

RETROSPECTIVE QUALITATIVE ANALYSIS OF OPTOMETRIC EQUIPMENT
PURCHASING AND UTILIZATION AMONG OPTOMETRIC STUDENTS

by

Michael J. McLaughlin & Jared J. Lampe

This paper is submitted in partial fulfillment of the
requirements for the degree of

Doctor of Optometry

Ferris State University
Michigan College of Optometry

May, 2009

RETROSPECTIVE QUALITATIVE ANALYSIS OF OPTOMETRIC EQUIPMENT
PURCHASING AND UTILIZATION AMONG OPTOMETRIC STUDENTS

by

Michael J. McLaughlin & Jared J. Lampe

Has been approved

May, 2009

Ferris State University
Doctor of Optometry Senior Paper
Library Approval and Release

RETROSPECTIVE QUALITATIVE ANALYSIS OF OPTOMETRIC EQUIPMENT
PURCHASING AND UTILIZATION AMONG OPTOMETRIC STUDENTS

I, Michael J. McLaughlin, and Jared J. Lampe, hereby release this Paper as described above to Ferris State University with the understanding that it will be accessible to the general public. This release is required under the provisions of the Federal Privacy Act.

ABSTRACT

Background: The purpose of this research was to obtain qualitative data about optometry students' equipment purchases throughout their optometric student careers that would be useful in the decision making process of students requiring the purchase of this equipment in the future. *Methods:* This research was based from information obtained from a voluntary survey geared only toward optometry students in second, third and fourth years at the Michigan College of Optometry at Ferris State University. *Results:* 58 students responded to the survey. Information was obtained about deciding factors in the purchasing of equipment and satisfaction and durability of equipment after its purchase. *Conclusions:* Personal preference of fit and feel was the number one deciding factor in purchasing, followed by price. Overall students were satisfied with whatever brand or type of equipment that was purchased, and a high level of durability each brand or type was reported overall.

TABLE OF CONTENTS

	Page
ABSTRACT.....	iii
LIST OF TABLES.....	iv
LIST OF FIGURES.....	v
INTRODUCTION	1
METHODS.....	1
RESULTS.....	2
DISCUSSION.....	9
APPENDIX	
A. EQUIPMENT SURVEY.....	10

LIST OF TABLES

Table		Page
1	Equipment Purchases by Class, Brand and Type	2

LIST OF FIGURES

Figure		Page
1	Diagnostic Set Purchases by Brand.....	3
2	Binocular Indirect Ophthalmoscope Purchases By Brand.....	3
3	Fundus Lens Purchases by Type.....	4
4	Diagnostic Equipment Purchasing Influences.....	5
5	BIO Purchasing Influences.....	7
6	Percent of Respondents Who Needed Warranty Service.....	8

INTRODUCTION

The purpose of this research is designed to obtain qualitative data about optometry students' equipment purchases throughout their optometric student careers. Students at the Michigan College of Optometry at Ferris State University are required by faculty to purchase expensive equipment before they know anything about such equipment. Often, decisions are difficult because very little objective information about the different equipment choices are available; only corporate marketing. Friends, doctors, faculty and upper classmen give advice about which equipment, but no comprehensive survey has been conducted. This research is geared toward analyzing qualitative information provided by current students and package it in a way that will provide useful, objective information that may help future students in the decision making process when it come to selecting and purchasing required optometric equipment and supplies.

METHODS

This research was based from information obtained from a voluntary survey geared only toward optometry students in second, third and fourth years at the Michigan College of Optometry at Ferris State University (see appendix A). After obtaining approval from Ferris State University's Human Subjects Review Committee, a survey form was given or e-mailed to each student and the student was asked to participate in the survey. The students were told that the survey is voluntary, and that no personal information would be used. The survey consisted of questions about which products students purchased, and students were then asked to rate qualitative satisfaction with the product (as measured by a quantitative scale). Questions were asked about which factors that were most important when deciding to purchase (cost, looks, feel, etc.). Questions were also asked about their

impression of their equipment now that they are proficiently trained and educated in its use. Opportunity was given to expand in further detail to any questions if the student wished to provide more input. After completion of the survey, the student was instructed to submit the survey to a mailbox established in the administrative office on the fourth floor of the Michigan College of Optometry.

No financial gain will be obtained from the sale of this information to any private company. Neither researcher has any financial interest in any company referenced in this project, or is receiving any payments or royalties from these companies.

RESULTS

A total of 58 MCO students responded to the survey. Total numbers and brand purchasing choices are shown in Table 1. Results of each diagnostic set by brand, each BIO by brand and each Volk fundus lens by type were calculated by percent (see figures 1, 2, & 3.)

Table 1: Purchasing Demographics

2nd Year Students	19				
Diagnostic Set		BIO		Diagnostic Lens	
Heine	16	Heine	12	78D	9
Welch Allyn	2	Welch Allyn	0	90D	8
Keeler	1	Keeler	7	Superfield	2
3rd Year Students	23				
Diagnostic Set		BIO		Diagnostic Lens	
Heine	5	Heine	14	78D	7
Welch Allyn	18	Welch Allyn	4	90D	1
Keeler	0	Keeler	5	Superfield	17
4th Year Students	16				
Diagnostic Set		BIO		Diagnostic Lens	
Heine	8	Heine	10	78D	11

Welch Allyn	6	Welch Allyn	3	90D	6
Keeler	2	Keeler	2	Superfield	6
All Students					
58					
Diagnostic Set		BIO		Diagnostic Lens	
Heine	29	Heine	36	78D	27
Welch Allyn	26	Welch Allyn	8	90D	31
Keeler	3	Keeler	14	Superfield	9

Figure 1: Diagnostic Set Purchases by Percent of Total Purchases

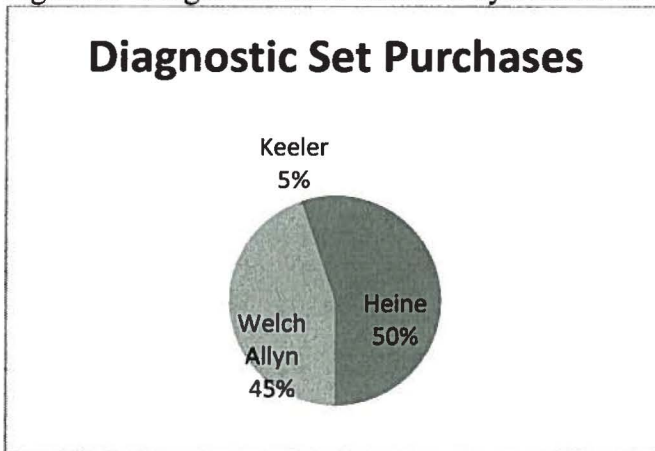


Figure 2: BIO Purchases by Percent of Total Purchases

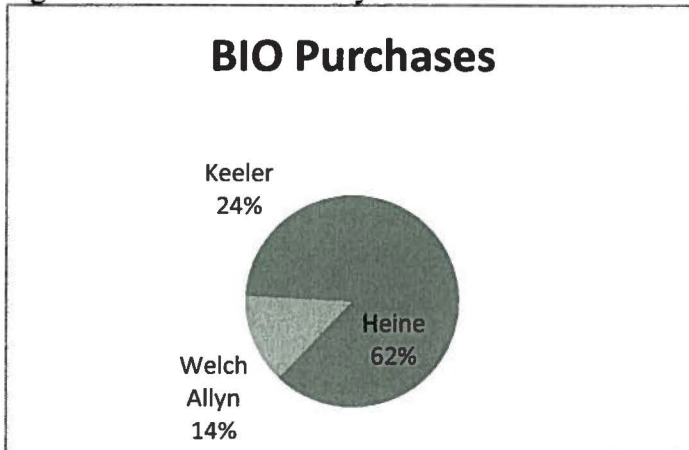
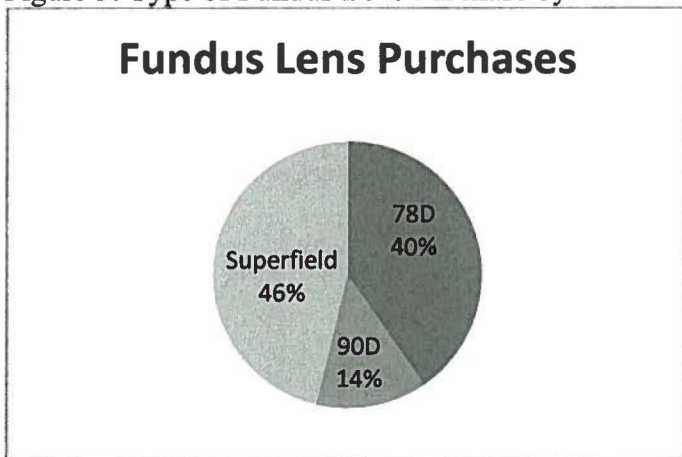


Figure 3: Type of Fundus Lens Purchase by Percent of Total Purchases



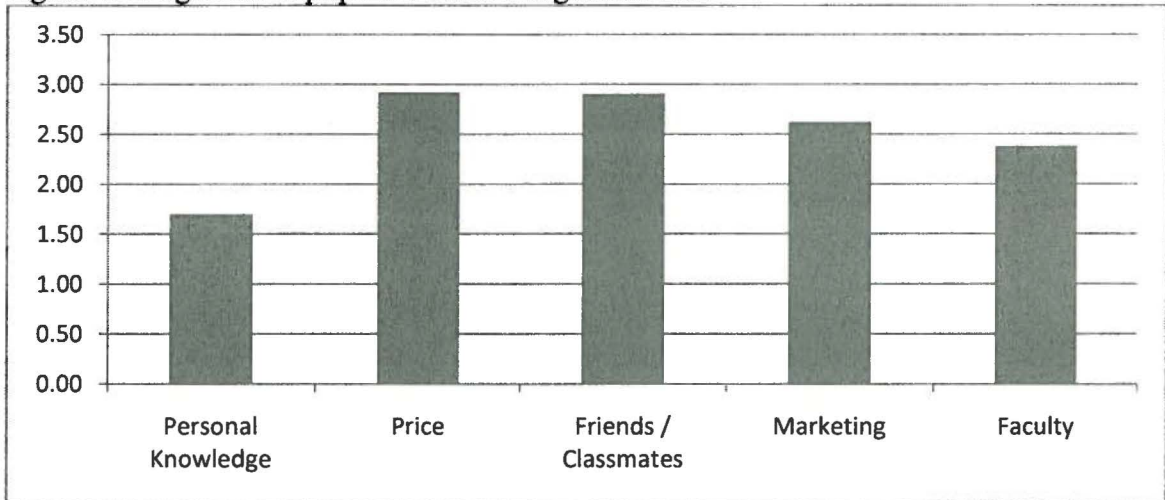
A large part of our study investigated the decision making process behind each student's purchase. When asked what features of each diagnostic set were most influential, by far the most popular answers were "feel," including such things as handle size, and price. Both thick handles and thin were mentioned as deciding factors in the ergonomics heading. Secondary reasons were usability, such as the locations of switches and rotators, and warranties. Not surprisingly, those answers were duplicated in the responses to a question asking what advice the students would give to others seeking to purchase diagnostic equipment, with comfort being the dominant leader. When recommending a specific brand, 51% of students recommended Heine, 44% recommended Welch Allyn, and 5.5% recommended Keeler. These numbers are almost identical to the ratio of what was actually purchased (50%, 45%, and 5%).

Students were also asked to rate, on a scale of 1 to 5, internal (personal familiarity) and external (e.g. friends and price) factors which may have influenced their decisions. Those results were averaged and summarized in Figure 4. The high influence of friends

and classmates is reflected in the tendency for each class to purchase similar devices.

Regardless of their selection strategy, there was a very high satisfaction rate. Fully 65% of students rated their equipment as 5 out of 5, with an average of 4.57.

Figure 4: Diagnostic Equipment Purchasing Influences



The study also asked what students disliked about their diagnostic sets. These responses were then broken down by manufacturer, with very little consensus amongst students.

Those complaints are listed below.

Heine

- Too heavy / large
- Handles too skinny
- Cannot charge small handles in charging wells at school
- Size of the charger (Too big or small was not specified.)
- D-cell battery attachment fits poorly
- No portable charger available (Though a table charger is.)
- Poor battery life

Keeler

- (No faults listed in survey.)

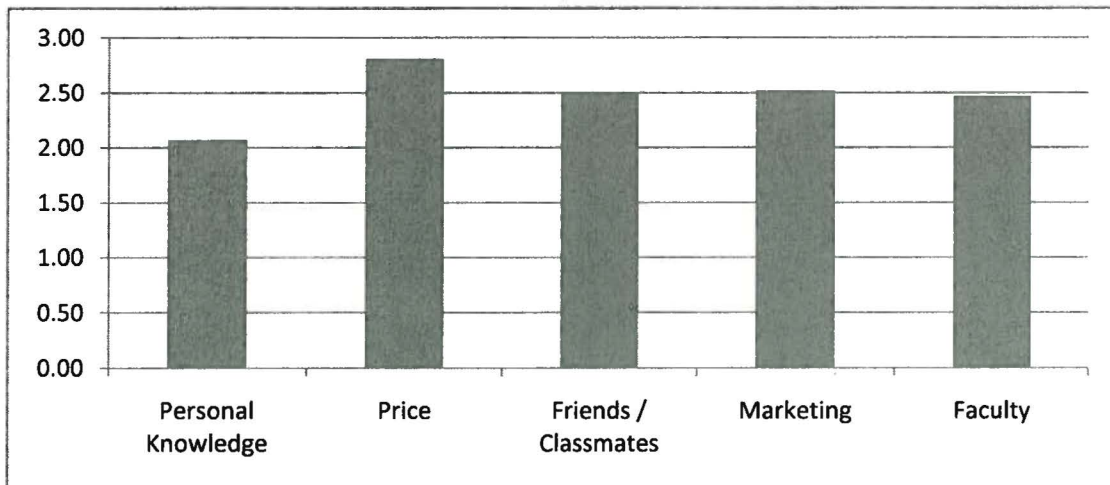
Welch Allyn

- Weak optics

- Not light emitting diode (LED) for light
- Overheats when left on
- Dust collects inside head
- Feels cheap
- Difficult to separate head from handle
- Short battery life
- Needs adapter to be used with charging wells

Similar questions were asked about BIOs. Most purchases were made on the basis of comfort, wireless battery, and price. Lagging behind those features were recommendations, optics, and weight. Another practical criterion was that the carrying case fit in the notoriously small lockers at the college. The students' main advice to future classes was to make their purchase based upon comfort, with optical quality in a distant second place. One useful, though only once cited, pointer was to make sure that it was possible to fuse an image through the oculars. On a scale of 1 to 5, average satisfaction of BIO purchases was 4.29. Specific brand recommendations favored Heine at 67%, Keeler at 22%, and Welch Allyn at 10%, compared to purchase percentages of 62, 24, and 14%. Respondents who specified models recommended wireless varieties 67% of the time. Figure 5 details purchasing influences.

Figure 5: BIO Purchasing Influences



Complaints about BIOs, by brand are as follow:

Heine

- Weak battery clip
- Not wireless / "Cords" (Most of these complaints were nonspecific, though one mentioned that the cord falls out of the tracks at the top of the headpiece.)
- Short battery life
- Bulky case
- Difficult to change filter
- Feels off-center
- Heavy / uncomfortable

Keeler

- Too heavy
- Bag is too large
- +2 lenses are difficult to remove
- Turns on when placed in case
- Oculars cannot be positioned close to eyes

Welch Allyn

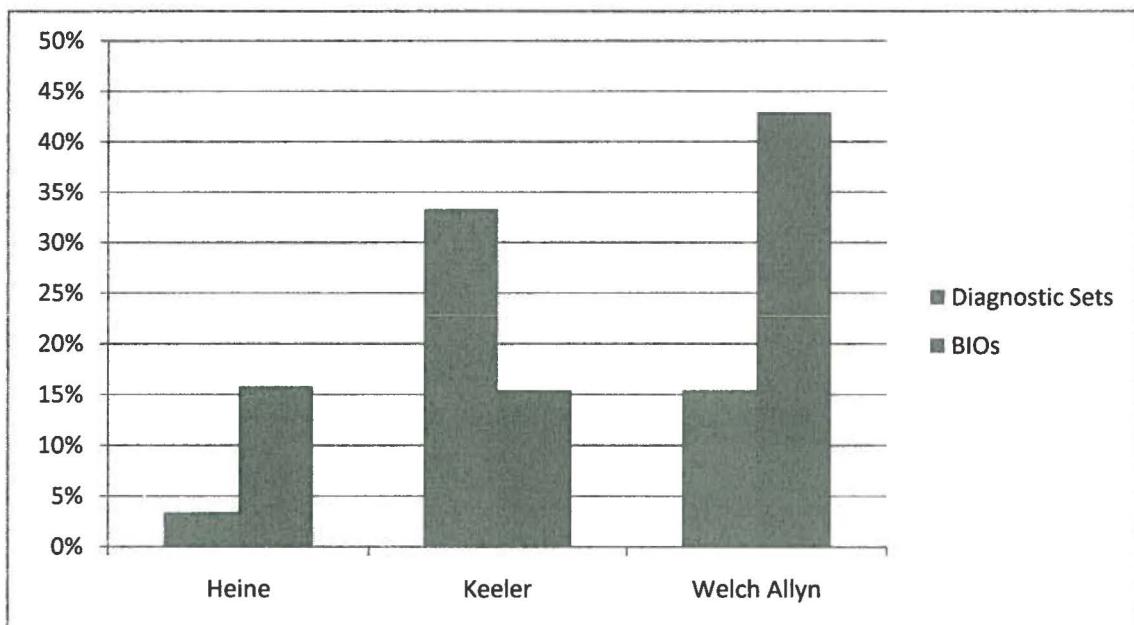
- Looks / feels cheap
- Poor optical clarity
- Short battery life

The survey's section about fundus lenses was much briefer. Superfield lenses were recommended by 46% of students, 78D lenses by 35%, 90D by 17%, and Digital Wide

lenses by 2% (one respondent.) Price as a purchasing factor was rated at an average of 1.98 on a 1 to 5 scale. Dislikes common to all lenses included obvious tradeoffs between field of view and magnification. Other common issues were things such as difficulty learning how to use and hold the lens. There was no clear trend of complaints particular to any one lens.

Several questions on the survey investigated reliability and warranty support of both diagnostic equipment and BIOs. Students reported if they had ever had to pursue warranty service on their equipment. The results are included in Chart 6. Satisfaction with customer support during warranty issues was rated on a scale of 1 to 5. Heine received a perfect 5.0, Keeler a 4.0, and Welch Allyn a 3.86.

Figure 6: Percent of Respondents Who Needed Warranty Service



DISCUSSION

Although many factors and variables were investigated in this survey, the number one decision on what to purchase was feel and fit of equipment, followed by price. Very few students would purchase different equipment; they had little regret. Although there were some complaints about different aspects of the equipment, they were minor and minimal. Even warranty and service issues seemed to be very minor. This may suggest that all companies or brands involved in this study manufacture quality equipment.

Limitations of this survey include limited number of respondents, variance in the level of detail in which each student chose to respond, and the qualitative nature of the survey itself. Future research that may be beneficial may be a survey of long term qualitative analysis of graduates measuring opinions of equipment quality, durability and customer service after graduating from the Michigan College of Optometry.

APPENDIX A
EQUIPMENT SURVEY

Retrospective Qualitative Analysis of Optometric Equipment Purchasing and Utilization among Optometric Students

In order to assist first- and second-year optometry students in deciding what examination equipment to buy, we would like your input on the following questions. Please complete this questionnaire and return it to a box #7 for Michael McLaughlin in the MCO office by March 13, 2009. It should take about five minutes of your time to complete. The information provided will be used in aggregate; no personally identifying information will be collected. By completing and returning this survey, you consent to its use for research purposes. Thank you for your time.

Concerns about the conduct of this research may be directed to the faculty advisor, Dr. Michael Cron at 231-591-2171, or to the Chair of FSU's Human Subjects Review Committee, Dr. Connie Meinholdt, at 231-591-2759.

Circle your current year in optometry school: 2 3 4 Circle your gender: M F

Your Equipment – Diagnostic Set

Which brand of diagnostic equipment did you purchase?

- a. Heine
- b. Welch Allyn
- c. Keeler
- d. Other _____

What model did you purchase? _____

Why did you select that particular set? _____

How much knowledge did you have about retinoscopes/ophthalmoscopes before purchasing your diagnostic set?

(Minimal) 1 2 3 4 5 (Extensive)

How much was price a factor in purchasing you diagnostic set?

(Minor) 1 2 3 4 5 (Major)

How much did friends or fellow students' opinions influence your purchase decisions?

(Minor) 1 2 3 4 5 (Major)

How much did marketing (item brochures, sales representatives, company websites etc.) influence your purchasing decisions

(Minor) 1 2 3 4 5 (Major)

How much did faculty opinions affect your purchasing decision?

(Minor) 1 2 3 4 5 (Major)

Overall, how satisfied are you with the purchase of your diagnostic equipment?

(Unsatisfied) 1 2 3 4 5 (Very satisfied)

Have you ever had to send in your equipment in for repair or service? Yes No

If so, how would you rate customer service and why? _____

(Poor) 1 2 3 4 5 (Exemplary)

What do you like about your diagnostic equipment? (e.g. handle size, weight, position of switches, battery life, etc.) _____

What characteristics do you dislike, if any? _____

Other equipment

Have you used another brand of diagnostic equipment? Yes No

If Yes, which brand/model? _____

After learning to use your equipment do you feel that it is difficult to use other styles of equipment? Yes No

What characteristics do you like about this other equipment? _____

What characteristics do you dislike, if any? _____

Miscellaneous Questions

If you could give purchasing advice to someone unfamiliar with the use of such items, what would you tell them to look for? _____

Knowing what you do now, what would you buy, and why? _____

Please provide any other important information about your diagnostic set that was not captured in these survey questions. _____

Your Equipment - BIO

Which brand of BIO did you purchase?

- e. Heine
- f. Welch Allyn
- g. Keeler
- h. Other _____

What model did you purchase? _____

Why did you select that particular BIO? _____

How much knowledge did you have about BIOs before purchasing your BIO?
 (Minimal) 1 2 3 4 5 (Extensive)

How much was price a factor in purchasing your BIO?
 (Minor) 1 2 3 4 5 (Major)

How much did friends or fellow students' opinions influence your purchase decisions?
 (Minor) 1 2 3 4 5 (Major)

How much did marketing (item brochures, sales representatives, company websites ect.) influence your purchasing decisions?
 (Minor) 1 2 3 4 5 (Major)

How much did faculty opinions affect your purchasing decision?
 (Minor) 1 2 3 4 5 (Major)

Overall, how satisfied are you with the purchase of your BIO?
 (Unsatisfied) 1 2 3 4 5 (Very satisfied)

Have you ever had to send in your equipment in for repair or service? Yes No

If so, how would you rate customer service and why? _____
 (Poor) 1 2 3 4 5 (Exemplary)

What do you like about your BIO? (e.g. weight, battery life, switch locations, filters, optics, etc.)

What characteristics do you dislike, if any? _____

Other equipment

Have you used another brand of BIO? Yes No

If Yes, which brand/model? _____

After learning to use your BIO do you feel that it is difficult to use other styles of BIO? Yes No

What characteristics do you like about this other equipment? _____

What characteristics do you dislike, if any? _____

Miscellaneous Questions

If you could give purchasing advice to someone unfamiliar with the use of such items, what would you tell them to look for? _____

Knowing what you do now, what would you buy, and why? _____

Please provide any other important information about your diagnostic set that was not captured in these survey questions. _____

Fundus Lens

What type of fundus lens did you purchase?

- a. 78D Volk
- b. 90D Volk
- c. Superfield
- d. Other _____

How much was price a factor in the purchase of your fundus lens?

(Minor) 1 2 3 4 5 (Major)

What lens to you currently use? _____

If having to purchase only one fundus lens today, which one would you purchase? _____

What is the best feature about your fundus lens? _____

What do you dislike about your fundus lens? _____