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‘We Don’t Need No Education’ – Or Do We? The Impact of Management Education upon Alumni Adoption of Strategy Tools

**BRITISH ACADEMY OF MANAGEMENT CONFERENCE
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‘We Don’t Need No Education’ – Or Do We? The Impact of Management Education upon Alumni Adoption of Strategy Tools

Abstract

The debate about the relevance of management education to management practice has been intense and full of contradictory findings, with increasing concerns about the application of management education within the workplace. Despite these concerns, there is relatively little evidence about whether graduates use the tools, techniques and concepts taught as part of management education. This paper addresses this gap by providing evidence from a large-scale survey on business school alumni’ patterns of adoption of those tools, techniques and frameworks typically taught within strategic management education. The results clearly indicate that education characteristics on four dimensions, level of formal education, exposure to and frequency of management training, and specificity of strategic management education, are important drivers in alumni adoption of strategy tools. Moreover, using regression analysis, we find a cumulative effect, that also indicates the relative weight of each of these educational characteristics in predicting tool adoption.

Key Words: Management Education, Management Training, Strategic Management, Strategy Tools, Relevance Debate

There has been a growing debate about the significance of business schools to management practice and, within that, the appropriateness and relevance of strategy theory to strategy practice (e.g. Academy of Management Journal, 2001; Baldrige, Floyd & Markóczy, 2004; British Journal of Management, 2001; Jarzabkowski & Wilson, 2006). This debate is driven by two concerns; the knowledge economy and the purpose of the business school. The EU has had a strong drive for higher education investment in order to advance the strategic goals of a knowledge-based economy (Sapir, 2003). This drive has increased the requirement for management education. While a knowledge economy is founded on a broad disciplinary base, management education, particularly at postgraduate level, is often taken to complement discipline-specific education and improve its application within the business context (Keep & Westwood, 2003; Porter & Ketels, 2003). Investment in management education is considered important for developing world class employees and competitive economies (CEML, 2002; Hirsh, Burgoyne & Williams, 2002; Leitch, 2006). Management education has thus proliferated over the past 20 years in response to the increasing demands for a knowledge economy (AACSB, 2002).

However, the role and value of management education has been increasingly questioned and even accused of producing major business flaws and failures, such as those of Enron and Worldcom (Whittington *et al.*, 2003). There is, therefore, concern about the application of management education within the workplace and, more broadly, the relevance of the business school (e.g. Brocklehurst *et al.*, 2007; Mintzberg, 2004; Pfeffer & Fong, 2002; Shareef, 2007; Thomas, 2006). Despite these concerns, there is, with some exceptions (e.g. Sturdy *et al.*, 2006; Legge, Sullivan-Taylor & Wilson, 2007), relatively little evidence about whether graduates use the tools, techniques and concepts taught as part of management education (Keep & Westwood, 2003).

This paper addresses this gap by providing survey-based evidence on business school alumni' patterns of adoption of those tools, techniques and frameworks typically taught within strategic management education. As it is not possible to undertake a detailed investigation of all management education tools and techniques in a single survey, strategic management education was surveyed for three reasons. First, strategy is commonly taught as a foundation course in business qualifications (Bower, 2008; Pettigrew *et al.*, 2002). Second, applicants to management courses typically express an interest in improving their strategic thinking (Bower, 2008; Carroll & Levy, 2005; Grant, 2008). Third, improving the quality and application of strategic management education is seen as one way to enhance management practice (Baldrige *et al.*, 2004; Bower, 2008; Grant, 2008; Ghoshal & Moran, 1996; Jarzabkowski & Whittington, 2008; Prahalad & Hamel, 1994; Whittington, Jarzabkowski, Mayer, Mounoud, Nahapiet & Rouleau, 2003).

The paper is in four sections. The first section provides a theoretical overview of existing debates about the positive and negative impacts of management education before outlining our research questions. Section two explains the survey-based research design. Section three presents our statistical findings on the impact of management education upon alumni adoption of strategy tools. In the final section we discuss these findings and their contributions.

THEORETICAL BACKGROUND

Criticisms of management education are based on what it taught in business schools, how it is taught and the extent to which the knowledge gained transfers into the workplace. First, management education is criticised for focussing excessively on hard skills that are not actionable in the real world. Managers are not provided with an appropriate set of 'soft', interpersonal skills such as communication, leadership and negotiation (Elmuti, 2004; Grey, 2004; Pfeffer & Fong, 2002; Simpson, 2006). Second, the way that management education is taught, through separation into functional and disciplinary areas, is criticised for providing

students with a fragmented thinking process that is in contrast with the complexity and uncertainty of real management practice (Elmuti, 2004; Gosling & Mintzberg, 2006; Monks & Walsh, 2001). Finally, teaching management education in the classroom primarily provides individual career benefits, with limited transfer of knowledge and skills to the workplace (Gosling & Mintzberg, 2006; Legge *et al.*, 2007). There are, therefore, calls for management education to incorporate the central role of action and to teach management as a craft rather than a science (Bailey & Ford, 1996; Jarzabkowski & Whittington, 2008). In order to increase real world benefit for individuals and organizations, managers' prior and current experience should be emphasized, thus moving away from the full-time postgraduate approach to one that incorporates more workplace-based and reflective learning (Gosling & Mintzberg, 2006).

Many of the above criticisms are expressed in theoretical terms. There has been surprisingly little research designed to evaluate and measure the impact of management education, with some exceptions (e.g. Legge *et al.*, 2007), so that many of these criticisms lack a solid and reliable empirical basis (e.g. Donaldson, 2002; Elmuti, 2004; Grey, 2004; Pfeffer & Fong, 2002; Simpson, 2006). Nonetheless, the scant and somewhat inconsistent research in this area gives credence to some of the posited criticisms. For example, across different studies, management education has consistently been found to develop 'hard' analytical skills but to have a less pronounced or even non-existent effect on 'soft' skills (Baruch & Peiperl, 2002; Kretovics, 1999; Simpson, Sturges, Woods & Altman, 2005). Thus, while management education is found to have a general impact on the development of managers' skills and competencies, indicating that there is some level of knowledge transfer from classroom teaching to the individual's skill profile (Cheng, 2000; Baruch & Peiperl, 2000; Ishida, 1997; Hay & Hodgkinson, 2008; Kretovics, 1999; Priem & Rosenstein, 2000; Simpson *et al.*, 2005; Sturges, Simpson & Altman, 2003; Wren, Habesleben & Buckley, 2007), criticisms of weak effects on soft skills are empirically supported.

Despite growing criticism, there is also conceptual support and some empirical evidence for the view that management education is vital for individual development and for increasing organizational performance and, indeed, for promoting a better society (Elmuti, 2004). For example, the positive effects reported indicate that management education develops management skills (Hay & Hodgkinson, 2008; Simpson *et al.*, 2005; Baruch & Peiperl 2000; Kretovics 1999; Ishida 1997; Elmuti 2004; Sturges *et al.*, 2003), broadens and challenges management perspectives (Hay & Hodgkinson, 2008; Baruch & Peiperl 2000; Ishida 1997) and makes managers more prone to try new things (Hay & Hodgkinson, 2008; Simpson *et al.*, 2005; Baruch & Peiperl 2000; Ishida 1997; Sturges *et al.*, 2003). Furthermore, there are suggestions that managers who engage in management education develop a thinking pattern that is closer to theory (Priem & Rosenstein, 2000). Theoretically-informed thinking is perceived to give managers analytic skills that are superior to anecdotal or 'folklore' ways of approaching management problems (Grant, 2008). For example, Baldrige *et al.* (2004) highlighted that management education is important because it teaches theories that hold both academic quality and practical relevance. That is, management education helps to discern which tools and frameworks are theoretically robust and hence, appropriate to transfer into management practice.

In summary, there have been intense debates on the impact of management education upon management practice, both in support of management education but also, increasingly, critical of its relevance. Much of this debate is conceptual but there is also some empirical support for both the benefits and the limitations of management education. For example, there have been empirical studies focussing on the content and way of teaching management education (e.g. Wren *et al.*, 2007), an assessment of the outcomes and benefits of management education (e.g. Hay & Hodgkinson, 2008; Ishida, 1997; Sturges *et al.*, 2003), a focus on the application and transfer of knowledge to the workplace (Cheng, 2000; Priem & Rosenstein,

2008), a concern with the impact of gender on management education outcomes (Simpson *et al.*, 2005) and an assessment of the impact of managers level of education in the skills that they developed (Baruch & Peiperl, 2000; Kretovics, 1999; Shipper, 1999). While valuable, these studies used different approaches and measures and still do not provide a solid and consistent assessment of the management education effect. Hence, empirical assessment is scant and existing findings are difficult to compare in order to develop any systematic knowledge about the impact of management education on individual practitioners, organizational contexts, or on the business environment more broadly.

In order to support our study, we now outline some specific characteristics of management education that may influence individual's propensity to adopt particular educational frameworks. In particular, we specify the concept of management education. Much of the relevance debate around management education is conducted without a proper discussion or explicit statement of what is meant by management education. For example, most studies only indicate implicitly that management education is an undergraduate or postgraduate course in management. Although it is not the intention of this paper to engage in a deep discussion about the concept of management education, it is necessary to explain the dimensions we are using to operationalize it in this paper. According to Hogan and Warrenfeltz (2003) education is the outcome of learning. Therefore, "management education would be shaping mental models and acquiring skills" (Elmuti, 2004: 440). Management education is about developing individuals' knowledge through an exposure to academic content and social interactions with other programme attendees (Raelin, 1995). The traditional management education approach is to teach management in the classroom using several pedagogical techniques, usually in degree-granting institutions (Elmuti, 2004).

The reported effects of formal management education are varied. Some empirical research reported that those with a Master of Business Administration (MBA) had acquired and developed more skills than those with no postgraduate education (Baruch & Peiperl, 2000; Kretovics 1999). However, Shipper's (1999) study found no real differences between MBAs and their non-MBAs counterparts in terms of managerial skills, albeit that his findings were developed from a survey of 1000 managers in a single large USA company. By contrast, Priem and Rosenstein (2000) revealed that graduates use the specific theories that they are taught. In fact, they provided evidence that MBA graduates hold cause maps that are closer to theory compared with other practitioners without postgraduate education or without any management education. Thus, the experience of having formal management education and also the level of education, in terms of undergraduate or postgraduate education appear to be important within the management education concept. For the purposes of this research, we considered one dimension of management education to be any type of formal programme resulting in the award of an undergraduate or postgraduate degree in some area of business or management within a degree-granting institution. This definition is important for capturing the management education that is the core business of the business school; teaching undergraduate and postgraduate students. By assessing management education as it most typically occurs within the business school, we are better able to contribute to debates about the relevance of the business school.

However, we accepted that management education may also occur outside formal degree programmes. In particular, we wanted to evaluate the influence of management training, as this is an under-researched area that is considered to have an impact on practitioner's skills and competences (Tharenou, Saks & Moore, 2007). According to Raelin (1997) management training develops individual knowledge and competence. Specifically, training is considered to increase practitioners' job performance, productivity and work quality and to be positively associated with individual and organizational outcomes (Tharenou *et al.*, 2007). Training can be defined as the "systematic acquisition and development of the knowledge, skills, and

attitudes required by employees to adequately perform a task or job or to improve performance in the job environment” (Tharenou *et al.*, 2007: 252). Johannessen and Olsen (2003) add that training is something that combines theory from formal education with practical tasks. For our purposes, and in order to distinguish it from the first dimension of our management education construct, management training is considered all the management programmes and short courses undertaken by practitioners outside formal degree programmes.

Finally, we considered issues of specificity, according to our interest in studying the influences of management education on adoption of strategy tools. Strategy tools are defined as “a generic name for any methods, models, techniques, tools, frameworks, methodologies and approaches which provide decision support” (Clark & Scott, 1999: 36). A strategy tool, such as Porter’s Five Forces, is a product of strategy theory, that is produced in order to disseminate theoretical knowledge within the classroom (Jarzabkowski & Wilson, 2006; Mazza & Alvarez, 2000; Spee & Jarzabkowski, 2009). Based on Priem and Rosenstein’s (2000) finding that graduates use the specific theories that they are taught, the extent of an individual’s strategic management education might therefore have an impact on adoption of strategy tools. While the previous dimensions of formal education and management training are general management education concepts, we therefore also incorporated a measure of specific strategic management education arising through either formal education or management training or some combination of the two.

By defining management education along these three dimensions, we are able to generate separate results for the different effects of each type of education, so developing a more specific understanding of what is meant by management education and its impacts. Additionally, we are able to combine the results, in order to analyze whether there are cumulative effects of management education that might indicate a richer and more complex understanding of the term. The aim of our paper is to address the dearth of empirical evidence on the relevance of management education by answering the following overarching research question: To what extent do the educational characteristics of alumni explain their patterns of strategy tool adoption? In order to answer this question, we examined the effect of the following educational characteristics on the adoption of strategy tools:

1. Formal business education at undergraduate and postgraduate level.
2. Exposure to management training.
3. Frequency of management training
4. Specificity of strategic management education.

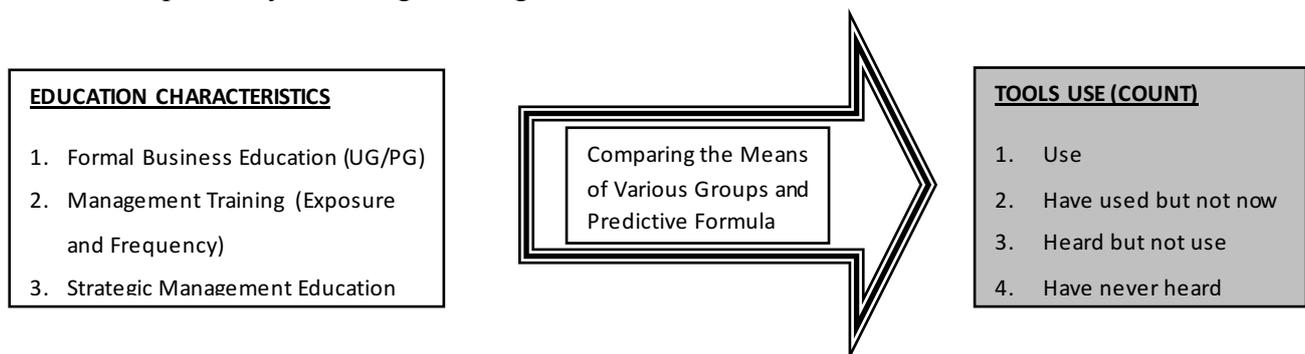


Figure 1: Conceptual Framework of Impact of Educational Characteristics on Patterns of Adoption

Our aim is to understand how these educational characteristics influence business school alumni patterns of adoption of strategy tools and frameworks that are typically taught in business schools. The unit of analysis is an individual business school alumnus. The purpose of looking at business school alumni, is to examine a group of practitioners who have been

exposed to management education, in order to ascertain which aspects of that management education they use within their workplace (Keep & Westwood, 2003). We assess patterns of adoption according to the number of tools used, including four possible dimensions of use: i) those tools currently used, ii) those that have been used but are not currently used; iii) those that the alumnus has heard of but not used; and iv) those of which the alumnus has not heard. Our conceptual framework is modelled in Figure 1.

RESEARCH DESIGN

Sampling and survey design

A survey method was used to evaluate the impact of education in the adoption and use of typical strategy tools by a population of domestic and international alumni from 12 of the top 30 UK business schools. Higher-ranked schools were selected because these schools have higher graduate employment, ensuring the target population is employed in positions where they might reasonably have an opportunity or need to use tools. As the study does not query how institutional ranking or quality of the educational experience shapes tool adoption, limiting the study to higher-ranked schools with high graduate employment was felt to control for unintended variation effects. The sample population covers both undergraduate and postgraduate alumni who have graduated within a 20 year period to allow for career progression effects. The limitations of surveys, for example in terms of self-report biases, are acknowledged and, where possible, have been addressed by the survey design.

In order to establish a list of tools most typically taught in foundation strategic management courses, a survey of 66 strategy academics in the top 30 business schools was conducted. We found that 11 tools were typically taught by between 75-100% of respondents, another 5 were taught by 50-74% and that was more variation below 50%. Using a cut off point of 40%, a list of 20 typically taught strategy tools was established as the basis of our survey. The list derived from this survey, included as Appendix A, reflects tools that have been used in previous surveys (e.g. Glaister & Falshaw, 1999; Hodgkinson *et al.*, 2006) and so provides confirmation that our study has captured those typically taught strategy tools. We then developed a survey instrument to map tool use according to alumni education characteristics, using existing measures where possible. However, as many existing studies are partial or use inconsistent measures, some questions and measures were developed through qualitative interviews. Three pilot studies of this survey were conducted, generating 76 responses in total. Results of each pilot were analysed, including questioning some respondents, in order to further shape the questionnaire and ensure the questions provided robust and practically meaningful measurements.

The survey was then administered online in 2007 to a population of 20,108 alumni in a sample of 12 out of the top 30 UK business schools. These schools were selected pragmatically because they were prepared to email our survey link to their alumni databases at this time period. The alumni population parameters of these schools are consistent with those of UK business schools within their league (top 30), inasmuch as these figures are known. The specific response rate from our target population (business school alumni who have done a foundation strategy course) is difficult to ascertain, as we do not have figures for non-responsive email accounts and were not able to isolate the datasets to include only those alumni in our target population but had to email to the alumni databases held by the various business schools. For example, in some schools strategic management is not a required course in some degrees, such as finance, operations research or personnel management, whereas in others it is. However, the response rate from total numbers emailed, without excluding non-responsive emails or non-target population, is 14.2%, suggesting that responses from the target population of those

alumni who have been taught foundation strategic management is at least 14.2%, from which we gained 1407 usable responses.

In addition to questions about alumni education and training characteristics, variation by individual characteristics is incorporated through personal demographics such as age, job tenure, job function and hierarchical position, which are not modelled here. These potentially moderating variables are not modelled in this paper, which presents the initial findings about the impact of management education on the use of strategy tools.

Measures

As illustrated in Appendix A, we assessed respondents use of strategy tools by asking them to indicate, against each of 20 tools typically taught in foundation strategy courses, which tools:

- they are currently using;
- they have used previously but do not use now;
- they have heard of but do not use; and
- they never have heard of.

We looked at how many tools each respondent listed under each of these categories. These responses were used to create four separate outcomes (dependent variables), in order to give a measure of respondents' adoption of strategy tools.

The four educational characteristics were measured as follows.

- Formal business education was assessed by asking respondents to select their highest business related education from a list of four categories: None; Undergraduate; MBA or other taught postgraduate; and others. In subsequent analysis, the frequency counts indicated that all participants could be grouped into two categories; undergraduates and taught postgraduates.
- Management training exposure was assessed by asking respondents to indicate if they had management training or not.
- If they responded yes to management training, they were asked to indicate frequency of training, which measure provided us with two categories: less than annually; and annually or more often.
- Finally we assessed specificity of strategic management training by asking the type, if any, of formal strategic management education they had received during management development courses; and/or as part of their formal education at undergraduate or postgraduate level. Respondents were asked to tick as many as applied, so that we could use a count in order to gain a measure of the extent of formal strategic management training in which they have been involved.

Before undertaking statistical tests, we checked the distributed properties of the dependent variables. As our sample is very large, normality was assessed simply by graphical means and also computing the z-scores of skewness and kurtosis (see Field, 2005: 72-73). Visual observation of the various graph indicated that all the variables follow a normal distribution. Also all values of z-scores of skewness and kurtosis (see Table 1) were found to be below the recommended upper threshold of 3.29 (see Field, 2005: 72), indicating that normality is not seriously violated.

We assessed homogeneity of the variance in the output of the t-test looking at the Levene's Test for Equality of Variances. In those case when the assumption of the homogeneity of the variance is violated ($p < 0.05$) then we report the values of *t*-test and significance for the cells "Equal variances not assumed". We now present the results of the statistical analyses we did of these educational characteristics in relation to the responses to tool use. We first present the results according to each educational characteristic separately and then present a regression

analysis that combines the effects of characteristics to determine which characteristics are more predictive of patterns of tool adoption.

RESULTS AND FINDINGS

The Level of Formal Business Education and Strategy Tool Adoption

Our first research question was concerned with investigating whether the level of formal business education, undergraduate or postgraduate, influences tool use. We examined this question by using a *t*-test for differences in the means of our four tool use outcome variables; the results are tabulated in Table 1. We found two very interesting patterns. Firstly, on the average, postgraduates “use” more tools ($M = 5.83$; $S.D. = 3.78$), than undergraduates ($M = 3.95$; $S.D. = 3.78$); this difference was significant ($t = -6.995$; $p = 0.000$). Also similarly there was a significant difference ($t = -2.836$; $p = 0.005$) between postgraduate ($M = 2.64$, $S.D. = 2.84$) and undergraduates ($M = 2.07$; $S.D. = 2.66$) on the number of tool they “have used before but are not using now”; although for both groups the number is smaller than the tool use outcome variable.

Dependent Variables	Formal Business Education	Descriptive			Levene's Test for Equality of Variances		t-test for Equality of Means	
		N	Mean (M)	Std. Deviation S.D.	F	Sig.	T	Sig. (2-tailed)
Count of tools 'use'	UG	246	3.95	3.76	0.930	0.335	-6.995	0.000
	PG	1009	5.83	3.78				
Count of tools that you "have used but do not use now".	UG	246	2.07	2.66	2.572	0.109	-2.836	0.005
	PG	1015	2.64	2.84				
Count tools that you "have heard of but don't use":	UG	246	6.70	4.58	6.160	0.013	3.207	0.001
	PG	1015	5.67	4.22				
Count of tools "have never Heard of"	UG	246	7.09	4.70	12.661	0.000	6.280	0.000
	PG	1015	5.07	3.82				

Table 1: Descriptive Statistics, Levene’s Test and T-test for Formal Business Education

These results indicate that a higher level of formal business education, in terms of a postgraduate as opposed to undergraduate degree, results in the use of more tools. Postgraduates have also used a larger number of tools that they no longer use. As Table 1 shows, increased use by formal level of education is reinforced by the fact that undergraduates (UG) have a higher mean than postgraduate (PG) for the tools "have heard of but don't use" and also tools "have never heard of". All of these differences were found to be highly significant (see that $p < 0.001$ in column under t-test for Equality of means in Table 1).

Management Training and Strategy Tool Adoption

Research questions 2 and 3 examined whether exposure to, and also the frequency of, management training (e.g. short courses, seminars, workshops) influences tool use. We measured exposure on a yes/no basis and, where the respondent answered yes, defined management training frequency as ‘infrequent’, meaning training less than once a year or

‘frequent’, meaning training once a year or more. Here again, we used a t-test to examine whether attending management training influences tool use on our four outcome variables. The results are summarised in Table 2.

Dependent Variables	Exposure to Management Training	Descriptive			Levene's Test for Equality of Variances		t-test for Equality of Means	
		N	Mean	Std. Deviation	F	Sig.	t	Sig. (2-tailed)
Count of tools 'use'	Yes	858	6.10	3.85	2.048	0.153	7.952	0.000
	No	540	4.45	3.62				
Count of tools that you "have used but do not use now".	Yes	858	2.62	2.81	0.052	0.820	1.138	0.255
	No	540	2.44	2.94				
Count tools that you "have heard of but don't use":	Yes	858	5.42	4.11	6.307	0.012	-4.349	0.000
	No	540	6.45	4.48				
Count of tools "have never Heard of"	Yes	858	5.27	3.99	3.957	0.047	-2.656	0.008
	No	540	5.87	4.21				

Table 2: Descriptive Statistics, Leven’s Test and T-test for Exposure to Management Training

Examination of Table 2 indicates two interesting results. Those who have been exposed to management training ($M = 6.10$; $S.D. = 3.85$) use more tools than those not exposed to management training ($M = 4.45$; $S.D. = 3.62$); and this difference was found to be highly significant ($p = 0.000$). Also for the variable “have used but no not use now”; exposure to management training ($M = 2.62$; $S.D. = 2.81$) leads to higher tool use than for those not exposed to management training ($M = 2.44$; $S.D. = 2.94$). This difference was however not significant ($p = 0.255$). Nonetheless, this trend is reinforced by the fact that those with no management training have a higher number of tools that they “have heard but don’t use” ($M=6.45$; $S.D.=4.48$ vs $M=5.42$; $S.D.=4.11$) and “have never heard of” ($M=5.87$; $S.D.=4.21$ vs $M=5.27$; $S.D.=3.99$). In both cases the differences were highly significant ($p=0.000$ and $p=0.008$).

Table 3 also indicates that on the average participants with frequent management training ($M = 6.44$; $S.D. = 3.93$) use more tools than those with infrequent training ($M = 5.41$; $S.D. = 3.63$) and this difference was highly significant ($p = 0.000$). However, there was no significant difference in the outcome variables, tools that you "have used but do not use now" ($p = 0.482$), and tools that you "have heard of but don't use" ($p = 0.057$). Nonetheless, the trend for a positive impact of management training is reinforced by the fact that participants with infrequent management training have more tools they “have never heard of” ($M=5.77$; $S.D.=3.98$) than those with frequent management training ($M=4.99$; $S.D.=3.91$). This difference was highly significant ($p=0.004$).

Dependent Variables	Frequency of Management Training	Descriptive			Levene's Test for Equality of Variances		t-test for Equality of Means	
		N	Mean	Std. Deviation	F	Sig.	t	Sig. (2-tailed)
Count of tools 'use'	Infrequent	365	5.41	3.63	0.646	0.422	-3.963	0.000
	Frequent	524	6.44	3.93				
Count of tools that you "have used but do not use now".	Infrequent	365	2.55	2.94	1.834	0.176	-0.704	0.482
	Frequent	527	2.68	2.76				
Count tools that you "have heard of but don't use":	Infrequent	365	5.79	4.20	0.103	0.748	1.906	0.057
	Frequent	527	5.26	4.04				
Count of tools "have never Heard of"	Infrequent	365	5.77	3.98	0.309	0.578	2.901	0.004
	Frequent	527	4.99	3.91				

Table 3: Descriptive Statistics, Leven's Test and T-test for Frequency of Management Training

Examination of Tables 1 and 2 indicates that exposure to management training ($M = 6.10$) made participants use more tools than their highest level of formal business education (see PG with $M = 5.83$). Similarly, examination of Tables 1 and 3 indicates that frequency of management training ($M = 6.44$) made participants use more tools than their highest level of formal business education (see PG with $M = 5.83$). These results are examined further below.

Strategic Management Education and Strategy Tools Adoption

Our fourth research question examines whether the amount of formal strategic management training that alumni have had is related to their tool use. We examined this by computing a correlation between this variable and our four tool use outcome variables. Table 4 shows that there is a significant relationship between the 'amount of strategic management education' and 'tool use' ($p < 0.01$); however the correlation is small $r = 0.14$ ($R^2 = 0.02$ or 2%). The results were also the same for 'tools used but not used now'; where we found a small positive correlation $r = 0.13$ ($R^2 = 0.017$ or 1.7%). As expected the other tool use variables exhibited a significant negative correlation.

		count of strategic management education
count of tools 'use'	Pearson Correlation	0.140**
	Sig. (1-tailed)	0.000
Count of tools that you "have used but do not use now".	Pearson Correlation	0.130**
	Sig. (1-tailed)	0.000
Count tools that you "have heard of but don't use":	Pearson Correlation	-0.084**
	Sig. (1-tailed)	0.001
Count of tools Have never Heard of	Pearson Correlation	-0.145**
	Sig. (1-tailed)	0.000

Table 4: Pearson Correlation Coefficients

Cumulative Educational Characteristics and Strategy Tools Adoption

In the above analyses, we have been evaluating the impact of each educational variable upon tool use in isolation. We are, however, interested in examining in greater detail whether a combination of these education characteristics results in greater tool use. We thus developed a variable to indicate the *level of business education* (Super3i Education Grouping) of different participants; defined by the combination of the various educational variables in which they have been involved. The educational characteristics we use are formal business education in terms of undergraduate (UG) or postgraduate (PG); their strategic management (SM) training and the frequency of their management training (infrequent or frequent). Based on the significant variations found for each of these variables in isolation, we came up with six main groups intended to broadly capture least to most educated, as follows:

1. UG with no SM and no management training
2. UG with SM, but no management training
3. UG with SM and mgt training (both frequent and infrequent)
4. PG with SM and no management training
5. PG with SM and infrequent management training
6. PG with SM and frequent management training

We used a one-way ANOVA with a Turkey multiple comparison *post hoc* test to examine the differences in means, and to give an indication of which of the four educational characteristics is the most significant determinant for tool use. With the exception of tools that you "have heard of but don't use", we found that there were significant differences in all the tool use outcome variables (see Table 5).

	F	Sig.
Score (count) of tools 'use'	25.276	0.000
Count of tools that you "have used but do not use now".	2.186	0.068*
Count tools that you "have heard of but don't use":	7.098	0.000
Count of tools Have never Heard of	13.185	0.000
* not significant at ($p < 0.05$)		

Table 5: Extract from ANOVA Table

We further examine the cell means of two of our outcome variables in Table 6. As Table 6 and the charts in Figure 2 indicate PG (keeping SM training as constant) with frequent management training results in more use of tools than any of the other groups. As shown by the slope in Figure 2, the number of tools used increases steadily as participants add levels of education, with the exception of our category UG with strategic management but no management training, which variation may be explained by the relatively low number of respondents in this category, so that their results are not indicative. There is also a slight decrease from UG with management training to PG with no management training, which indicates that management training is highly important to ensure a higher use of strategy tools. Indeed, is worth noting the substantial impact of management training on the number of strategy tools used by undergraduates, who were otherwise lower tool users than postgraduates in our analysis of the formal education variable in isolation.

	Count of tools 'use'			Count of tools that you "have used but do not use now".		
	N	Mean	Std. Deviation	N	Mean	Std. Deviation
UG with no Strategic Management & no Management Training	12	3.750	3.980	12	1.333	1.231
UG with Strategic Management, but no Management Training	94	2.787	3.175	94	1.936	2.727
UG with Strategic Management and Management Training (both Frequent & infrequent)	126	4.937	3.898	126	2.302	2.760
PG with Strategic Management Training and no management Training	360	4.869	3.504	362	2.580	2.913
PG with Strategic Management Training & Infrequent management Training	247	6.069	3.693	247	2.530	2.789
PG with Strategic Management Training & frequent management Training	377	6.748	3.844	379	2.815	2.824

Table 6: Descriptive Statistics of Groups

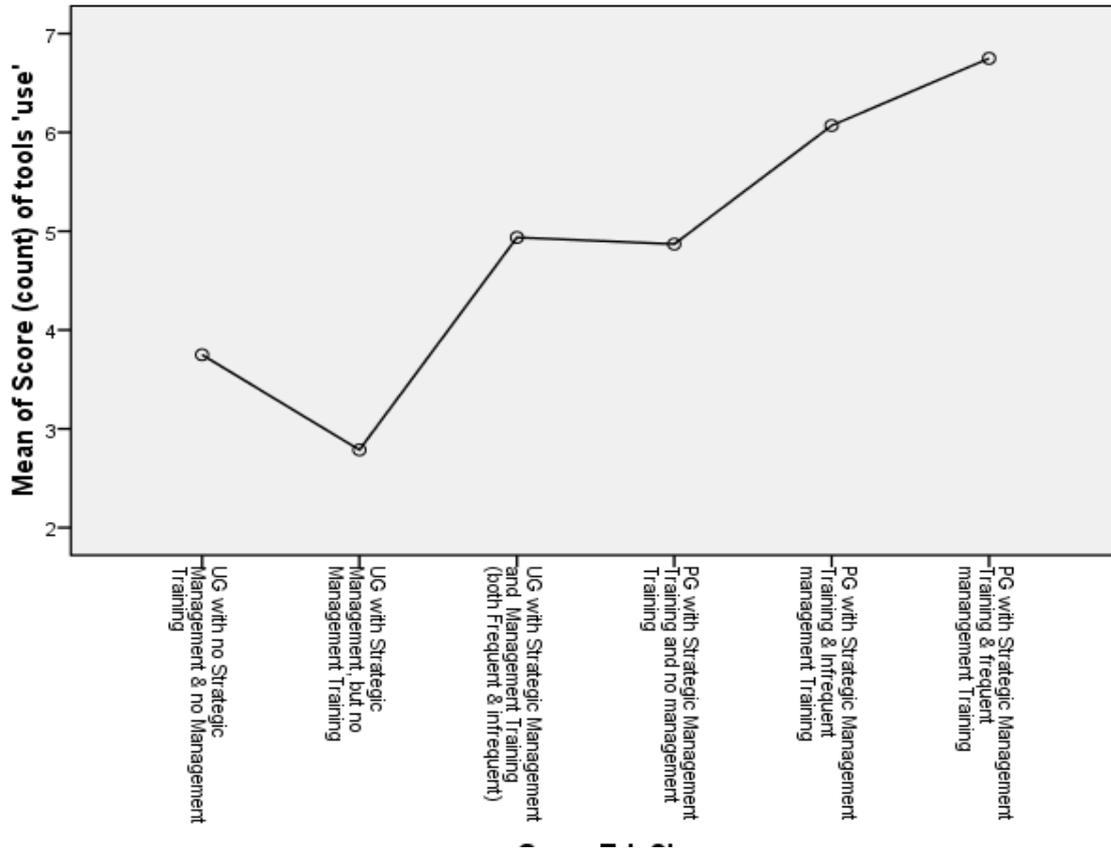


Figure 2: Chart of the Means of Groups

Table 6 and Figure 2 confirm and extend our initial findings. We know from our previous analysis that PG participants use more tools than UG; we also know that the more SM training participants have, the more tools they use; and we also know that having frequent management training results in participants using more tools than being a PG or UG. Table 6 confirms that there is a cumulative effect of these educational characteristics, which also bears further examination.

We further investigated the apparent cumulative effect in a regression analysis using 3 of our educational variables, with the aim of having a better understanding of the part played by each of the 3 variables in accounting for the variance in one of the outcome variables (tool use). Our aim also is to develop a predictive formula that can indicate probable strategy tool selection considering various combinations of our educational characteristics.

We used a dummy-variable coding system to code PG/UG and management training (yes/no) as dichotomous variables. As participants could enter multiple responses for the strategic management training question, we entered strategic management training as a continuous variable in a multiple regression equation. We also specified a regression equation as below where we are interested to look at the t-values and their significance (if $p < 0.05$) of the unstandardised estimated coefficients to give an indication of their predictability of tool use.

$$Y = B_1X_1 + B_2X_2 + B_3X_3 + B_0 \quad \dots \text{Equ 1}$$

Where Y is the dependent variable, tool use

X_1 is coded 1 for PG and 0 for UG

X_2 is coded 1 if yes to management training and 0 if no management training

X_3 is count (continuous) of the specificity of strategic management training (and it can have positive values including 0 (no training)); and $B_{1,2}$ are the unstandardised estimated coefficients to be estimated from the regression analysis. B_0 is the intercept and represents when all the independent variables take a zero value (also includes the error of our estimation).

Table 7: Model Summary – Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.193 ^a	0.037	0.036	3.783	0.037	48.036	1	1247	0.000
2	0.287 ^b	0.082	0.081	3.695	0.045	61.114	1	1246	0.000
3	0.299 ^c	0.090	0.087	3.681	0.008	10.275	1	1245	0.001

a. Predictors: (Constant), PG/UG

b. Predictors: (Constant), PG/UG, mgt training

c. Predictors: (Constant), PG/UG, mgt training, strategic management education (SM)

d. Dependent Variable: Score (count) of tools 'use'

The model summary (see Table 7) indicated that our 3 educational variables can account for about 9.0% ($R^2 = 0.090$; $\Delta F = 10.275$; $p < 0.001$) of the variance in tool use. The value of $R^2 = 0.090$ although small is however highly significant ($p < 0.001$); indicating that we can use these educational characteristic in explaining tool use. The Table also confirms our earlier results that as compared to strategic management training, having management training accounts for more variance in tool use ($\Delta R^2 = 0.045$; $\Delta F = 161.114$; $p = 0.000$).

An examination of the R Square Change (ΔR^2) in Table 7 (see change statistics columns) also confirms our earlier results that as compared to formal business education (PG/UG) ($\Delta R^2 = 0.037$; $\Delta F = 48.036$; $p = 0.000$) and strategic management training ($\Delta R^2 = 0.08$; $\Delta F = 10.275$; $p = 0.001$), having management training accounts for more variance in tool use ($\Delta R^2 = 0.045$; $\Delta F = 16.114$; $p = 0.000$). Indeed, management training ($\Delta R^2 = 0.045$) accounts more than 5 times as much than as strategic management training ($\Delta R^2 = 0.08$).

Predictive Modelling of Educational Characteristics and Strategy Tool Adoption

We turn our attention now to unstandardised estimated coefficients in model 3 of Table 8 to give the predicted values in equ1 as follows

$$Y = 1.71X_1 + 1.56X_2 + 0.55X_3 + 2.43 \dots \dots \text{Equ2}$$

The estimated regression coefficients listed in Table 8 (column B) have been used to develop the predicted equation Equ2 which can be used to determine the expected number of tools to be used by people with different levels of business education. For instance an 'average' undergraduate with no other business education is expected to use 2.43 tools but if the same 'average' person acquires postgraduate qualifications the expected number of tools would increase to 4.14.

Table 8: Regression Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	3.963	.243		16.331	.000					
PG/UG	1.874	.270	.193	6.931	.000	.193	.193	.193	1.000	1.000
2 (Constant)	3.014	.266		11.315	.000					
PG/UG	1.762	.264	.181	6.662	.000	.193	.185	.181	.997	1.003
mgt training	1.684	.215	.212	7.818	.000	.222	.216	.212	.997	1.003
3 (Constant)	2.431	.322		7.562	.000					
PG/UG	1.705	.264	.175	6.457	.000	.193	.180	.175	.993	1.007
mgt training	1.564	.218	.197	7.179	.000	.222	.199	.194	.968	1.033
SM	.548	.171	.088	3.205	.001	.136	.090	.087	.965	1.036

a. Dependent Variable: Score (count) of tools 'use'

Using the estimated coefficients from Table 8 it is possible to calculate the expected number of tools used by people with different types and combinations of business education. A few illustrative examples are provided in Table 9. This Table shows that increasing level of business education are associated with a higher expected number of tools used, with the highest marginal impact on tool used being driven by the acquisition of postgraduate education. This contrasts with the previous indications that management training was the most important factor driving tool adoption. This finding illustrates the importance of combining variables in order to determine their relative weight in predicting strategy tool adoption. While management training was the leading effect when observed in isolation, after filtering for the effect of postgraduate level formal education, it is important but is not the most important effect. Thus, what we were capturing in the descriptive analysis prior to the regression analysis was the fact that the majority of people with management training also have postgraduate level education and so we were measuring a double effect. Nonetheless, both sets of findings are important in indicating the types of management education that are typically found together, their importance in isolation and their relative weight in combination, for explaining patterns of strategy tool adoption.

<u>Level of Business Education</u>	<u>PG/UG</u>	<u>MT</u>	<u># of SM</u>	<u>Y (TOOL USE)</u>
UG with no Management Training & no Strategic Management	0	0	0	2.43
UG with, but Management Training no Strategic Management	0	1	0	3.99
UG with Management Training & 1 Strategic Management	0	1	1	4.54
PG with Management Training and no Strategic Management	1	1	0	5.70
PG with Management Training & 1 Strategic Management	1	1	1	6.25
PG with Management Training & 2 Strategic Management	1	1	2	6.80
PG with Management Training & 3 Strategic Management	1	1	3	7.35

Table 9: Prediction of Mean Number of Tools

DISCUSSION

This paper set out to analyse the extent to which the educational characteristics of alumni explain their patterns of strategy tool adoption, by examining the effect of the following educational characteristics on the adoption of strategy tools:

1. Formal business education at undergraduate and postgraduate level.
2. Exposure to management training.
3. Frequency of management training
4. Specificity of strategic management education.

We have conducted analysis of each of these characteristics in isolation before analysing their cumulative effects. We now summarise our overall findings and discuss them. Using the t-test, we showed that a higher level of formal business education (postgraduate over undergraduate) results in greater use of strategy tools by an individual alumnus. The t-test also showed that exposure to and frequency of management training results in greater use of strategy tools by an individual alumnus. We use a correlation analysis to show that the more specific strategic management training that participants have had, the more tools they will use. Finally, we used regression analysis to generate a finer-grained understanding of the part played by each of our 3 educational variables and have found that formal business education at postgraduate level can account for the most variance in tool use, followed by management training and that these effects explain much more of the variance than specific strategic management education. Hence, broad levels of education in terms of formal education and management training are more important in adopting strategy tools than specific strategic management education. However, all of these educational characteristics explain some variation in tool use, which enables us to assert that management education across multiple dimensions is an important factor in alumni adoption of strategy tools within their workplace.

One of the main motivations for this study was to contribute reliable and comprehensive empirical evidence to further the relevance debate on management education. This relevance debate emphasizes the existence of contradictory views. On one hand there are some empirical assessments that generally report important benefits of management education although there

is some consensus that the effect of management education in the so-called 'soft' skills is weak. On the other hand, there is increasing criticism of management education, which is normally based on theoretical arguments. The critics blame management education for not being relevant for practitioners and call for different educational content and pedagogical techniques to enhance the relevance of the business school.

Based on these contradictory arguments, we might have expected ambiguous results from our study of the impact of management education on strategy tool adoption. However, our results strongly indicate a powerful effect of management education. Our results suggest that the greater the exposure to management education, the more that individuals use the techniques, tools and frameworks taught in business schools, at least in the area of strategic management. Our findings thus confirm and extend those studies that indicate that education makes practitioners eager to incorporate their learning into their practice (Cheng, 2000; Hay & Hodgkinson, 2008; Simpson *et al.*, 2005). In particular, our finding that increasing levels of education increase the use of tools gives credence to others' suggestions that management education may increase practitioners self-confidence and sense of self in the workplace (e.g. Baruch & Peiperl, 2000; Hay & Hodgkinson, 2008; Ishida 1997; Simpson *et al.*, 2005; Sturges *et al.*, 2003). Indeed, the fact that those with higher formal management education and management training are also more likely to have used tools that they no longer use (see Tables 1-3), indicates that these more educated practitioners may be more prepared to experiment with a range of tools and also to discard them if they are not suitable to their contexts or purpose.

The evidence that formal management education at postgraduate level and exposure to and frequency of management training increases the use of strategy tools may be explained in two ways. First, increased use may be based in the teaching approach (Knowles, 1990), as postgraduate and management training tend to use a combination of case method and practical experience and, particularly for MBA and management training, often requires practical experience as a prerequisite for enrolment (Christensen & Hansen, 1981; Greiner *et al.*, 2003). These characteristics may increase the relevance of tools to the individual at the time of learning (Knowles, 1990) and, hence, their retention in the workplace. In particular, the results for management training may be related to the fact that managers remain in the workplace and can immediately make interactions between learning and their practice in order to instantly test some of their new learning. In fact, they can engage in a reflective learning experience which may be more fruitful in promoting learning (Elmuti, 2004; Gosling & Mintzberg, 2006). These findings thus provide support for those scholars within the relevance debate who call for greater incorporation of management experience during the learning process (Bailey & Ford, 1996; Bower, 2008; Elmuti, 2004; Gosling & Mintzberg, 2004; Jarzabkowski & Whittington, 2008).

However, it is important to recognize that our study did not test whether management training resulted in an increase in the specific tools taught during that training. Rather, we found that management training in general increased the use of strategy tools specifically, even where strategic management education remained constant. Hence, it appears that exposure to management training increases the general learning characteristics of the participant and makes them more prone to use their repertoire of educational tools. This finding may be explained by the belief that training is generally positive because it increases the knowledge of individuals (Raelin, 1997) and makes managers more prone to try new things (Hay & Hodgkinson, 2008; Simpson *et al.*, 2005; Baruch & Peiperl 2000; Ishida 1997; Sturges *et al.*, 2003). There may also be career effects here (Milton, 2008), as postgraduates and management training participants have often self-selected or been selected for management training as a career move (Baldwin & Ford, 1988). Interestingly, an undergraduate education, supplemented by management training gave a similar level of tool use to a postgraduate education with no management training, which further supports the notion that career effects may be influential

in this finding, as undergraduates who engage in post-education training are likely to be those on a career trajectory.

The results of this research have also demonstrated that there is some relationship between the number of strategy tools used and the amount of formal strategic management education that participants have had. It is reasonable to assume that having a more focused education on strategic management would increase the number of strategy tools that an individual would know and therefore be able to use. Furthermore, this result is congruent with the finding that the content of management education shape management cause maps and mental models (Priem & Rosenstein, 2000). The fact that education content does make a difference may also suggest that business schools and scholars need to think carefully about the consequences of what they are teaching in order to avoid damaging outcomes. Indeed, Donaldson (2002) and Ghoshal and Moran (1996) aver that some theories taught in business schools (e.g. agency theory, institutional theory, transaction cost theory) are the cause of some bad management practices and behaviours. However, we must point out that specific management education had the least predictive effect on strategy tool adoption compared with broader characteristics of formal education and management training. Hence, specificity of educational content may not be as dominant in driving workplace practices as the fact of education itself.

Generally, our results are interesting and make an important contribution to the relevance debate because they confirm that management education does have a positive impact on alumni's adoption of strategy tools in their workplace. However, whether this is a beneficial thing or not it is a double-edge sword. That is, if we are certain that traditional business schools model are appropriate and efficient then the impact of management education on tool adoption in the workplace can be seen as beneficial. On the other hand, if some of the critics of management education are correct then the impact we found may be dangerous and may be at the core of bad management practices, a charge that has been levelled at business schools (Ghoshal & Moran, 1996; Ghoshal, 2005; The Economist, 2008; Whittington *et al*, 2003).

CONCLUSION

Our results clearly indicated a strong impact of management education in the workplace practice of business school alumni. All of the educational characteristics measured in this research (level of formal education, management training and strategic management training) demonstrated that management education does have an effect on the tools that alumni use in their workplaces. Although these results do not enable us to conclude that management education is beneficial to management practice, they, at least allow us to fuel the relevance debate by saying that education is relevant, insomuch as what we teach has an effect on what practitioners use in their workplace. Therefore, the scope of these results are broad and profound. They mean that instead of discussing if management education is transferred into management practice, we should be more concerned in ensuring that the effect is beneficial. The fact that education does matter also increases the responsibilities of those who teach management practice. While the findings of this research will not end the relevance debate, they add a reliable, robust and consistent body of empirical evidence on the impact of management education on individual alumni's propensity to use strategy tools. Future research can build on the findings in this study, to develop a stronger empirical basis with which to take the relevance debate forward.

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**APPENDIX A:
LIST OF STRATEGY TOOLS SURVEYED FOR PATTERNS OF USE**

Strategy tools	Currently Use	Have used but do not use now	Heard of but never used	Never heard of
Scenario Planning				
Dynamic Capabilities analysis				
Corporate Parenting Matrices				
SWOT				
Value Chain				
Porter's Five Forces				
Globalisation Matrices				
Strategic Groups Analysis				
Resource-Based Analysis				
Portfolio Matrices, e.g: BCG or McKinsey				
Bowman's Strategy Clock				
Merger and Acquisition Matrices				
PESTLE Analysis				
Porter's Diamond				
Benchmarking				
Industry Life Cycle				
Porter's Generic Strategy Model				
Key Success Factors				
Balanced Scorecard				
Methods of Expansion Matrices				
Ansoff's Product/Market Matrix				
Core Competences analysis				