Higher Education Advertising Expenditures' Impact on The Key Performance Indicator of New Enrollments Using Information Systems and Business Analytics

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ABSTRACT

The impact of advertising expenditures on student enrollments has not been explored extensively in the literature. The higher education sector demonstrated an increase in paid advertising but soft overall higher education enrollments recently. This research explored the relationship between advertising expenditures in higher education and new enrollments using information systems and business analytics. Results indicate a weak association between advertising expenditures in higher education and the key performance indicator of new student enrollments. A contribution of this study is to the media planning function and users of information systems and analytic techniques for actionable insights.

Keywords: higher education, advertising, enrollments, analytics, information systems

INTRODUCTION

The challenge for many authors has always been the visualization of data to transform it into useful information that is easy to understand. That challenge has become more complicated in the era of "Big Data" (Gutierrez, 2017). This fact equally applies to the study of the impact of higher education advertising expenditures, the subject of this paper, in which marketing research must mate with information technology in order to develop the understanding of the data that is available and convert it into useful information. Therefore, before considering the problem statement and research questions of this paper, it is helpful to examine advertising and promotion in business endeavors outside of higher education and then delve into the latter. What follows is that examination.

Marketers in the 21st century now more than ever face a competitive business environment. The battle for marketers to capture value from customers across a variety of verticals in the form of brand equity and sales is as fierce as it has ever been. This is because customers have numerous choices partially driven by the access and information provided by the internet (Solomon, 2019).

As such, consumers are exposed to a plethora of alternative products and services more than ever as compared to the past. As such, consumers apply a high level of effect in the market about several aspects of brand attributes. These aspects include but are not limited to quality, services, and price. Therefore, it is very important for marketers of products and services to meet customers' needs and remind customers' and potential customers of their ability to meet those needs in order to stay competitive.

Advertising and sales promotion as a part of an integrated marketing plan are influential in attracting the attention of the customer and influential in building brand equity, encouraging sales (Myers, 2003). Advertising and sales promotion are the main tools of an integrated marketing plan to communicate brand benefits. Advertising and sales promotions are highly effective influencers of consumer purchase decisions of a brand (Solomon, 2019). In increasingly competitive markets, companies recognize that they must improve and strengthen their brands' communication of brand benefits regularly in order to sustain consumer value for an extended period of time (Sedaghat, Sedaghat, Moakher, 2012).

The literature provides evidence of the relationship between advertising expenditures and positive response amongst the target audience on key performance indicators (KPI) in terms of brand equity and sales effects (Palazon-Vidal, M., Delgado-Ballester, 2005).

This has been seen in many categories including but not limited to consumer products, services and business to business products and services.

The impact of advertising expenditures on key performance indicators (KPIs) in higher education, such as incoming class size has not been explored extensively in the literature.

U.S. colleges and universities demonstrated an increase in paid advertising.

It is now at an all-time high of $1.65 billion in 2016 as this expenditure represents a 19% increase over that of 2015 and 22% when compared to 2013 expenditures (Brock, 2017). This represents a growth of 18.5% over 2015 expenditures and a surge of 22% since 2013. This increase in paid advertising spending in higher education has occurred despite declines in advertising in the for-profit educational sector of higher education that has experienced trouble in recent years (College Board, 2018). Nevertheless, the increasing advertising investments coincide with steady declines in overall higher education enrollment over the past six years. Since 2011, U.S. enrollments in colleges and universities have not been strong according to the National Student Clearinghouse Research Center (2018). The factors that are contributing to lack luster enrollments include flat and declining high school graduate populations in many regions of the country, continuing increases in the rate of employment (with many prospects choosing a job instead of college), rising costs of a college education, and signs that there has been a trending loss of public confidence in the value of traditional college credentials (The College Board, 2018).

The following trends and projections have been noted for enrollment in public and private institutions of higher education i.e., institutions that grant postsecondary degrees, since 2002 (The National Center for Education Statistics 2018). Public institutions experienced a 14% growth in enrollment between 2002 (12.8 million students) and 2016 (14.6 million students) while private institutions experienced a 36% growth from 3.9 million students to 5.3 million students in the same period. The forecasted growth trends for the period 2016 to 2027 is 4% for the public institutions from14.6 million students to 15.2 million while the private institutions are expected to be flat at 5.3 million students i.e., the same in 2027 as in 2016.

Unfortunately for higher education institutions, the projections for the total number of high school graduates over the next ten years is for a slow-down of the growth (The National Center for Education Statistics 2018). Exacerbating the situation is that many institutions source most of their students from their geographic region and some of those regions have been significantly affected by the shifting populations within the United States. For instance, the Northeast region is expecting a decrease in the number of high school graduates in the coming ten years which does not bode well for the region's higher education institutions.

An additional challenge for most of the private institutions in the eastern part of New York State, home to the authors' institution, is the emergence of 1)

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The New York State Excelsior Scholarship, 2) Western Connecticut State University's scholarship program for New York localities bordering that institution' s location in Danbury, Connecticut and 3)
The University of Maine's program along with 4) Southern New Hampshire University's outreach with online degree programs at affordable costs.
Clearly, the competitive environment necessitates a change in the practice of sourcing students. The change is of paramount importance and not just a "nice to do program."

PROBLEM STATEMENT AND RESEARCH QUESTIONS

The main purpose of this research is to explore the link between advertising expenditures with college success factors to include college and university admission metrics such as new enrollments. A tenet of advertising is to spend on the media type within those markets that will lead to the greatest positive outcomes for an institution. The media type is especially important as it addresses which media will reach the institution's target audience. Each institution has to decide which outcome(s) are most relevant for it such as reputation enhancement or development, new student enrollment, retention, graduation rate, student quality or selectivity, or just a financial outcome such as net revenue. In this paper we have explored the relationship between advertising expenditures and new student enrollments.
As such, the primary research question addressed in this research is:

Does advertising spending at the college and university level, influence college success factors in terms of new student enrollments?

The secondary research question is:
Is there evidence that colleges and universities that spend more on advertising achieve increases in new student enrollments?

The third question is:
Is the way an institution deploys it advertising budget among the various media types more important than just the total spend?

A fourth research question is:
Is there a parallel to the consumer products and services situation?

A fifth research question is:
Can information systems and business analytics tools be used to explore these research questions?

METHODOLOGY

To explore these research questions, the tools of business analytics, leveraging technology innovations to include statistical analysis, information systems, and data visualizations were used. In terms of data sources, Kantar Media (2021) a worldwide leader in advertising and expenditure monitoring was used. Kantar Media (2021) as a resource captures information to assess what is happening in the media landscape to include what competitors across various industries are doing to support better advertising decisions. Kantar Media's advertising occurrence and expenditure service monitors hundreds of millions of ads each year across industries to include monitoring advertisements in the higher education sector. Kantar Media (2021) captures advertisements across most traditional and digital media channels, classifies them by segment and reports on day part, ad network, format, and length. Furthermore, Kantar Media (2021) is a data and evidence-based resource where the organization collects data in a variety of formats to include digital formats. The company utilizes proprietary information systems technologies to include leveraging the use of artificial intelligence and machine learning to make data intelligence offerings available to clients. Kantar Media (2021) provides information systems where developers of its systems focus on continuous innovations and emerging technologies to be a resource for media intelligence across industries to include higher education; the industry focus of this study.

Information was obtained from Kantar Media (2021) on advertising spend at fourteen colleges and universities. The competitive set was based on those with the same proprietorship as the author's institution who tended to have overlap in new applicants. The sample was limited to 14 colleges and universities due to the relatively high acquisition cost for the data and the exploratory nature of this analysis. Quality, size, and financial information for each institution was primarily gathered using data publicly available from the Integrated Postsecondary Education Data System (2018) (IPEDS). Additional sources of data consulted included The National Center for Education Statistics (2018), The College Board (2018) and The National Student Clearinghouse (2018). All of these data sources provide reported data and/or aggregated information from data collected from individual colleges and universities.

The National Student Clearinghouse also provides individual student level data.

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The first step was to achieve data understanding through data collection and review of the advertising spend data for institutions of higher education. Towards this end, data was purchased from Kantar Media (Kantar 2021) for 14 private college and universities (including the authors' own) in New York and Connecticut for the period 2015-2017 and included dollars spent by media type and market. New York is the home state for the author's institution and Connecticut neighbors it and overlaps the author's institutional admit pool. Key performance indicators (KPIs) for the chosen colleges and universities were selected from publicly available data from The Integrated Postsecondary Education Data System (IPEDS).

While information was extracted for the 14 colleges and universities across a range of variables, the initial focus was on new student enrollment as it was hypothesized that this indicator had the potential to be most directly impacted by advertising spend.

The second step was data preparation to include selection and cleansing which was achieved by merging and cleaning data sets from Kantar and IPEDS. Annual data from Kantar did not align with academic years; however, quarterly data allowed the authors to compute information for a corresponding academic year. An initial analysis indicated that year-to-year differences in KPIs for each institution were better measures for analysis than raw numbers, particularly due to differences in enrollment and other variables between the colleges and universities in the sample. Therefore, year-to-year difference variables were calculated. Additionally, slicing of the data by media type provided more opportunity for analysis than using just total advertising spend.

The third step was to analyze data and draw conclusions. Data files received from Kantar (2021)and extracted from the IPEDS Data Center were merged to create a data model. Descriptive statistics were run and examined to understand the data and to identify general trends. Trends and relationships were investigated using correlation analyses to assess whether a predictive model could be created (Malhorta, 2019).

The authors examined the available array of visualization methods and techniques in order to select the ones that would be most important and impactful for the study described in this paper. Before discussing the ones that were chosen, let's consider some of the options which the reader may research, if interested, but are beyond the scope of purpose of this paper to present in detail namely, Charts (Line, Bar, Column, Pie, Area, Scatter), Pivot Tables, Maps (scatter, area, geospatial, dot, cartogram, contour),

Tree Maps, Surface and Volume models, Time Lines, Gantt Charts, Histograms, Bubble Charts, Step Charts, Spider Charts, Box Plots, Waterfall Charts, Mosaic Displays, Matrices, and many, many more (Camm, J., et. al., 2022).

The authors chose the following methods and techniques for the reason(s) indicated in order to best answer our research questions namely, box plots, scatter plots and tree maps that will be detailed in the next section of this article.

RESULTS AND DISCUSSION

The total advertising spend over an academic year, as calculated from the Kantar (2021) data, increased 6.7% from 2015-16 to 2016-17 for the 14 institutions examined. The distribution of the year-to-year advertising spend for this group shows an increase in all measures of central tendency. The data distribution is visualized using a box plot in Figure 1. The box plot demonstrates the distribution of the advertising spend each year, including measures of central tendency (mean, median), the range, 25th and 75th percentile values, and outliers.

Box plots are useful to see these characteristics of the distribution in a singular visualization and expand upon typically reported measures such as the mean.

## Figure 1. Distribution of Total Advertising Spend for Select Colleges/Universities
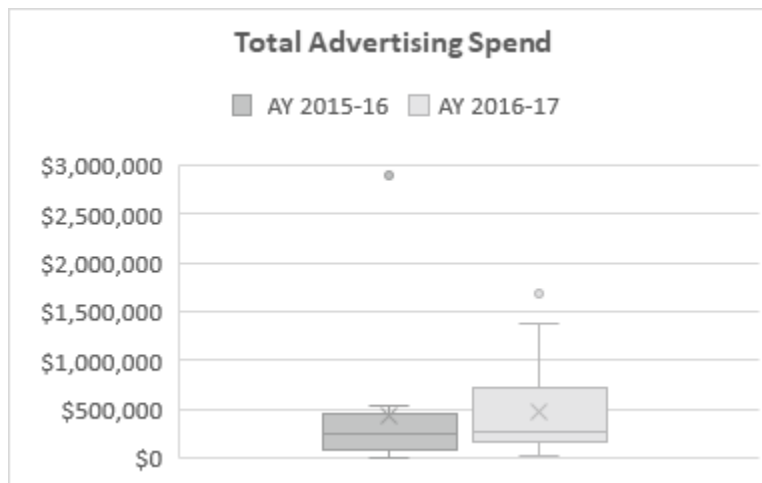
Given the undergraduate to graduate student ratios at the sample institutions, it is reasonable to assume that much of the advertising spend is designed to increase new undergraduate enrollment.

Nonetheless, when examining the total number of first-time, full-time undergraduate students for the sample institutions in the subsequent fall semesters, it was found that overall, there was a 9.5% decrease from fall 2016 to fall 2017. The data distribution is visualized using the box plot seen in Figure 2.

This was an initial indicator that a strong positive relationship did not exist between advertising spend and new undergraduate student enrollment for this sample of institutions during this time period.

Figure 2. Distribution of First-time, Full-time Undergraduate Cohort Enrollment for Select Colleges/Universities
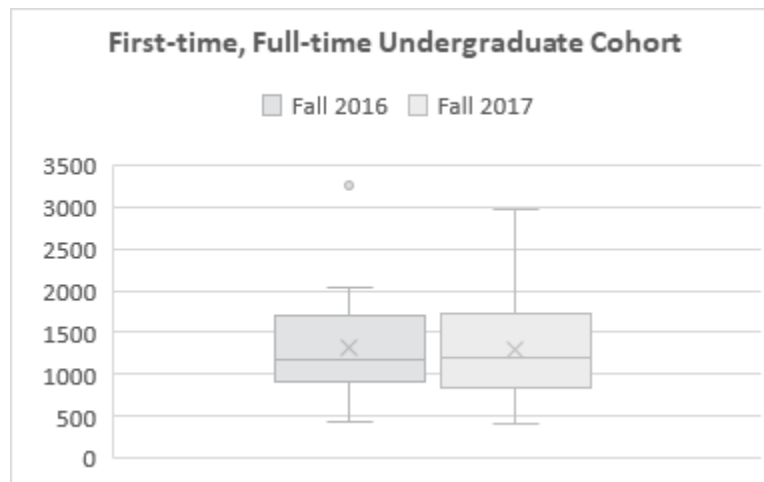
Further investigation into the relationship between advertising spend during an academic year and first-time, full-time undergraduate cohort size in the subsequent fall semester showed only a weak positive correlation between these variables ($r = .145$). A data visualization of this relationship using a scatter plot with a regression line showing the trend of the data set is shown in Figure 3.

**Figure 3. Scatter Plot of Advertising Spend vs. First-time, Full-time
Undergraduate Cohort Enrollment for Select Colleges/Universities**
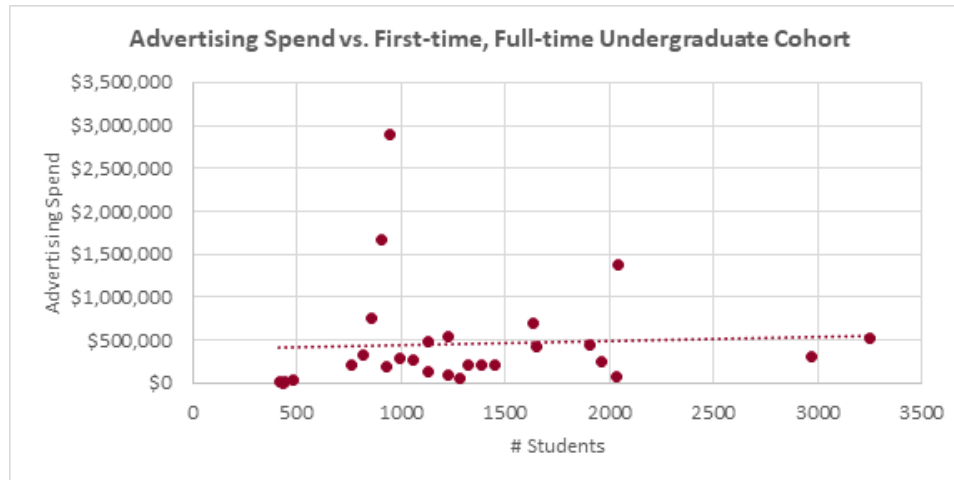
Given the weak correlation between advertising spend and the size of incoming undergraduate cohorts, a predictive model could not be developed using our current data sample. It is possible looking at a larger sample of institutions over a longer time period would allow for a stronger predictive model.   However, other characteristics of the data were examined to better understand the factors that would be available for larger scale analyses. Comparing the advertising spending by media type over the two-year period, the authors observed that, counter to expectations, internet display advertising spend actually decreased year over year. This might highlight the complexity of working with this data – different media types vary in terms of the ease of measuring effectiveness and likely have different levels of cost effectiveness over time. Thus, while spend may decrease in a category, it might be that an institution has become more effective in managing that media type. Tree maps of the spend by media type for each year are shown in Figures 4 and 5. Tree maps were chosen to visualize this information in order to quickly view the differences in advertising spend by media type in a single visualization. Nevertheless, the relationship between advertising expenditures in the higher education sector and college/university enrollments appears to be unrelated.

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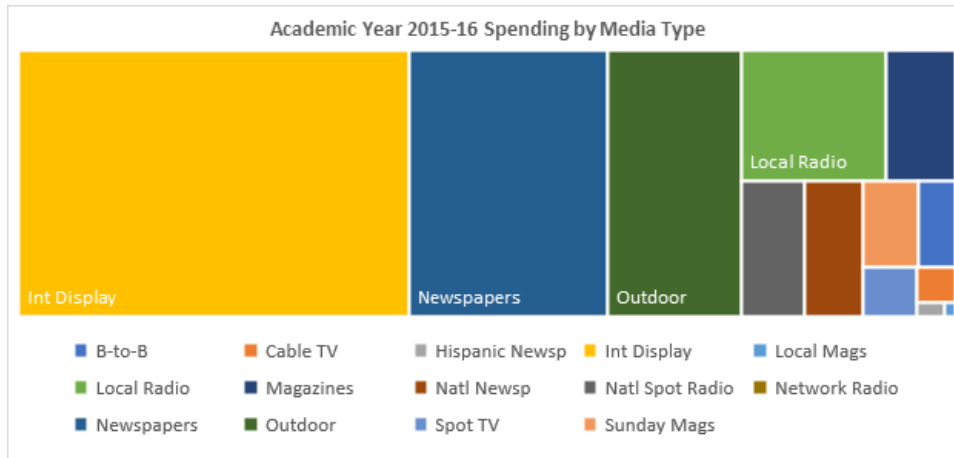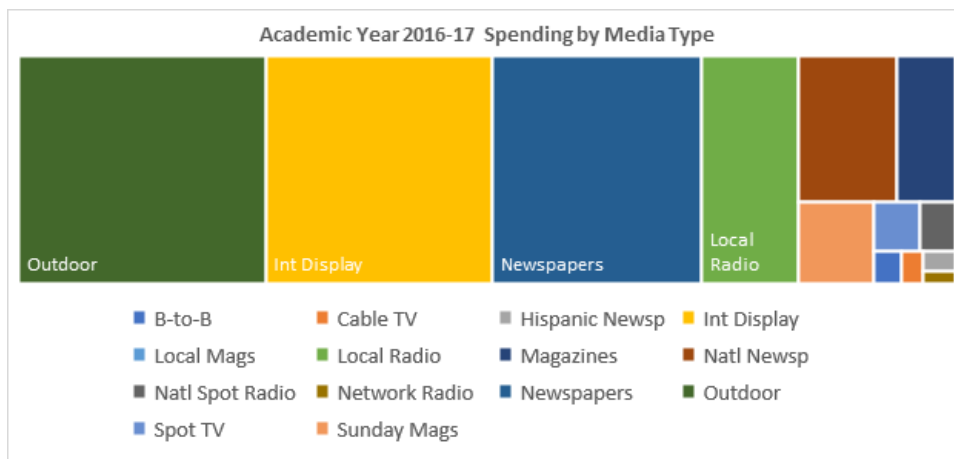**Figure 4. Advertising Spend by Media Type 2015-16.**

Figure 5. Advertising Spend by Media Type 2016-17.

CONCLUSIONS

The analysis of the data using the tools of business analytics on data acquired with information systems yielded results that make a contribution to the media planning function within the higher education sector. The advertising spending that colleges and universities leveraged over a given academic year does not appear to have an impact on new college/university enrollments. Given the relatively small sample size, these findings are of an exploratory nature and may be directional at best. There was a relatively high acquisition cost for the data for this study.

As such, future research will seek to expand in the investment to capture a larger sample size to include more colleges and universities and their associated advertising expenditures.

Advertising and sales promotion as a part of an integrated marketing plan are important influencers of consumer behavior in other sectors beyond higher education to include fast moving consumer goods and retail as an example. This has been proven empirically where the relationship between increased advertising expenditures and increased sales (in these sectors has been established (Myers, 2003). However, using the tools of information systems and business analytics, the failure to find a relationship between college/university advertising expenditures and new enrollments (a similar construct to business sales) may not follow the same pattern seen in business constructs. This is a major contribution of this study.

The results of this study suggest that other factors could confound the relationship of advertising expenditures and new student enrollments.

Sung & Yang (2008) found that at least one variable, was an important influencer of the supportive attitude of freshmen towards a college or university leading ultimately to an enrollment. Specifically, the attitude is the perception of how others view the university they belong to. Other variables included the university's /college's personality traits and reputation as significant influences, although not as strong. It may be that advertising expenditures have a weaker influence in the higher education sector on enrollments relative to more qualitative variables, such as reputational value whereas advertising expenditures are more positively correlated with brand equity and ultimately sales in other sectors (Kotler & Keller, 2015). Furthermore, other sectors have been developing and executing advertising for a longer period of time and with a greater frequency in comparison to the higher education sector. This relative novelty and relatively infrequent pattern versus other sectors could be another confounding factor (Bart, 2000).

Another factor that may be a key driver of the failure to find a relationship between college/university advertising expenditures and enrollments may be the absolute level of advertising expenditures in terms of dollar volume in higher education. U.S. colleges and universities demonstrated an increase in paid advertising.

In 2016 advertising expenditures were $1.65 billion a 19% increase over that of 2015 and 22% when compared to 2013 expenditures (Brock, 2017).

This pales in comparison to advertising expenditures in other industries where Proctor and Gamble (a fast-moving consumer foods company) alone spent 10.1 billion dollars on advertising in a similar period (The Marketing Fact Pack, 2017). These expenditures, continue to grow among major U. S. advertisers (Marketing Fact Pack, 2020).

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Furthermore, according to Market Line (2019), the top industries for advertising expendituresareretail,automotive,food/beverage,media,and telecommunications. These industries demonstrate advertising expenditures in excess of the levels reported for higher education overall.

As such, it is well documented that there is a positive correlation between the level advertising expenditures, brand equity and ultimately sales. These variables (with all things being equal) are positively correlated (Myers, 2003). It may be that advertising expenditures in the higher education sector are not at a high enough level to make an impact on key performance indicators (KPI), particularly new enrollments as explored in this study.

CHALLENGES AND LIMITATIONS

One limitation with this study is that the Kantar (2021) data does not capture direct marketing by institutions to prospective students. This begs the question, "Is paid advertising capture more effective for brand awareness than directly influencing consumer behavior?" A second limitation is that one cannot control for the quality of advertising or its success rate in reaching the intended target audience. In part, the observed higher level of advertising spending in higher education is relatively new and not mature when compared to other consumer industries so the differences may be of skill levels of the marketing teams of the higher education institutions or, perhaps, that insufficient funds are expended on advertising, the recent increase notwithstanding.

QUESTIONS FOR FUTURE RESEARCH

The authors expect to conduct research to address the following questions:
1. Should expectations for outcomes of higher education advertising be different than in other consumer industries?
2. What other variables should be included in models to determine whether advertising dollars are an effective way to improve outcomes such as institutional reputation, affinity, and geographic factors?
3. Is the goal of advertising an intermediary step prior to the desired final outcome and if so, is data available to measure those steps such as the impact of Campus visits?
4. Will a broader sample size of institutions of higher education change the results found in this study?

5. How do the study's finding compare internationally when examining advertising expenditures in other countries and new enrollments within higher education?

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