

# A Cost-Benefit Analysis of HRD Master's Degree On-line Program

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## **Abstract**

*The purpose of the study was to estimate break-event number of students and return on investment (ROI) for HRD online program with a case of F University in the U.S. Achieving this goals, the study calculated the costs required to course development and delivery and revenue by enrolled students over twenty years (2013-2032). The results showed that the total cost per course was \$44,530, and the break-even number of students is 32 per course. In addition, as the result of the long-term projection (2013~2032), this program will get a net benefit of \$41,400,587 (ROI of 452%), other things being equal. For the sustainable success of the program, the study suggested the university should make an investment in program advertizing to recruit students and maintain the quality of the program in terms of design, content, delivery method, student support, and accessibility to enhance student retention and completion rate as well.*

**Keywords:** *Return on investment, HRD online program, distance learning*

## **1. Introduction**

Along with rapid development of technologies and computers, distance learning programs have become a big trend in the field of education. Many universities such as the University of Phoenix, the University of Maryland, and Athabasca University, to name a few, have multimillion dollar budgets for web-based teaching of part-time students.

Current statistics highlight the unprecedented escalation in the number of distance learning programs and student enrollment in postsecondary institutions. According to the National Center for Education Statistics, the number of students enrolled in at least one distance education course increased significantly between 2002 and 2006, from 1.1 million to 12.2 million [1]. Future projections suggest that student demand for online education is still growing, while the rapid level of growth that has occurred over the past decade is beginning to slow down. The market for online-based corporate learning is expected to increase over the next year from \$16.7 billion to \$23.8 billion [2].

In particular, the use of distance learning program is one of major trends in the field of Human Resource Development (HRD). Like other distance learning programs, HRD programs are interested in using online-based training under the assumption that it is an effective and convenient alternative to classroom training. Since online-based training is also a customer product, it is necessary to demonstrate its value in order to interest customers in using this type of training model.

The increasing interest and investment in distance learning programs, naturally leads to a consideration of the benefit and effectiveness of these courses. Organizations such as universities and companies are eager to know how effective their online-based training programs are. Accordingly, organizations have increased efforts to prove whether the training intervention was successful or not, especially online-based learning.

However, the literature in the area of cost-benefit analysis of online-based distance learning is sparse, and the purpose of this paper is to fill the gap in the literature using the case of the HRD online master's degree program at a state-run university in the U.S. This paper provides an estimate of the break-even number of students required to recover course development and delivery costs, the return on investment over twenty years, and a comparison of gains and losses over five years as the number of student enrolled changes.

## 2. Measurements of Performance

Although few cost-benefit analyses for online-based training are available, standard measures of performance can apply to this type of study. Two common measures are the break-even point, or the point at which costs are recovered and return on investment (ROI), which illustrates the economic gain or loss from having undertaken a program.

*Break-even Number of Students:* To offset the costs of online courses, a certain number of students must be trained. The number of students that offsets the costs of online courses is the breakeven point. Online programs need enormous investment at the start-up stage of developing and delivering a program. Because of the high start-up costs, online programs are known to be more expensive than traditional classroom learning in the case of small enrollment. Break-even point analysis provides crucial information for deciding class size. Deciding appropriate size of online class is balancing between quality and budget, and one of the crucial issues course designers should consider.

*Return on Investment:* The return on investment (ROI) is the percentage that represents the net gain or loss of using online training [3]. The net benefits are the program benefits minus the costs. The formula is as follows:  $ROI (\%) = (\text{Net program benefits} / \text{program costs}) * 100$ . For example, an ROI of 300% means that \$3 was saved in reduced delivery costs for every \$1 spent on online training. When calculating the program benefits, it is crucial to convert various data to monetary value in order to get an accurate and credible result. Phillips (1997) suggested ten major strategies to convert data to monetary value: output data is converted to profit contribution or cost savings; cost of quality is calculated; wages and benefits are used for the value for time; historical costs; internal and external experts; external database; participants estimates; senior management provides estimates; and HRD staff estimates.

## 3. Program Description

The Department of Educational Leadership and Policy Studies (ELPS) in cooperation with the Office for Distributed & Distance Learning (ODDL) has been developing HRD online master's degree program from 2012 Summer to 2014 Spring to meet an existing demand for a master's degree in HRD. The program start-up was funded through a cost sharing approach between the ELPS, and the ODDL. The ODDL allocated a budget of \$ 300,000 to be spread over a three-year period for 11 online courses. These funds were used for faculty and graduate assistants support for development, for equipment and supplies, and for marketing and advertising on a work for hire basis.

The Master of Science in Adult Education with a concentration in Human Resource Development may be completed at a distance through online learning program or by attending traditional classes on the main campus. Students may also earn the Graduate Certificate in HRD as part of the degree, or separately as a stand-alone certificate.

Online courses are delivered electronically on the World Wide Web over the Internet. Students complete 32 credit hours of coursework and submit and defend a competency-based portfolio to earn master's degree, paying the tuition handled differently for on-campus vs.

distance learners. These courses are similar in content to courses taught on campus as part of the master's program. Students are recruited every year. Students are expected to take two courses per term that includes Fall, Spring, and Summer.

11 courses are delivered in an asynchronous form as shown in Table 1. The asynchronous delivery occurs through students' receiving a series of assignments together with PowerPoint lecture. Additionally, students are provided by learning activities that they complete either independently or as a team activity. Students submit their work electronically in a variety of forms and ways, according to professor's preferences.

**Table 1. Course Delivery and Development Schedule**

Course Number and Title	Credit Hours	2012			2013			2014			2015		
		FA	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU
1 ADE 5083 Human Resource Development	3				O			X			X		
2 ADE 5080 Adult Education HRD Policy	3	D	D		O			X			X		
3 ADE 5380 Program Development & Evaluation	3	D	D			O		X				X	
4 ADE 5385 Adult Learning & Development	3	D				O		X				X	
5 ADE 5189 Staff Development and Training	3			D	D		O			X			X
6 ADE 5932r Public Policy and HRD	3			D			O			X			X
7 EME 6636 System Approach	3				D	D		O			X		
8 EDF 5461 Program Evaluation	3				D	D		O			X		
9 ADE 5932 Analytical Applications HRD	3					D	D		O			X	
10 EME 5601 Introduction to Instructional Systems	3					D	D		O			X	
11 ADE 6920 Capstone Colloquium	2							D	D		O		
Total Credit hours	32												
Number of Offering Courses						6		10			11		

- O First offering of course
- X Future offering of course
- D Faculty and Graduate Assistant development support funding provided

#### 4. Data Collection

The data for the costs of HRD online program were based on the ODDL budget data collected from the program coordinator. However, the budgetary data did not contain the cost information of faculty office room, server computer, technician, etc. such cost data were garnered from the real market. Benefits (revenue) data were gathered from the ODDL web site containing information on tuition of distance learning courses. Basic information connected to operate the program was provided by the program coordinator. In addition, the Office of Institutional Research and the Office of Budget & Analysis provided the useful statistical data for future projection such as salary increase rate, tuition increase rate, student enrollment rate, etc.

#### 5. Cost Analysis

The cost of HRD online program can be divided into four parts: course development costs, delivery costs, administrative costs, and revision costs. Cost drivers of HRD Online program consists of two elements - fixed costs and variable operating costs. These costs were analyzed to determine the costs per online course.

Fixed costs include capital costs such as the server platform shared by all courses mounted on that server as well as the cost of the content development shared by all students taking that course. In addition, fixed costs include tech coordination salary and benefit, secretarial support, equipment, facility, space.

Variable costs depending on the number of courses are faculty salary, technology support staff, teaching assistant/graduate assistant salary and tuition waivers, course materials, and mailing costs.

Costs that have not been included: The space costs do not include the cost of land nor the cost of campus infrastructure, such as roads, pathways, libraries, grounds-keeping, and security, nor the costs to students (*e.g.*, using computers, time spent attending lectures or studying online, purchasing textbooks and other course-related materials).

### **5.1. Course Development Cost**

According to the course development support schedule from the ODDL budget data, 11 online courses are supposed to be developed completely from 2003 Summer semester to 2006 Spring semester. This budget data did not include costs shared with ODDL and university such as server computer, building, maintenance for online courses. However, this cost analysis included such costs as opportunity costs for HRD online course development together with personnel costs.

*Instructor:* Based on the budget data from ODDL, the cost of instructors to develop online course content was differently calculated only regarding salary depending on the status of instructors and semester. 11 courses are in charge of 7 faculty members including one adjunct faculty. Faculty biweekly rates of salary ranged from the standard .25 FTE level to .375 FTE. The total cost of instructors from 2012 summer to 2014 Spring is about \$ 117,234. The cost of instructors for course development per course is \$10,658.

*Graduate assistant:* The cost of graduate assistant included salary for a 20-hour work per week and tuition waivers for 9 credit hours. While standard GA funding is .25 FTE for 3 terms, graduate assistants in this project were funded at .375 FTE for 2 terms. The cost of tuition waivers was calculated in different category of the ODDL budget data, reflecting the increase rates of tuition each year based on in-state matriculation fee waiver. The total cost of graduate assistant during 2012 Summer ~ 2013 Summer was approximately \$90,696 (salary: \$65,040, tuition waivers: \$25,656). The cost of graduate assistants for course development is about \$8,245 per course.

### **5.2. Course Delivery Cost**

According to the current schedule to delivery HRD online courses, 6 courses during the 2013 academic year, 10 courses during the 2014 academic year (including 4 courses offered first), 11 courses (including 1 course offered first) during the 2015 academic year respectively are supposed to be offered.

*Instructor:* The cost of instructor to delivery HRD online courses was based on the budget data from the ODDL. Salary and fringe benefits regarding 7faculty (including one adjunct faculty) were calculated differently according to the status of faculty. Faculty biweekly rates of salary were at the standard .25 FTE level in each Fall and Spring semester, and were at .375 FTE level in each Summer semester. Fringe benefits were calculated at .30 for faculty and .08 for OPS/Adjunct. The estimated average cost of delivery per course is \$6,866.

*Teaching Assistant (TA):* It is assumed that 1 teaching assistant per 30 students is needed. The cost of teaching assistant is salary for a 10-hour work per week and tuition waiver. Salary for teaching assistant per course is .25 FTE level. Teacher assistant generally earns 1500 per semester in College of Education. Estimate of tuition waiver of 9 credit hours is based on in-state matriculation waiver. It is assumed that each course needs at least 1 teaching assistant and increase rate of tuition is 10% each year, based on the FSU tuition increase rate. The cost

of teaching assistant per course is \$6,362. The summary of the development and delivery costs is Table 2 below.

**Table 2. HRD Online Course Development and Delivery Cost**

		Year1 (2013)	Year2 (2014)	Year3 (2015)	Total cost(\$)	Cost per course(\$)
Development Cost	Instructors	40,697	61,526	15,011	117,234	10,658
	Graduate assistant	28,680	29,340	7,020	65,040	8,245
		Year1 (2013)	Year2 (2014)	Year3 (2015)	Total cost(\$)	Cost per course(\$)
Delivery Cost	Offering course	6	10	11		
	Instructors	40,280	69,580	76,197	186,057	6,866
	Teaching assistant	36,932	63,540	72,341	172,813	6,362

### 5.3. Administrative Cost

*Program coordinator:* Program coordinator is in charge of overall support for course development and advertising this program. The cost of program coordinator included salary and fringe benefits. According to the ODDL budget data, program coordinator biweekly rates of salary were at the standard .25, .50, .75 FTE level in each year respectively. Fringe benefits were calculated at .30 level. The total cost of program coordinator during the period development and delivery was about \$80,844. The cost of program coordinator per year is about \$26,948 and the cost of program coordinator per year course is about \$2,450.

*Technical support & maintenance:* Technical support and maintenance are needed at the stage of course development as well as course delivery. The cost of this category was not included in the ODDL budget data because ODDL faculty and staff support technically the development of HRD online courses. In this study, it is assumed that 2 persons for technical support and maintenance for this program are needed. The cost of technical support is estimated based on biweekly rates of salary were at the standard .25 FTE level from the ODDL budget data. The total cost of technical support during development and delivery is about \$17,433(8716.5 \*2). The cost of technical support per year is \$5,811 and the cost per course is about \$528.

*Marketing and recruitment:* Marketing and recruitment is necessary to succeed HRD online program under the study. This cost ingredient include the ODDL budget allocated to expenses of advertising and marketing as well as the cost funded partly by Department of Educational Leadership and Policy Studies, Dean office of College of Education. The ODDL budget data included the cost of marketing and recruitment such as printing and reproduction of brochures and post card, postage and shipping, advertising in magazine, travel cost for advertising, which was funded by Department of Educational Leadership and Policy Studies, Dean office of College of Education, and ODDL. The total cost of marketing and recruitment during the period of development and delivery was about \$90,367 (ODDL: 80,367, ELPS: 5,000, COE: 5,000). The cost of marketing and recruitment per year is about \$30,122 and the cost per course is about \$2,738.

*Equipment and Supplies:* This category included the office equipment of furniture, computer, telephone (long distance telephone services), and basic office supplies. The cost of equipment for a faculty office room was \$1,967, based on the cost of furnishings estimated by MGT of America (7% of the construction cost of faculty office room--see, the cost of space usage). During the period of online course development and delivery, the average cost of

office supplies was \$1,262 and the cost of office supplies per course was \$115 based on the ODDL budget data. Thus, the estimated cost of equipment and supplies per course is \$2,082.

*Server computer:* This HRD online program is supposed to share the university Campus server. However, it is assumed that a server computer with required software to operate this online program is purchased in terms of opportunity cost. The price of server computer depends on the number of users and functions. The server is supposed to have a capacity of 11 courses per semester and 1000 simultaneous accessibility and to have a useful life of five years. In addition, this server computer has other functions with basic operating system such as Internet access, file and data management, email access, and discussion among users.

In market, the price of server computer with similar capacity and function is various according to company. Thus, this study used the average price of package server computer with needed software through price comparison based on the online search and consulting. The current purchase price of server computer package is about \$118,700. An annual depreciation amount using the capital recovery factor is based on the assumption of a 6.5% interest rate and a five-year asset life [4]. 1/11 of that annual amount to the course is assigned because the annual server capacity is 11 courses. This computation resulted in a cost of \$2,597 per course.

*Space usage:* The cost of space usage is usually excluded in the budgetary data. In this study, the cost of office room space for instructors and graduate assistant/ teaching assistant to development and delivery of online course was estimated based on the Plan for a Four-Year School of Medicine at F University. This document estimated the construction cost of research space as \$244.38 per gross square feet. The size of a faculty office room is approximately 115 square feet. The cost of construction of a faculty office room is about \$28,103. It is assumed that allowance for utilities and maintenance is 5% of the cost of the office room. Thus, the total cost of space usage per faculty office room is about \$29,508. An annual depreciation is based on the assumption that a 6.5% interest rate and a thirty-year asset life [4]. The cost of space usage is \$2,004 per online course.

**Table 3. Administrative Cost**

	Year1 (2013)	Year2 (2014)	Year3 (2015)	Total cost(\$)	Cost per course(\$)
Program coordinator	12,951	26,677	41,217	80,845	2,450
Technical support & maintenance	6,504	6,571	4,358	17,433	528
Marketing & recruitment	19,455	256,237	281,928	557,620	2,738
Equipment & supplies	1,700	1,044	1,044	3,788	2,082
Server computer				*118,700	2,597
Space usage				**29,508	2,004

Note: \* The current purchase price of server computer package

\*\* The total cost of space usage per faculty office room

#### 5.4. Course Revision Cost

It is assumed that instructors and graduate assistants make overall revision of online courses every five year. The cost of course revision includes overall content development and sever computer upgrade. The revision cost of instructors and graduate assistants puts into every five year, reflecting the increase rate of salary.

## 6. Benefit (Revenue) Estimate

### 6.1. Estimate of Tuition

The revenue of HRD online program mainly relies on tuitions of enrolled students. Tuition is handled differently for on-campus students and distance learning students. In addition, there is difference in tuition among online programs. According to the ODDL data derived from the decision of the University Board of Trustees, policy of 2013 tuition rates regarding HRD online program is as follows:

**Table 4. Tuition of HRD Online Course**

Locations	Residency	Tuition per credit hour (\$)
Leon, Gadsden, or Wakulla County resident	Florida resident	346.27
	Non- Florida resident	880.80
All other locations	Florida resident	344.97
	Non-Florida resident with partial waiver	360.42
	Non-Florida resident without partial waiver	869.50
Estimated average tuition	Florida resident	346
	Non-Florida resident	875

Note: This value does not include fee.

The number of students who get a tuition waiver is not considered in this study.

In this study, the average tuition for Florida resident and Non-Florida resident will be used regardless of locations. The estimated average tuition for Florida resident is \$346 and that of Non-Florida resident is \$875. Tuition and fees will increase for the each academic year. Based on the average increase rate of tuition from 2012~2013, it is assumed that the increase rate of tuition is 10% every year.

### 6.2. Estimate Number of Student Enrolled

The average increase rate of new degree-seeking graduate students at F university was about 3.3% for the past ten years (2002~2012). However, it is assumed that the increase rate of graduate students enrolled HRD online course is 10% considering that online course is much more accessible than face-to-face course. In addition, the ratio of Non-Florida resident to Florida resident to is approximately 1/4 among 10% based on the data of student characteristics at F university.

## 7. Cost-Benefit Analysis

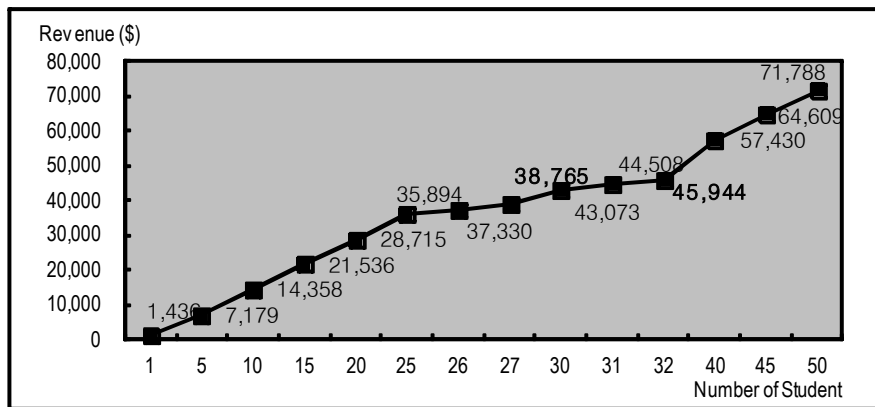
### 7.1. Break-even Analysis

Break-even analysis was based on the estimates of cost per course. The total cost per course was the sum of all cost estimates, and this computation resulted in a cost of \$44,530 as shown in Table 5. However, the cost was \$38,581 when the costs were excluded, which were not included in the ODDL budget such as server computer, space usage, furnishing and technical support. The revenue from one student enrolled one course (3 credit hour) was \$1,038 ( $\$346 \times 3$ ) for Florida resident and \$2,625 ( $\$875 \times 3$ ) for Non-Florida resident. In addition, the ratio of Florida resident to Non-Florida resident is assumed as 4:1. The break-even point estimated when the number of students enrolled was 32 per course. But in case that the total cost per course excludes the ODDL data abovementioned, the break-even point estimated 27 students per course.

**Table 5. Cost per Course in HRD Online Program**

Cost	Item	Cost per course (\$)	*Cost per course (\$)
Development Cost	Instructors	10,658	10,658
	Graduate assistant	8,245	8,245
Delivery Cost	Instructors	6,866	6,866
	Teaching assistant	6,362	6,362
Administrative cost	Program coordinator	2,450	2,450
	Technical support & maintenance	528	-
	Marketing & recruitment	2,738	2,738
	Equipment & supplies	2,082	1,262
	Server computer	2,597	-
	Space usage	2,004	-
Revision cost		-	-
<b>Total</b>		<b>44,530</b>	<b>38,581</b>

Note: \* cost per course is only based on the ODDL budgetary data



**Figure 1. Break-even Point of HRD Online Program**

## 7.2. Future Projection

The summary of relevant assumptions in order to project the loss and gains in terms of finance is showed in Table 6.

**Table 6. Assumptions for Future Projection**

Future Revenue Assumption	Rate	Future Cost Assumption	Rate
• After 2015, 11 courses are offered per semester	-	• Revision cost puts into every 5 year.	-
• Starting number of students enrolled	10	• Instructor and staff annual salary increasing rate	3.50%
• Student increasing rate	10%	• Teaching assistants' salary increasing rate	2.50%
• Tuition increasing rate	10%	• Teaching assistants' tuition (waiver) increasing rate	10%
• Student ratio (Resident:Non-resident)	4:1	• Marketing & recruitment	100% (Revision year) 50% (Other year)
• Ratio of Teaching assistant/student	1:30	• Equipment and supply	100% (Revision year) 20% (Other year)
		• Server computer (Plus upgrade cost)	110% (Revision Year)

Note: 1. Tuition increasing rate (10%) is based on the average increase rate of tuition from 2002~2012



2. The average increase rate of new degree-seeking graduate students was 3.3% for the past ten years (2002~2012). However, it is assumed that the increase rate of graduate students enrolled HRD online course is 10% considering that online course is much more accessible than face-to-face course.
3. The ratio of Non-Florida resident to Florida resident is approximately 1/4 among 10% based on the data of student characteristics.
4. Instructor salary increase rate (3.5%) is based on the average increase rate during the past years (2002~2012)

### 7.3. Short-term projection (2013~2017)

Considering that whether HRD online program succeeds or not depends on the first five year, it is appropriate to examine how the net benefit would be changed during the first five-year as the starting number of students enrolled is 5, 10, 15, 20, 25, and 30.

Other things being equal, as seen in Table 7, HRD online program goes into the black for the first five years when more than 15 students enroll. Only when more than 30 students enroll, HRD online program gets into the black from the first year (2013). However, when the number of students enrolled is 5 and 10, the program is in the red, and the total loss for the first five years is \$893,347 and \$317,258, respectively.

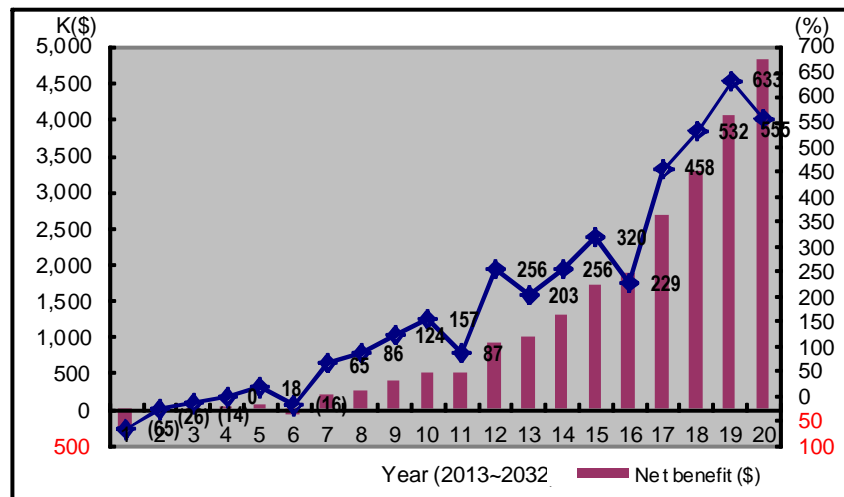
**Table 7. Loss and Gain in Short-term Projection (2013~2017)**

Cohort of students	Year/ Net benefit					Total Net benefit (\$)
	2013	2014	2016	2016	2017	
5	(335,532)	(160,569)	(160,165)	(134,949)	(102,131)	(893,347)
10	(263,372)	(65,793)	(37,277)	200	48,984	(317,258)
15	(174,252)	28,983	65,089	135,350	224,931	280,100
20	(102,092)	105,103	187,976	270,500	376,047	837,533
25	(29,932)	199,879	214,059	325,858	468,425	1,178,289
30	42,228	221,634	336,947	461,008	619,541	1,681,358

Note: numbers in parentheses indicate the amount of the loss

### 7.4. Long-term projection (2013~2032): Return on Investment

Ceteris paribus, HRD online program will be considered as a good investment based on the estimate of return on investment during the future years (2013~2032). That is, HRD online program will make a net gain of \$41,400,587 and the ROI of 452%. Considering different discount rate 6%, 8%, 10%, the 2013 present value of HRD online program over twenty years is \$8,642,343, \$6,324,733, \$4,656,953 respectively.



**Figure 2. Return on investment of HRD online program (No. of Students=10)**

## **8. Conclusion**

### **8.1. Summary**

This study aimed to examine the break-even point and return on investment of the HRD online program at FSU, which is under the development and is supposed to offer some courses in the 2013 Fall semester. For this, this study estimated the cost per course based on the ODDL budget data, and the benefit (revenue) per course based on tuition of students enrolled. As a result, the total cost per course was \$44,530, and the break-even number of students is 32 per course. In addition, as the result of the long-term projection (2013~2032), this program will get a net benefit of \$41,400,587 (ROI of 452%), other things being equal. However, the short-term projection (2013~2017) with change of starting number of student enrolled showed that this program goes into the black for the first five years when more than 15 students enroll. When the starting number of students is 30, this program is in the black at the first year (2013).

### **8.2. Suggestion**

The results of this study strongly support that whether HRD online program succeeds or not depends on how many students register in this program, particularly for the first five year. In this sense, first of all, this program should have much more interest and make an investment in the marketing and advertising to recruit students. As a way to recruit more students, this program and the ODDL needs to take the cut down of tuition into serious consideration in the light that the enrollment rate of Non-Florida resident is increasing. In addition to marketing, the student enrollment, retention, completion, and satisfaction are most likely to be affected by quality of online course in terms of design, content, delivery method (communication), student support, and accessibility [5]. In particular, considering of the research result that student retention and completion rate of online distance learning is 10 to 20 percent lower than traditional courses [5], how this program (or instructors) helps students feel connected, motivated, and successful could be considered as a big task to be touched.

### **8.3. Follow-up Research**

This study is limited to the cost-benefit analysis in terms of monetary gains. In other words, this study did not consider the value related to the quality of courses and learner's needs and satisfaction and outcomes when estimated the financial performance of this program [7]. In fact, considering such value to be hard to translate in monetary value, a cost-effectiveness analysis of this program is taken into consideration in the future. In the same line, a cost-benefit analysis or cost-effectiveness analysis between HRD online course and face-to-face course will be applied to this program in the future.

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