, this activity has several advantages. First, this activity is flexible. An instructor may use only a single class period or several class periods throughout a semester to present the elasticity concept in different contexts. Another advantage is that this activity can be easily expanded to introduce additional pricing topics. For example, students could learn how the price elasticity of demand affects sales. Another possible topic is cross-price elasticity.

Managers should have an in-depth knowledge of price elasticity concept and the factors that affect it to design successful promotion and pricing strategies (Foxall, Yan, Oliveira-Castro, & Wells, 2013) to achieve growth and profitability. Price elasticity is a central input to marketing strategy that usually specifies decisions such as price and advertising and related outcomes that imply "one or more elasticities" (Kamakura, Kopalle, & Lehman, 2014, p. 123).

The topic of price elasticity "will not come easily to many students on their first readings" (Quddus & Bussing-Burks, 1997, p. 59). It involves percentages, and these calculations may be confusing for students (Pilling et al., 2012). The presented learning activity equips students with procedural knowledge and brings "the real world into the classroom in new and exciting ways" (Gray, Peltier & Schibrowsky, 2012, p. 233).

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APPENDIX A

In-class Assignment on the Elasticity Concept

Come up with two interesting and related factors and provide the following information:

- List two related factors.
- Indicate which factor is the cause and which factor is the effect and loci of control (people vs. outside uncontrollable factors).
- Indicate what type of relationship they have (negative or positive).
- Determine how factors can be measured.
- Provide your thoughts on whether the relationship between the factors is elastic or inelastic.
- Interpret the elasticity coefficient.

Two factors:
Cause and effect:
Relationship between factors and loci of control:
Measures of factors:
Your thoughts about elasticity:
Assume that you estimated the elasticity coefficient, and it equals 3. Please explain what 3 means.

APPENDIX B

Student Comments on Learning Activity

- I took economics for a whole semester, and in just 40 minutes you have explained it better than I learned in the econ class.
- Taking the topic and applying it to different areas is a good way to understand the topic.
- This was a fun, creative exercise and it kept my attention. Got to think outside the box.
- Good way to teach the application of elasticity.
- It was presented well and simple enough to understand.
- I like that activity because it's interactive.
- More funny examples; overall interesting so makes understanding of the concept easier.
- It helped me understand the interaction of demand and pricing a lot better.
- …cleared up some misunderstandings I had.
- …nice to help understand that price elasticity can be applied in different ways.
- This assignment has answered my questions on the elasticity changes because I did not really understand it well in my econ 102.
- I like the different social examples.
- It kept me entertained and will help me out.
- Being an economics major, I already understand price elasticity. However, this helped me apply it to marketing.
- I enjoyed this activity; it'll definitely help me.
- I already had a strong understanding of elasticity. He did a good job of elaborating and explaining elasticity in terms other than price.