
ORIGINAL ARTICLE

A comparison of the academic outcome of chiropractic students on full-time and full-time equivalent chiropractic education routes

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Objective: To compare the academic equivalence of full-time (FT) and full-time equivalent (FTE) delivery routes for chiropractic training and to assess nontraditional education delivery as a viable method for training chiropractors.

Methods: A retrospective analysis of student summative assessment data was undertaken on a total of 196 FT and FTE students studying for the master's in chiropractic degree at a UK chiropractic college between 2009 and graduating by 2017. The analysis consisted of within-group comparison and between-group comparisons using the Kruskal-Wallis test and the Mann-Whitney U test.

Results: The demographics of the 2 student groups varied in terms of gender and age distribution. The analysis of summative data indicated no differences between the 2 routes of delivery. There was also no difference in the distribution of final degree classification outcome between the 2 routes.

Conclusions: While it is possible that demographic differences influence the outcomes in each training route, this preliminary study indicates that, based only on analysis of overall achievement, there is no difference in either FT or FTE programs in training chiropractors, allowing them to register with the UK regulatory body. It suggests that a nontraditional mode of delivery is an achievable route to qualification as a chiropractor, enabling a greater number of students to consider chiropractic as a career choice while managing other life commitments.

Key Indexing Terms: Achievement; Career Choice; Chiropractic; Students

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INTRODUCTION

The nature, structure, and teaching methodology of chiropractic programs offered at chiropractic schools varies considerably around the world. According to a 2005 guideline by the World Health Organization, regardless of the model of education utilized, student chiropractors must spend no fewer than 4200 hours (or the equivalent) in 4 years of full-time education.¹ This includes a minimum of 1000 hours of supervised clinical training.²

In the United Kingdom, the educational criteria and standards for chiropractic education are set and regulated by the General Chiropractic Council (GCC),³ the statutory body responsible for regulating chiropractic practice in the United Kingdom. The criteria and standards cover all aspects of chiropractic education and allow the GCC to monitor the education providers, ensuring that chiropractic students are trained to deliver high levels of patient care and safety.

The McTimoney College of Chiropractic (part of BPP University School of Health) is 1 of 4 chiropractic schools based in the United Kingdom and offers 2 different routes

for students to study for the master's in chiropractic (MChiro). The programs are a 4-year full-time (FT) route and a 5-year full-time equivalent (FTE) route. The latter is a "nonstandard" mode of delivery run over an extended time period. Although in the United States many students who begin on a traditional "standard" delivery mode may transfer to a nontraditional delivery, McTimoney College of Chiropractic is currently the only college in the United Kingdom to offer such extended education delivery options as a student choice at the outset of chiropractic training. The FTE program was designed to respond to the rapidly changing environment in higher education and produce chiropractic graduate professionals who are able to deliver chiropractic care competently and safely within the standards of the profession and the laws of the United Kingdom.^{3,4} Both MChiro programs at McTimoney College of Chiropractic are recognized and accredited by both the UK regulatory body, the GCC, and the European Council for Chiropractic Education. This recognition results from rigorous accreditation processes by both bodies, coupled with an annual monitoring and reporting process.

Although the FTE format is unique in chiropractic training, this delivery system is not an unusual phenomenon in other educational settings. Adults have learned in systems that are outside formal settings for many years.⁵ Such “nonstandard” programs tend to attract a different student demographic, the so-called nontraditional students.² This type of student population tends to be intrinsically motivated, focused, responsible for their own learning, and capable of excellent academic achievement.^{5,6} However, they are demographically different and learn differently from the traditional student group and often have time restrictions due to many external responsibilities and commitments.⁷

Compared with the more traditional FT route, the FTE route is delivered in a classic extended weekend and summer school format across a longer academic year, with the academic year for this route running from January to November in each year. The curriculum comprises 4 years of academic and practical studies followed by a clinical practice year in a community chiropractic clinic setting. In each FTE academic year, there is an intense weeklong residential school. The students also undertake internal and external observation sessions with qualified practitioners across chiropractic and multidisciplinary practice.

The FT route is a more traditional 4-year FT route designed to attract those students coming straight from UK secondary education or some form of equivalent vocational qualifications. The FT route is delivered in a normal academic year format, during the working week, running from September to July. It comprises 3 years of academic and practical studies followed by a clinical practice year in a community chiropractic clinic setting for the final year. Observations are undertaken by students in exactly the same way as the FTE route.

It is important to note that both routes include the same modules and content; have the same learning support materials, including recorded lectures on the virtual learning environment; and have the same learning outcomes and assessment schedules. In both routes, the learning and competencies are assessed prior to entering clinic through the same clinic entrance examination, ensuring that all preclinical learning outcomes have been met to the same standard across both routes before commencing the clinic year. The students on both routes complete the same final clinic year, attend the same group clinical teaching sessions, and are assessed alongside each other in exactly the same way throughout that year. This includes the completion of either a research project or a practice-based equivalent during the final year of study. All examinations, including the final assessment, are overseen by the same external examiners and presented to the same examination boards. The final award is a master’s degree qualification at the Framework for Higher Education Qualifications (FHEQ) academic level 7. The various modules and subject areas are integrated both horizontally and vertically, with consolidation throughout, and all the modules have explicit learning outcomes. Elements of self-directed learning are inculcated throughout the curriculum on both routes, with research and evidence-informed practice as important elements.

The aim of this study was to compare the general academic performance of students attending the FT chiropractic training route and the FTE training route for the MChiro degree at McTimoney College of Chiropractic. This study investigates whether there are potential outcome differences between students on the 2 routes in terms of their general academic achievement over the duration of the course.

METHODS

This comparison was assessed across the academic levels of both programs of study. The outline of the curriculum of both FT and FTE routes is summarized in Table 1. To achieve the aim of the study, a retrospective analysis of student achievement data was undertaken.

Participants

The participants in this study consisted of all students at McTimoney College of Chiropractic enrolled in either the MChiro FT program or the MChiro FTE program between 2009 and graduating in 2017. There were no other specific inclusion criteria. The FT program group consisted of students enrolled between the 2009–2010 and 2014–2015 academic year intakes (September–June), graduating between the 2012–2013 and 2017–2017 academic years, respectively. The FTE program group consisted of students enrolled between the 2009 and 2013 academic year intakes (January–December), graduating at the end of 2013 and 2017, respectively.

Any student participants with incomplete data were excluded from the analysis. Any student who failed any year, resulting in having to retake a full year or dropping out (resulting in partial data), was also not included in this analysis. Information regarding the attrition rates of students across both pathways was recorded to help the analysis.

Sample Size

The study was powered at 80% ($\alpha = .05$) to detect a mean difference of 2.5 percentage points in the assessment outcomes. A pooled calculation of data from 3 previous similar studies was applied.^{8–10} The calculation suggested a minimum sample size of 80 participants per group, a figure that was achieved in this study (FT group, $n = 81$; FTE group, $n = 115$). The sample size was calculated using the software package StatMate v2.0 (www.GraphPad.com).

Data Collection and Management

The complete academic records of 223 chiropractic students studying at McTimoney College between 2009 and 2017 were examined. In order to preserve confidentiality and reduce potential bias, the data were provided to the research team in an anonymized format. The anonymization was carried out by the MChiro program manager, and the required data were supplied on a series of anonymized spreadsheets. Demographic data collected included year of intake, year of course, student gender, and age, and all data were noted on the spreadsheet to identify groups. No other student-identifiable data were recorded on the spreadsheets. All data were stored on password-

Table 1 - Overview of the McTimoney College of Chiropractic Full-Time (FT) and Full-Time Equivalent (FTE) Program Curricula

FT Program			FTE Program			
Year	Content	FHEQ Level ^a	Year	Content	FHEQ Level	
1	Human Function	4	1	Human Function	4	
	Philosophy I	4		Philosophy I	4	
	Chiropractic Studies I	4		Chiropractic Studies I	4	
	Clinic Studies I	4		Clinic Studies I	4	
	Research I	4				
2	Neuroscience	5	2	Research I	4	
	Biomedicine	5		Neuroscience	5	
	Behavioral Science	5		Biomedicine	5	
	Philosophy II	5		Philosophy II (part)	5	
	Chiropractic Studies II	5		Chiropractic Studies II (part)	5	
	Clinic Studies II	5		Clinic Studies II (part)	5	
	Research II	5				
3	Musculoskeletal Medicine	6	3	Behavioral Science	5	
	Clinical Neurology	6		Philosophy II (part)	5	
	Clinical Medicine I	6		Chiropractic Studies II (part)	5	
	Clinical Medicine II	6		Clinic Studies II (part)	5	
	Philosophy III	6		Research II	5	
	Chiropractic Studies III	6		Musculoskeletal Medicine	6	
	Clinic Studies III	6		Clinical Neurology	6	
	Research III	6				
				4	Clinical Medicine I	6
					Clinical Medicine II	6
		Philosophy III	6			
4 Final	Clinic and Clinical Management	7	5 Final	Clinic and Clinical Management	7	
	Research IV	7		Research IV	7	

^a The FHEQ level indicates the academic level of the modules based on the UK Framework for Higher Education Qualifications. Institutions awarding degrees are reviewed by the Quality Assurance Agency for Higher Education to ensure regulatory compliance.

protected Excel spreadsheets in encrypted files on the lead researcher's computer. This was coupled to an external backup device, ensuring that only the research team had access to the data.

All marks from the study participants were collated onto a master spreadsheet. The learning outcomes of each module in the course are assessed by a summative examination at its conclusion. The data collected consisted of all summative assessment outcomes for each module, across each year, for each student included in the study. For analysis purposes, it was decided to break down the data into the FHEQ academic levels 4–7. The FHEQ system is the academic framework produced by the UK Quality Assurance Agency for Higher Education, the independent body that checks on standards and quality in UK higher education. The FHEQ levels define the outcomes of progressively more challenging learning (and typical qualifications) in ascending order and show the relative position of levels of achievement and/or qualifications.¹¹ Typically, an undergraduate degree consists FHEQ levels 4–6 covered in the 3 years of a degree course. A formal master's degree is FHEQ level 7. The MChiro degree is an integrated master's and contains

modules at FHEQ levels 4–7 spread over the 4 years (FT) or 5 years (FTE) of the course, as indicated in the curriculum plan in Table 1.

Anonymized end-of-year results for all modules were used in the analysis, and progressive achievement was noted according to mode of delivery and FHEQ level. Average level grade was determined by calculating arithmetic mean, standard deviation, and standard error of the mean from all summative marks for each FHEQ level. This gave a picture of average achievement across FHEQ levels 4–7 in both course routes.

Analysis

The data set was cleaned appropriately prior to analysis. Relevant statistical analysis was carried out with InStat v3.0 (graphPad.com). Due to the nature of the data selection in this study, nonparametric statistical analysis was employed. Intragroup variation and progression across the academic levels was examined using the Kruskal-Wallis test, and intergroup analysis between the 2 groups at individual FHEQ academic level points was examined using the Mann-Whitney U test. The significance level was set at $p < .05$ in all cases.

Table 2 - Demographics of the Participant Groups

	Full-Time Course	Full-Time Equivalent Course
Group totals (<i>n</i>)	81	115
Male:female (<i>n</i> [ratio])	36:45 (1:1.3)	32:83 (1:2.6)
Group mean age (SEM) ^a	21 (1.7)	33 (1.3) ^b
Group age range ^a	18–55	20–53

^a Age at the start of the course.^b $p < .0001$.

Ethics

In accordance with the BPP University Research Ethics Policy and Procedures, ethical approval was sought from the BPP University Research Ethics Committee. This study forms a part of a larger study undertaken at McTimoney College of Chiropractic. The original study was reviewed by the university REC and appropriate approval granted.

RESULTS

Participant Demographics

Twenty-seven records contained incomplete data due to students leaving the programs and were excluded for the analysis, leaving a total of 196 complete student records as part of the study: 81 from the FT route and 115 from the FTE route.

The basic demographics of the 2 groups are shown in Table 2 and indicated that there was a statistically significant difference in the proportion of female students in the FTE group compared with the FT group ($p = .04$). In addition, there was a statistically significant difference in the average age of the FTE group at the start of the course compared with the FT group ($p < .0001$), although the overall age range was similar across both student groups.

MChiro Results by FHEQ Level

Both course routes showed increases in achievement over the duration of the course (Table 3). The FTE route showed a significant increase in general achievement over the duration of the course ($p = .0042$), while the FT group did not ($p = .083$). No statistically significant differences

were demonstrated between the FT and FTE programs at any FHEQ level ($p > .05$ at all points).

There was no significant difference in the numbers of students gaining 1st-class honors degrees between the 2 programs ($p = .377$). Approximately 16% (1 in 6) students gained 1st-class honors classification across both program routes during the time period analyzed. It is important to note that all student groups exceeded the prescribed competency requirements as verified by external examiners across both routes.

Attrition rates across the program were noted and amounted to 12% overall (27 students: 12 FT students and 15 FTE students). The majority of this group of students left after the first year (70%; $n = 19$). Attrition is usually highest in year 1 and into year 2, and relatively few students leave in the higher years of the program. Later leavers were generally from the FTE route, and this was normally due to external commitments and responsibilities becoming incompatible with their continued studies. In addition, there are occasional transfers from the FTE route into the FT route.

DISCUSSION

The chiropractic profession requires advanced university-level education coupled with regular personal post-graduate enrichment (the so-called continued professional development). The educational standards in chiropractic training are set by regulatory bodies, such as the GCC in the United Kingdom, National Boards in the United States, and the Councils on Chiropractic Education. As in any professional context, the delivery of this education should be within the general tenets of academic practice, that is, clear scientific thinking, academic rigor, and critical analysis, with faculty who are practiced in both teaching and scholarship.¹² Within this framework, individual chiropractic schools can develop and adopt their own mechanisms for chiropractic training. This led McTimoney College of Chiropractic to develop 2 formal program routes, each culminating in the award of the degree MChiro. In addition to responding to changes in higher education, part of the rationale at McTimoney College of Chiropractic for developing 2 routes to achieve the same award was, indeed, a recognition that prospective students come from different backgrounds with different lifestyle

Table 3 - Overall Academic Results Comparing Full-Time (FT) with Full-Time Equivalent (FTE) Program

FHEQ Level	FT Program		FTE Program	
	Total Number of Assessments ^a	Assessment Outcome (Mean [SEM])	Total Number of Assessments	Assessment Outcome (Mean [SEM])
4	405	58.1 (0.7)	575	59.2 (0.5)
5	567	58.4 (0.5)	805	59.8 (0.4)
6	648	60.4 (0.5)	920	60.2 (0.4)
7	162	60.8 (0.8) ^b	230	62.4 (0.8) ^c

^a Total number of assessments = number of modules in the FHEQ level \times total number of students in the group. For each program there are a total of 5 individual level 4 assessments, 7 individual level 5 assessments, 8 individual level 6 assessments and 2 individual level 7 assessments. Intergroup comparison indicated no significant differences demonstrated at any level point between the 2 groups.

^b Intragroup variation (Kruskal-Wallis) between FHEQ4 and FHEQ7: $P = .083$ ($H = 6.67$).

^c Intragroup variation (Kruskal-Wallis) between FHEQ4 and FHEQ7: $P = .0042$ ($H = 13.22$).

choices and different learning needs and that traditional modes of study could limit market penetration and disadvantage nontraditional learners. It is considered that the nontraditional approaches allow the training access to a greater number of students and allow them to continue to work and meet their external commitments while studying to become a chiropractor. As Harding¹³ points out, one of the reasons that John McTimoney established McTimoney College of Chiropractic was to cater to the more mature students who were working and had family responsibilities.

The profile of the students in each program indicates a mixture of Millennial students, forming the majority and also a number of Generation X students. The characteristics of these 2 generations vary considerably and have been reviewed elsewhere.¹⁴ Apart from this, there are some clear differences between the demographics of the FT and FTE groups at the college. From the data presented, it can be said that a typical student on the FTE course at the time of this research was more likely to be female, aged between 35 and 44, while a typical student on the FT course could be of either gender, generally aged between 20 and 34.

Generically, the FTE students are termed “nontraditional students,” and in mainstream higher education in the United Kingdom, there has been a large number of nontraditional students with around 56% of students deemed to be mature.^{14,15} Mature students are defined as any student aged 21 or over at the start of their studies. Recent evidence might suggest that there is a falling number of students entering higher education,¹⁶ but this has not been the experience of McTimoney College of Chiropractic, where FTE student numbers remain relatively constant year to year.

There is a general lack of data comparing FT and FTE programs in clinical professional education and in chiropractic in particular. The findings of this study are supported by those in the fields of nursing,¹⁷ and pharmacy¹⁸ where no differences in general academic achievement have been shown between traditional full-time students and distance, online, or FTE students. There is some evidence to suggest that mature students have a higher level of dedication to their life goals and that may be reflected in increasing achievement,^{19,20} hinted at in the profile of the FTE achievements in this study (Table 3), although further examination of this is warranted.

A number of studies show that the nontraditional students tend to be intrinsically motivated, focused, responsible for their own learning, and capable of excellent academic achievement.^{6,7} In addition, nontraditional students face great time restrictions due to work and family commitments, but despite this and no doubt due to their maturity and life experience, their time management skills are generally excellent and, consequently, are potentially better equipped to cope with the stresses of studying.² Although the stresses and problems with studying a clinical course have been previously studied in a variety of academic settings, including chiropractic training,^{21–23} this was not explored in this study.

The stated aim of this study was to investigate whether it was possible to train students to become clinically

competent chiropractors over an extended period of time compared with a traditional full-time course. There have been no studies undertaken to date at chiropractic institutions that investigate whether a chiropractic training program could be delivered on a “nontraditional” basis while maintaining the required degree of academic rigor. Using a simple model of comparing average module grades to illustrate the nature of academic performance, the current study would suggest that such a delivery mechanism is indeed possible for chiropractic education. This study indicates that, using overall achievement measures, there is no difference in either FT or FTE routes for training in chiropractic. However, there were some marked demographic differences in the overall demographics between the 2 student groups in this study. Given these circumstances, it may be the case that the more mature female students are more successful in the FTE route, while the FT route suits the younger student better regardless of gender. From this preliminary study, it is not possible to conclude that a typical FTE student would be successful on the FT route or vice versa. It can be postulated that the observed demographic differences helped to create the success in each training route. This is an important finding that requires future investigation.

There is a clear need for further study since academic performance is influenced by a number of factors, including those outside academia.^{24,25} Previous studies have indicated that performance is affected by psychological issues in addition to academic issues and that factors such as motivation, study time, and attendance at classes need to be considered.^{22,23} The most common causes of adverse impact on FTE route students’ studies are employment concerns and conflicts, bereavement or divorce, pregnancy, and emotional stress.^{26,27} These, of course, are also reasons why students in any program might struggle, but it can be that those students who attend college less frequently feel the pressures more keenly and need more support to maintain their engagement with their studies. McTimoney College of Chiropractic tries to engage students and support them as far as possible by maintaining regular contact via e-mail and telephone as necessary and also by ensuring that college administrative staff and faculty are approachable, available, and responsive should problems arise.

Chiropractic requires a specific series of complex skills that must be mastered in order to achieve the required degree of competency, a learning set that continues past graduation and into clinical practice.^{28–32} Development of such a learning set involves both quality and quantity for education across both routes of qualification. McTimoney College of Chiropractic attempts to address this by ensuring that students on both routes complete a number of key activities together, particularly toward the end of their training, to reinforce the equivalency of the 2 routes. Such activities include clinical observation days and clinic-year group teaching sessions. Both FT and FTE program students complete their final clinical year together in the college’s Community Training Clinic, overseen by the same group of experienced clinical supervisors. Finally, students in both programs sit together in the same final

clinic exit examination assessment. This provision ensures equivalence of experience for the students in either program.

From an academic standpoint, measured by simple examination and assessment performance, there is no difference between the outcomes of the 2 programs of study. However, there is clearly more work to be undertaken to investigate the student experience between the 2 programs and also the postgraduation outcomes once in practice. No attempt has been made to analyze any predictors of success against overall outcome in this article. Nor was any attempt made to link academic achievement to clinical practice. These are both the subject of future investigation into the comparison of FT/FTE modes of course delivery.

Further useful studies planned include a longitudinal study gathering data throughout the 4 and 5 years of the 2 programs to provide a more accurate view of the results of individuals as they progress through the course on their chosen pathway. Such a study could then examine in detail patterns of achievement across the 2 routes, examining educational predictors and differentiating academic, practical, and clinical skills. Also, the question of whether the prior educational qualifications and performance between the student groups is related to outcomes across the 2 programs is being investigated.

CONCLUSION

This study indicated differences in demographics and external commitments of the students on the 2 routes of qualification but no significant difference in the overall academic outcomes as measured by simple summative assessments. This preliminary study shows that, based only on analysis of overall achievement, there is no difference in either FT or FTE programs in training chiropractors, allowing them to register with the UK regulatory body. It suggests that a nontraditional mode of delivery is an achievable route to qualification as a chiropractor, enabling a greater number of students to consider chiropractic as a career choice while managing other life commitments.

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Author Contributions

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