The Right Job Pays;

Effects of Student Employment on the Study Progress of Pre-service Teachers

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Spending time on work during a full-time study might compete with class attendance or self-study and slow study progress. At the same time, a domain-relevant job may grant beneficial effects that enhance academic outcomes. Prior research showed contradictory findings, possibly because of a lack of distinction between types of work and the different years of college. The current study analyzed the effect of different types of work on the study progress of 132 Dutch pre-service teachers with repeated measures at 25 points in time over a 4-year timespan using growth models. Students who spent more time on a paid job as a teacher obtained significantly more study credits. The optimal number of hours spent on paid work outside of education changes during college. These findings support the importance of study-job-congruence and add the roles of timing (year of college) and remuneration (getting paid) as relevant variables to role-based resource theory.

Introduction

Several countries cope with a shortage of qualified teachers (Donitsa-Schmidt and Zuzovsky 2016; European Commission 2014; Garcia and Weiss 2019; Sutcher, Darling-Hammond, and Carver-Thomas 2016), particularly in disadvantaged areas (OECD 2005). Subsequently, schools in need of teaching staff may opt to offer pre-service teachers a contract before they finish college. Hiring pre-service teachers could alleviate the shortage and provide pre-service teachers valuable experience. However, it could also strain their study progress, competing with study hours or demotivating students to obtain a degree that they no longer seem to require. It might thus even worsen the shortage of qualified teachers in the long run.

In a systematic literature review, Riggert et al. (2006) concluded that results about student employment's direct effect are contradictory and inconclusive. Riggert et al. expect that this might be due to the focus and quality of previous research. They address five shortcomings of the current literature. First off, it would be preferable if studies used more homogenous samples to assess what specific work could be beneficial in a particular domain, i.e., if domain-relevant jobs are better. Additionally, studies thus far have been based on (mainly Anglo-American) research universities, while most continental European teacher education takes place at professional universities or universities of applied sciences that incorporate work experience in the form of internships in their curriculum. Based on their internship experience, students are often offered (un)paid jobs in education. This leads to a second, much-needed improvement: studies should distinguish between different types of work. In the case of teacher education: how does the additional time that students spent on unpaid overtime during internships and jobs in- and outside of education influence their study progress? Thirdly, the statistical methods in the literature could use more precision and rigor (Riggert et al., 2006). For example, in their statistical analysis, studies that distinguished between the amount of time that students spend on employment used seemingly random categories (e.g., 1-15, 1-20, or 1-25 hours), which is a sub-optimal method that does not inform where the exact optimum lies. Fourth, previous studies did not distinguish between the different college years, making it unclear whether correlations are similar for different college years. Given that internships are often integrated in specific years of the teacher education curriculum and can lead to a paid job as a teacher, this should be relevant. Studying this interaction requires repeated measures throughout the four-year college duration, instead of the single outcome measures (e.g. first year GPA) that are mostly used. Finally, most studies thus far have lacked a theoretical foundation, which leads to a myriad of piecemeal exploratory findings that lack integration. These concerns should be addressed in order to truly answer the practical concerns of pre-service teachers, teacher educators and policymakers, and in order to further our scientific understanding of the interaction between different types of work on study outcomes throughout college.

Theoretical framework

The few studies on the effects of student employment on academic outcomes predominantly used the theoretical model of Bean and Metzner (1985), Tinto (1993), or Riggert et al. (2006). According to these three models, students allocate their scarce time between employment (‘external commitments’ in Tinto’s model) and college. Too much time spent on student employment competes with time spent on study or on-campus activities. Thus, the models predict a negative relationship or an indirect negative relationship mediated by social integration and psychological outcomes. Many studies have tested and found a negative direct relationship between student employment and different types of academic outcomes. There is some evidence that student employment is related to longer study duration and less obtained study credits (Aina, Baici, and Casalone 2011; Canabal 1998; Theune 2015; Tuononen et al. 2016), lower grades (DeSimone 2008; Gleason 1993; Humphrey 2006; Hunt, Lincoln, and Walker 2004; Kalenkoski and Pabilonia 2008; Stinebrickner and Stinkebrickner 2003), and dropping-out or not obtaining a degree (Beerkens, Mägi, and Lill 2011; Cuccaro-Alamin 1997; Roksa 2011). However, other studies found no significant relationship between student employment and GPA (Canabal 1998; Dallam and Hoyt 1981; Furr and Elling 2000; Volkwein 1989), or other outcomes such as growth in cognitive performance (Pascarella et al. 1994, 1998).

More recently, Butler (2007) applied the theory of role-based resources, thus far used in research on adolescents and work-family literature, to student employment. This theory proposes that performance in multiple domains is beneficial for individuals when certain conditions are met (Marks 1977; Greenhaus and Powell 2006). Butler extended this theory to student employment, stating that ‘job-school congruence’ enriches resources, leading to work-school facilitation, study effort, and better study performance. Job demands and number of working hours, on the other hand, lead to work-school conflict and subsequently lower study effort and study performance. Butler’s study on 253 full-time American college students and results from a few additional cross-sectional studies (Creed, French, and Hood 2015; Meeuwisse et al. 2017) confirmed this model with disciplinary heterogeneous samples from research university students. Specifically, they found that job-congruence relates to work-school facilitation, which subsequently relates to study effort and study performance.

Butler’s model could clarify some of the ambiguous results thus far. Job congruence and working hours may define whether student employment is negative or positive. Potentially this could also explain why so many studies thus far found a ‘curvilinear relationship’. A curvilinear relationship entails that working a limited number of hours is better than both not working or working more hours. For instance, Wikan and Bugge (2014) reported that working 1-15 hours related to better academic outcomes for Norwegian pre-service teachers. This suggests that there might be an ideal balance between time spent on work and study. A bonus granted by control and or job-school congruence could initially lead to a positive effect, which can become harmful when too many hours lead to work-school conflict.

To substantiate these findings, in particular for teacher education, more specific research is needed. The study from Wikan and Bugge (2014) did not distinguish between types of work. Additionally, even the few studies that did distinguish between types of jobs did not specify which jobs were job-congruent (e.g., in education) and did not take the role of unpaid internships into account (Tuononen et al. 2016; Wang et al. 2010). Especially in higher vocational education, internships are both a part of the curriculum and offer a work-like experience. The responsibilities and demands of internships can lead to requests for unpaid overtime. In studies about student employment, this type of unpaid work should be taken into account. Finally, none of the models or studies thus far takes the specific character of the different years of college into account. If internships function as a stepping stone for a paid position, then it should be expected that the importance of the types of work that students engage in changes during the study program.

Research Questions

This study analyzed the effects of unpaid internship overtime hours, as well as hours spent on paid work in- and outside the educational field, on study progress. Effects were studied with a longitudinal approach that enabled us to assess the effects of different types of work on study progress with more precision. Specifically, it allowed us to test whether, when, and how much hours spent on student employment affected study progress. In line with Butler (2007) and Wang et al. (2010), we predicted that domain-relevance (i.e., ‘job congruence’) and the number of working hours matter. Additionally, we expect that the types of jobs that students have, change during college time, and we explore the effect of these different types of jobs for every separate semester. Therefore, we formulated the following research questions:

RQ 1: How does the allocation of time spend by pre-service teachers on unpaid internship overtime, paid jobs outside of education, and paid jobs as a teacher develop during the span of their study?

RQ 2: How does time spend on unpaid overtime during internships, paid jobs outside of education, and paid jobs as a teacher, relates with study progress during the 4-year span of college?

RQ 3: How much time spent on either unpaid internships, paid jobs outside of education, or paid jobs as a teacher, relates to optimal study progress during each specific semester of 4-year college?

Method

Design

In order to measure the effect of different types of paid work and unpaid internship overtime on study progress, we used a dataset that contained the accumulated study credits of a full cohort of 132 pre-service teachers in the Netherlands at 25 time points (repeated measures) over a 4-year timespan. We combined this dataset with a survey about the average number of hours that students spent per week on different types of (un)paid work for every semester over the same 4-year period.

Inclusion and Exclusion

The studied cohort consisted of 330 pre-service teachers from 13 Bachelor study programs within a Faculty of Education at a Dutch university of applied sciences. All pre-service teachers who started a full-time teacher education study in 2016 and still attended university in 2020 received an email with a link to an online survey at the end of their fourth year. The email stated the purpose of the study and the key elements of the data management plan. Students who accepted the online informed-consent statement were directed to the survey. All students who finished the survey received €10 for their effort. 189 students started the survey, and 142 students completed the survey. After data cleaning, 10 students who interrupted their study and therefore had incomplete data were removed, and 132 students were used in the actual dataset.

Participants Characteristics

Within the chosen cohort, 36% of the pre-service teachers were male. In the Netherlands, students from different types of previous education are admissible to teacher education at a university of applied science. Most of the respondents followed ‘higher general secondary education’ (havo), followed by students from a vocational track (mbo), and students who followed an academic track (vwo) previous to becoming a pre-service teacher (Table 1). These percentages correspond nearly precisely with the dispersion among previous education in the sample, and are similar to national averages. The students in the sample followed 13 different courses of teacher education (Elementary school, Dutch, English, French, German, Mathematics, Physics, Biology, Economics, Business Administration, Sociology, Geology, and History).

Table 1. Sample and Response Characteristics

Characteristic	Sample		Response	
	N	%	*N*	%
Gender				
Female	212	64	103	78
Male	118	36	29	22
Previous education				
HGSE	177	54	71	54
Vocational track	89	27	35	27
Academic track	63	19	26	20

Note. This table shows the characteristics of the sample compared to the realized response. HGSE stands for Higher general secondary education.

Instruments

The university at which the study took place records the study progress of students in a ‘data warehouse’. Students received ECTS ‘study credits’ for the courses that they finish. Each year’s program contains 60 study credits, and 240 credits are needed to obtain a teaching degree. Each time a student receives new study credits, the new total amount of credits is recorded together with the associated date. The university information department provided us a dataset that included data about enrollment, gender, previous education, and the records of cumulatively obtained study credit at 25 repeatedly measured moments. Additionally, a survey asked students whether they had had a paid job outside or within the field of education and whether they had had internships during the past eight semesters. Subsequently, they filled in how much time they had spent on average per week on different types of jobs and unpaid internship overtime during the past eight semesters, resulting in eight repeatedly measured indicators for hours spend on jobs and overtime. Because internships are integrated into the curriculum of the study programs, we specifically asked how much extra time - beyond what the study program required- they had spent on unpaid internships within education. Paid work in education was also clearly distinguished from paid internships that were part of the curriculum. This allowed us to study the effects of both unpaid work in education and paid work in- and outside of education as separated from the study program on the accumulation of study credits.

Analytic Strategy

Growth models were fitted by means of multilevel modeling using the program MLwin (Rashbash et al. 2020). In the random parts of these models, the 25 repeated measures represent the lowest variance level, which is nested within students, implying that the random parts of the growth models contain at least two levels. Because the sample consisted of students from different courses, for every analysis, we tested whether the intra–course correlation was significantly larger than zero. If so, analyses were conducted with three variance levels in the random parts of the models, a repeated measures level, a student level, and a course level. The significance of the fit improvement after adding the course level to the random part of the model is evaluated with the chi-square distributed difference in the deviances (-2*loglikelihood) of both nested models. As indicated in Hox et al. (2018), the probability of this chi-square has to be divided by two, since variances cannot be negative.

In the growth models, time is included as an independent variable. Since occasions at which the 25 repeated measures of study credits are collected vary, the actual dates are used to construct the time variable. The first measurement for each student's time is set to zero. For each subsequent measurement of each student, time represents the days that have passed since his or her first measurement. An advantage of using MLwiN is that cases with missing values on the 25 repeated measures can and should be included in the analysis (Hox, Moerbeek, and Van der Schoot 2018). To be able to use the same time variable for hours weekly spent on jobs or unpaid internship overtime, the number of hours spent in a semester is repeated for all measurement moments falling within that semester.

Effects of the overwork on internships and work in- and outside of education are estimated as the interaction between the time factor in the growth model and the number of hours spend on respective overwork for the internship or work inside or outside education. To be able to estimate the effect sizes, variances in the random parts of two nested models are compared, one model with the main effects of time and the number of hours worked or spent on overtime and the same model but with an added interaction between time and overtime or work hours. This interaction represents the effects of weekly hours worked on growth in study credits over time. After fitting these growth models with time, hours worked and the interaction between both as independent variables, we fitted new growth models in which we controlled for gender and previous education. We analyzed these models separately to ascertain if and how adding control variables changes the effects, given that adding covariates can spuriously diminish estimated effects when covariates are correlated with the number of hours worked.

In order to measure whether the relationship between different types of paid work, unpaid internship overtime hours, and study credits is curvilinear a different set of analyses was conducted. We performed non-linear regression analysis in MLwiN separately for every semester and for each type of work on a cross-sectional dataset. Obtained study credits per semester functioned as dependent variables. In the first fitted models, the time spent on work outside of education, paid work as a teacher, or unpaid internship overtime hours during the first semester were included separately as independent variables. Subsequently, time squared is added to the models. By means of Wald tests (ratios of regression coefficients and their standard error) and through testing model fit improvement with the difference in deviances, we tested whether adding the squared time variable to the model significantly improved model fit. If so, the relation between time spent on the chosen type of work and study credits is curvilinear. This allowed us to infer both if there is a curvilinear relationship and at how many hours the exact break-even point is located for each separate semester and type of work.

Results

Trends in Types of Work During College

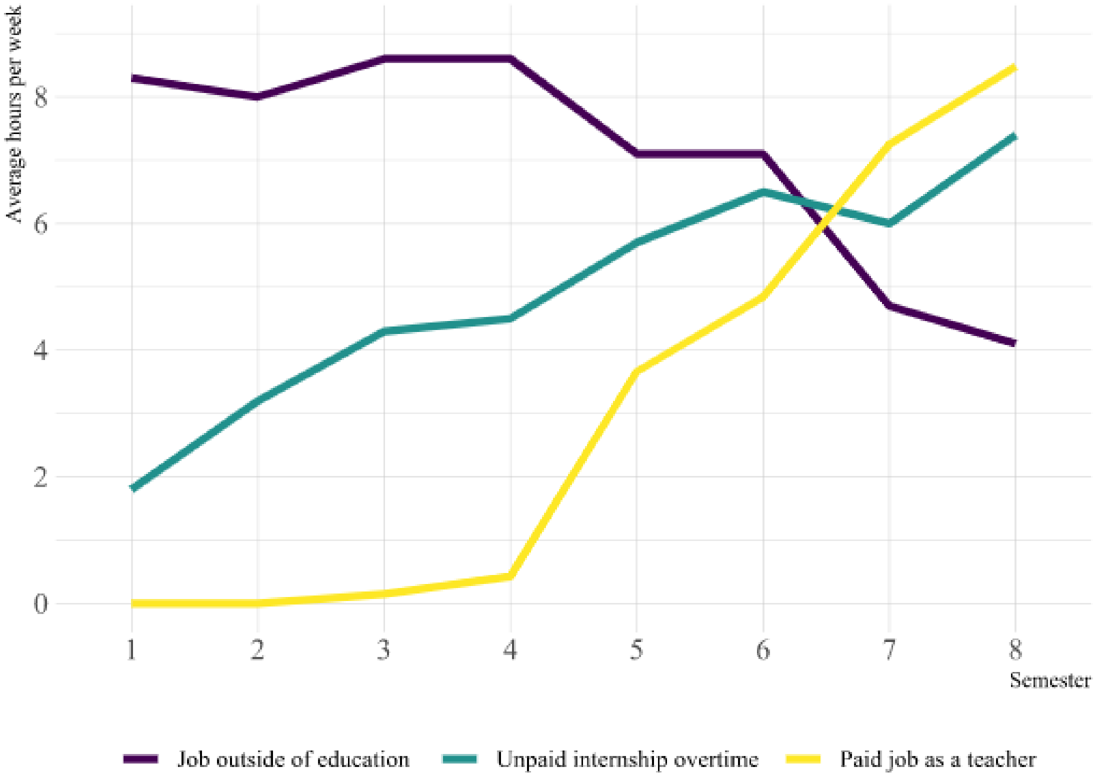
The results in Table 2 and Figure 1 show the descriptive analysis of the amount of time that students in our sample spent on overtime during internships, paid work outside of education, and paid work as a teacher over the course of eight semesters. At the start of their study, none of the students had a paid job as a teacher, one in four students reports overtime hours during internships, and a majority of 70.5 percent has a paid job outside of education. During the course of the four years of college, the balance gradually shifts; in the final year 54.5 percent has paid job as a teacher and 37.9 percent has a paid job outside of education.

The average number of hours of unpaid overtime that students do during their internship slowly increases from *M* 1.8 hours (*SD* 5.2) in the first semester to *M* 7.4 hours (*SD* 9.0) per week in the eighth. The combined number of hours of paid work and unpaid overtime that students report in addition to their study during an average week gradually rises from 10.1 hours per week during the first semester till 20 hours in the eighth semester. This suggests that on average students partly replace work outside the educational domain for (un)paid work within the educational domain. It also shows that the total number of hours spent on work increases during the study and that the percentage of students who work besides their study increases (during the last semester only 8.3% of the students do not work besides their full-time study).

Table 2. Descriptive Statistics

Semester	Paid job as a teacher %			Unpaid internship overtime %			Job outside education %		
	0 hours	1-15 hours	>15 hours	0 hours	1-15 hours	>15 hours	0 hours	1-15 hours	>15 hours
1	100	0	0	75	20.5	4.5	29.5	50	20.5
2	100	0	0	60.6	31.8	7.6	31.8	48.5	19.7
3	97	3	0	52.3	39.4	8.3	27.3	50.8	22
4	94.7	4.5	0.8	46.2	44.7	9.1	28	52.3	19.7
5	30.3	19.7	10.6	34.8	53.8	11.4	40.9	41.7	17.4
6	37.1	22	15.2	31.8	53.8	14.4	40.9	40.9	18.2
7	51.5	22	26.5	41.7	44.7	13.6	59.8	28.8	11.4
8	45.5	23.5	31.1	31.8	51.5	16.7	62.1	30.3	7.6

Figure 1. Time Spent on Different Types of Student Employment During 4 Years of College



Findings from Growth Models

Internship overtime hours show a significant but small positive effect on growth in study credits (Table 3, model 3; interaction overtime*time). Paid work outside of education has a small but nonsignificant negative effect on growth in study credits over time (Table 3, model 4 and 5). Paid work as a teacher has a significant positive effect on growth in study credits during the last two years of college (Table 3, model 6 and 7). This is in accordance with the fact that nearly no student reported having a paid job as a teacher during the first two years of college (Table 2). When both the interaction effects of growth in time with respectively internship overtime, paid work outside of education and paid work as a teacher are added to the model, only paid work as a teacher shows a significant positive effect on growth in study credits (model 9). This means that paid work in education did not hinder study progress of these preservice teacher. The positive effect is small though, given that the proportion of explained variance of model 8 and 9 together amounts to only 1.76%.

Table 3. Effects of Different Types of Work on Growth in Study Credits Over Time

Effect	Parameter	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
		Fixed effects								
Intercept	γ_{00}	-1.23 (1.02)	-1.34 (1.02)	-0.89 (1.04)	0.03 (1.10)	-0.69 (1.20)	-0.72 (1.02)	-0.49 (1.02)	-0.33 (1.42)	-0.04 (1.22)
Time	γ_{01}	54.11*** (0.19)	54.03*** (0.20)	53.81*** (0.22)	53.96*** (0.19)	54.26*** (0.27)	53.52*** (0.22)	53.43*** (0.22)	52.98*** (0.28)	53.36*** (0.33)
Internship overtime	γ_{10}		0.06 (0.05)	-0.08 (0.08)					0.03 (0.05)	-0.08 (0.08)
Internship overtime*Time	γ_{11}			0.06* (0.03)						0.04 (0.03)
Job outside of education	γ_{20}				-0.13* (0.05)	-0.04 (0.08)			-0.06 (0.05)	-0.02 (0.08)
Job o.o.e. *Time	γ_{21}					-0.04 (0.03)				-0.02 (0.03)
Paid job as teacher	γ_{30}						0.24*** (0.05)	-0.39 (0.20)	0.21*** (0.05)	-0.36 (0.21)
Paid job as teacher.*Time	γ_{31}							0.19*** (0.06)		0.17*** (0.06)
		Random effects								
Student variance	μ_{0j}	112.15 (14.71)	111.95 (14.69)	111.87 (14.67)	110.64 (14.40)	110.33 (14.38)	110.20 (14.40)	110.16 (14.38)	109.37 (14.19)	109.32 (14.23)
Repeated measures variance	e_{ij}	156.92 (3.96)	156.85 (3.96)	156.64 (3.96)	156.58 (3.97)	156.48 (3.96)	155.71 (3.94)	155.21 (3.93)	155.65 (3.95)	155.02 (3.93)
Total variance	μ_{0j+} e_{ij}	269.07	268.80	268.52	267.22	266.81	265.91	265.37	265.01	264.34
% expl. var. student level				0	1.35		1.74	0.04	2.49	0.04
% expl. var. rep. meas. level				0.13	0.22		0.77	0.32	0.81	0.40
% expl. var. total				0.10	0.68		1.18	0.14	1.51	0.25
		Goodness of fit								
Deviance		26000.31	25998.77	25994.56	25991.87	25989.57	25973.97	25964.06	25971.82	25959.14
Sig. difference of fit compared to model			Model 1 $\chi^2_{(1)} = 1.54$	Model 2 $\chi^2_{(1)} = 4.22$*	Model 1 $\chi^2_{(1)} = 8.45$**	Model 4 $\chi^2_{(1)} = 2.30$	Model 1 $\chi^2_{(1)} = 26.34$***	Model 6 $\chi^2_{(1)} = 9.91$**	Model 1 $\chi^2_{(3)} = 28.49$***	Model 8 $\chi^2_{(3)} = 12.69$**

Note. Dependent variable is study credits, measured 25 times (repeated measures *N* = 3,245; student *N* = 132; Course *N* = 13) (*SE* between brackets). Independent variables are respectively number of hours spent on unpaid internship overtime, a job outside of education and paid job as teacher, each measured 8 times and put on the time factor of the model by repeating the reported hours of a semester on each repeated measure within that semester. The time variable represents the dates of each of the 25 repeated measures of study credits (dependent variable).

*$p < .05$ **$p < .01$ ***$p < .001$

Table 4. Covariates Effects on Growth in Study Credits

Effect	Parameter	Model 1	Model 2	Model 3	Model 4	Model 5
		Fixed effects				
Intercept	γ_{00}	-1.23	-0.61	-1.85	-3.19	-1.11
		(1.02)	(1.13)	(1.15)	(1.40)	(1.44)
Time	γ_{01}	54.12***	54.11***	54.73***	54.73***	53.70***
		(0.19)	(0.19)	(0.21)	(0.21)	(0.27)
Male	γ_{10}		-2.83	2.91	3.44	3.14
			(2.28)	(2.45)	(2.40)	(2.40)
Male*Time	γ_{11}			-2.83***	-2.83***	-2.69***
				(0.45)	(0.45)	(0.44)
Vocational track	γ_{20}				-0.29	-2.45
					(2.17)	(2.35)
Academic track	γ_{30}				6.59***	-0.81
					(2.41)	(2.60)
Vocational*Time	γ_{21}					1.07***
						(0.43)
Academic*Time	γ_{31}					3.67***
						(0.48)
		Random effects				
Student variance	μ_{0j}	112.15	110.78	110.88	103.86	104.22
		(14.71)	(14.55)	(14.55)	(13.56)	(13.59)
Repeated measures variance	e_{ij}	156.92 (3.96)	156.92 (3.96)	154.90 (3.91)	154.90 (3.93)	152.08 (3.86)
Total variance	$\mu_{0j+}\ e_{ij}$	269.07	267.70	265.79	258.76	256.30
% expl. var. student level				-	6.33	0.35
% expl. var. rep. meas. level				1.28	0	1.82
% expl. var. total				0.71	2.64	0.95
		Goodness of fit				
Deviance		26000.31	25998.77	25958.62	25950.45	25893.56
Sig. difference of fit compared to model			Model 1 $\chi^2_{(1)}$ = 1.54	Model 2 $\chi^2_{(1)}$ = 41.69***	Model 3 $\chi^2_{(2)}$ = 8.17*	Model 4 $\chi^2_{(2)}$ = 56.90***

Note. Dependent variable is study credits, measured 25 times (repeated measures *N* = 3,245; student *N* = 132; Course *N* = 13) (*SE* between brackets). Independent variables are gender and previous education (general higher secondary education is the comparison).

**p* < .05 ***p* < .01 ****p* < .001

Table 5. Effects of Different Types of Work on Growth in Study Credits Over Time with Covariates

Effect	Parameter	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Fixed part							
Intercept	γ_{00}	-1.11 (1.44)	-1.19 (1.44)	0.34 (1.41)	-0.58 (1.42)	0.03 (1.48)	0.94 (1.56)
Time	γ_{01}	53.70*** (0.27)	53.57*** (0.28)	53.53*** (0.27)	53.79*** (0.28)	53.01*** (0.29)	52.57*** (0.37)
Male	γ_{10}	3.14 (2.40)	3.21 (2.40)	3.78 (2.40)	3.38 (2.37)	3.71 (2.37)	3.96 (2.38)
Male*Time	γ_{11}	-2.69*** (0.44)	-2.70*** (0.44)	-2.85*** (0.45)	-2.90*** (0.44)	-2.96*** (0.44)	-3.08*** (0.45)
Vocational track	γ_{20}	-2.45 (2.35)	-2.60 (2.35)	-2.55 (2.34)	-2.35 (2.32)	-2.51 (2.32)	-2.51 (2.32)
Academic track	γ_{30}	-0.81 (2.60)	-1.10 (2.61)	-1.19 (2.60)	-0.86 (2.57)	-1.22 (2.57)	-1.39 (2.58)
Vocational*Time	γ_{21}	1.07*** (0.43)	1.09** (0.43)	1.00** (0.43)	0.91* (0.43)	0.91* (0.43)	0.94* (0.43)
Academic*Time	γ_{31}	3.67*** (0.49)	3.73*** (0.49)	3.66*** (0.48)	3.76*** (0.48)	3.78*** (0.48)	3.86*** (0.49)
Overtime internship	γ_{40}		0.09 (0.05)			0.05 (0.05)	0.03 (0.08)
Overtime Internship*Time	γ_{41}						0.01 (0.03)
Student employment o.e.	γ_{50}			-0.16*** (0.05)		-0.08 (0.05)	-0.16* (0.08)
Student employment*Time	γ_{51}						0.04 (0.03)
Work in education	γ_{60}				0.28*** (0.05)	0.26*** (0.05)	-0.46** (0.21)
Work in education*Time	γ_{61}						0.22*** (0.06)
Random part							
Student variance	μ_{0j}	104.22 (13.59)	104.27 (13.72)	103.46 (13.62)	101.34 (13.26)	101.03 (13.20)	101.25 (13.15)
Repeated measures variance	e_{ij}	152.08 (3.86)	151.91 (3.84)	151.54 (3.83)	150.44 (3.81)	150.27 (3.81)	149.57 (3.80)
Total variance	μ_{0j+} e_{ij}	256.30	256.18	255.00	251.78	251.30	250.83
Deviance		25893.56	25890.07	25881.48	25856.23	25852.19	25838.00
% expl. var. student level			-	0.70	2.76	3.06	-
% expl. var. rep. meas. level			0.11	0.36	1.08	1.19	0.47
% expl. var. total			0.004	0.50	1.76	1.95	0.19
Sig. difference of fit compared to model			Model 1 $\chi^2_{(1)}$ = 3.49*	Model 1 $\chi^2_{(1)}$ = 12.08**	Model 1 $\chi^2_{(1)}$ = 37.33***	Model 1 $\chi^2_{(3)}$ = 41.37***	Model 5 $\chi^2_{(3)}$ = 14.19**

Note. Dependent variable is study credits, measured 25 times (repeated measures N = 3,245; student N = 132; Course N = 13) (*SE* between brackets). Independent variables gender, previous education, work outside of education, overtime internships, and work in education based on input per semester (8 times).

*$p < .05$ **$p < .01$ ***$p < .001$

Because we wanted to control for gender and previous education, we tested the effect of gender and previous education on growth in study credits over the four-year time span (Table 4). Especially previous education showed to be a predictor of growth in study credits, it explained 6.7 percent of the variance.

While controlling for gender and previous education, we tested the same models that included work outside of education, unpaid internship overtime hours, and paid work as a teacher (Table 5). This confirmed our earlier findings. Only paid work as a teacher proved to show a significant but very small positive effect on growth in study credits (Table 5, model 6). Again, this positive effect applied only to the last two years of college.

Finally, in order to answer RQ 3, we wanted to test if there exists a curvilinear relationship between either of the types of work and study progress and accordingly define the break-even point. We analyzed this for every separate semester, which allowed us to ascertain whether effects differ between semesters. The results in Table 6 (Model 3) show that working outside of education during the first semester does not significantly relate to more study progress. But when student employment hours squared is added to the model, both the first and second-order of employment hours significantly relate to study progress, which confirms a curvilinear relationship. The largest gain in study credits is found for students working 7.75 hours per week outside of education. There is no difference in terms of study credits between students working 15.5 hours per week outside of education and students that do not have a side-job. Students working more than 15.5 hours per week outside of education receive fewer credits than students who do not work outside of education and the more hours these students work per week, the more negative the relation between work and the number of study credits becomes (Figure 2). Adding paid work outside of education squared in model 4 (Table 6) explains 6.4% of all variance at the student level, but leads to more course and total variance.

Figure 2. Effect of Hours per Week Spent on Paid Work Outside of Education on Obtained Study Credits in the First Semester

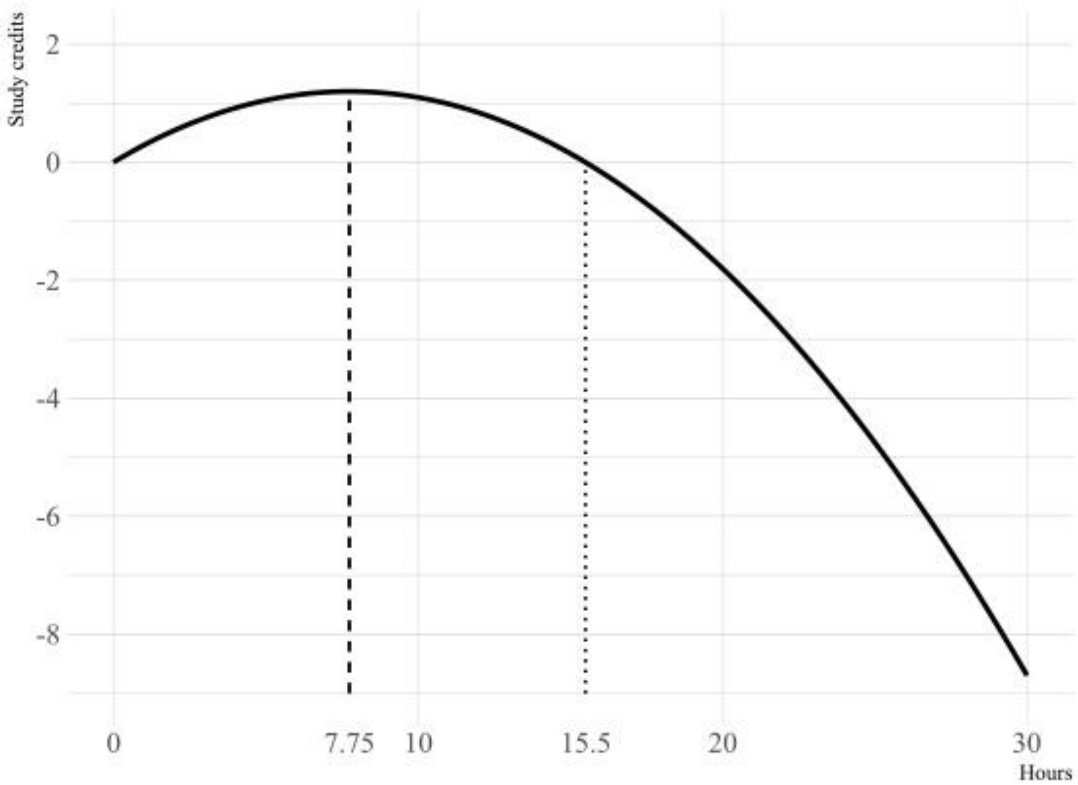


Table 6. Effect of a Job Outside of Education on Study Progress in the First Semester

Effect	Parameter	Model 1	Model 2	Model 3	Model 4
		Fixed effects			
Intercept	γ_{00}	26.55 (0.56)	26.35 (1.26)	27.02 (1.40)	26.01 (1.51)
Job o.o.e.	γ_{10}			-0.08 (0.07)	0.31* (0.17)
Job o.o.e.^2	γ_{20}				-0.02** (0.01)
		Random effects			
Course variance	μ_{0j}		15.81 (7.92)	15.91 (7.95)	18.58 (8.94)
Student variance	e_{ij}	42.61 (5.12)	27.20 (3.52)	26.90 (3.45)	25.28 (3.27)
Total variance	$\mu_{0j}+ e_{ij}$	42.61	43.01	42.81	43.86
% expl. var. course level					n.a.
% expl. var. student level					6.40
% expl. var. total					n.a.
		Goodness of fit			
Deviance		866.75	832.61	831.34	825.35
Sig. difference of fit compared to model			Model 1 $\chi^2_{(1)}$ = 34.14***	Model 2 $\chi^2_{(1)}$ = 1.27	Model 3 $\chi^2_{(1)}$ = 5.99*

Note. Dependent variable is study credits at Semester 1 (student *N* = 132; Course *N* = 13) (*SE* between brackets). Independent variable is overtime internships measured 25 times based on input per semester (8 times).

*p < .05 **p < .01 ***p < .001

We conducted the same analysis for other semesters and also found a significant curvilinear correlation between time spent on a paid job outside of education and obtained course credits during the third semester (Table 7, Model 4). In the third semester, paid work outside of education and its squared version together predict 7.93% of all variance in study credits at the student level and 5.68% of all total variance in study credits (Table 7, Model 5). In this case, 8.25 hours of paid work outside of education correlated with the largest net gain in study credits, and the break-even point is 16.5 hours. Internship overtime did not correlate significantly with obtained credits during any of the semesters.

Having a paid (congruent) job as a teacher shows a positive significant effect on the gain in study credits especially during the fifth semester (Table 8, Model 5). Interestingly, this relation is not curvilinear within semesters (Table 8, Model 6). As far as the range of our dataset permits (with 30 hours as the highest reported amount), more hours spent on paid work as a teacher during the fifth semester simply relates to more obtained study credits.

Table 7. Effect of a Job Outside of Education on Study Progress in the Third Semester

Effect	Parameter	Model 1	Model 2	Model 3	Model 4	Model 5
		Fixed effects				
Intercept	γ_{00}	24.16 (0.72)	24.39 (1.36)	25.86 (1.60)	24.36 (1.68)	24.36 (1.68)
Job o.o.e.	γ_{10}			-0.17* (0.09)	0.33 (0.22)	0.33 (0.22)
Job o.o.e.^2	γ_{20}				-0.02* (0.01)	-0.02* (0.01)
		Random effects				
Course variance	μ_{0j}		15.07 (8.94)	16.00 (9.27)	15.37 (8.89)	15.37 (8.89)
Student variance	e_{ij}	67.82 (8.35)	56.51 (7.30)	54.82 (7.08)	52.36 (6.76)	52.36 (6.76)
Total variance	μ_{0j+} e_{ij}	67.82	71.58	70.82	67.73	67.73
% expl. var. course level					4.10	n.a.
% expl. var. student level				3.08	4.70	7.93
% expl. var. total				1.07	4.56	5.68
		Goodness of fit				
Deviance		931.22	922.05	918.78	912.78	912.78
Sig. difference of fit compared to model			Model 1 $\chi^2_{(1)}$ = 9.17**	Model 2 $\chi^2_{(1)}$ = 3.27#	Model 3 $\chi^2_{(1)}$ = 6.00*	Model 1 $\chi^2_{(2)}$ = 9.27**

Note. Dependent variable is study credits at Semester 3 (student *N* = 132; Course *N* = 13) (*SE* between brackets). Independent variable is overtime internships measured 25 times based on input per semester (8 times).

#*p* < .1 **p* < .05 ***p* < .01 ****p* < .001

Table 8. Effect of a Paid Job as a Teacher on Study Progress in the Fifth Semester

Effect	Parameter	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
		Fixed effects					
Intercept	γ_0	21.69 (0.80)	22.47 (1.33)	22.29 (1.09)	21.73 (1.19)	20.30 (0.90)	29.87 (1.27)
Paid job as teacher	γ_1					0.38*** (0.12)	0.32 (0.40)
Paid job as teacher^2	γ_2						0.00 (0.02)
		Random effects					
Course variance	μ_{0j}		11.93 (8.38)				
Student variance	e_{ij}	84.85 (10.44)	76.34 (9.83)	84.44 (10.40)	83.64 (10.30)	79.17 (9.75)	79.15 (9.74)
Total variance	μ_{0j+} e_{ij}	84.85	88.27	84.44	83.64	79.17	79.15
% expl. var. course level							
% expl. var. student level						7.17	
% expl. var. total						7.17	
		Goodness of fit					
Deviance		960.80	957.74	960.15	958.89	951.64	951.62
Sig. difference of fit compared to model			Model 1 $\chi^2_{(1)}$ = 3.06	Model 1 $\chi^2_{(1)}$ = 0.65	Model 3 $\chi^2_{(1)}$ = 1.26	Model 1 $\chi^2_{(1)}$ = 9.16**	Model 5 $\chi^2_{(1)}$ = 0.02

Note. Dependent variable is study credits at Semester 5 (student *N* = 132; Course *N* = 13) (*SE* between brackets). Independent variable is overtime internships measured 25 times based on input per semester (8 times).

*p < .05 **p < .01 ***p < .001

Discussion

In this article, we described how much time pre-service teachers spent on different types of work during four years of college. We also analyzed how time spent on either type of work relates to study progress and specified how many hours related to study progress during every specific semester of college. Our results show that many pre-service teachers take on a paid job as a teacher from the third year on and that this significantly relates to more study progress over. Time spent on unpaid internship overtime or paid work outside of education does not significantly relate to study progress over the span of four years of college. However, we did find that working respectively 7.75 and 8.25 hours per week in a (non-congruent) job outside of education relate to obtaining the optimal amount of study credits during the first and third semester of college.

In accordance with Wang et al. (2010) and Tuononen et al. (2016), we found that it does matter what type of work students engage in during their study. Wang et al. surveyed third-year students and found that those who chose a job that they considered relevant to their study averaged a higher GPA. Their results align with our finding that a paid job as a teacher significantly but slightly improves study progress in the last two years of college. Wikan and Bugge (2014) reported a curvilinear relationship between the average number of hours spent on paid work and the most recently received grade (self-report) during the first year of teacher education. Their results coincide with the curvilinear relationship we found between paid work outside of education and earned study credits in the first semester. This study confirms both previous findings and shows how these correlations apply to specific semesters during college. Thereby this study offers a more suitable statistical methodology for future research and a more comprehensive explanation of how different types of work relate differently to study progress through time. Findings from both this study and the studies by Tuononen et al.

(2016), Wang et al. (2010), and Wikan and Bugge (2014) contradict the main assumptions about the influence of student employment on academic outcomes in the theoretical models of Tinto (1993), Bean and Metzner (1985), and their adaptation by Riggert et al. (2006). These three models all predicted a negative indirect effect of student employment on academic outcomes, because students who spent time on work have less time to spend on ‘on-campus activities’, thereby experience lower social integration, which in turn leads to lower psychological and academic outcomes. The models from Tinto (1993), Bean and Metzner (1985), and Riggert et al. (2006) are based mostly on research about North-American research universities with on-campus residents. The interaction between different types of student-employment and academic outcomes at vocational or applied universities might need a different model that takes internships and the different types of employment into account. We, therefore, proposed an adjustment to the conceptual model of Bean and Metzner (1985) and Butler (2007), which takes both job congruence, getting paid, intensity, and timing (semester) into account. During their study, students make choices on how to allocate their time. Given that most students face financial needs, they will seek available employment (Humphrey 2006). During college, they will seek to optimize the balance between employment and their study. Once the opportunity arises, we found that many pre-service teachers opt to trade their job outside of education for a domain-relevant job. For those who need the income from work, paid work in education can replace paid work outside of education, but unpaid work can’t. This might explain the positive effect of paid work in education compared to unpaid work in education. It also offers an addition to Butler’s model, which did not distinguish between voluntary and paid work. The positive relation between a paid job as a teacher and study progress might be explained by several potential explanations. It could be explained by a positive spill-over effect in accordance with the role-based resources theory (Butler 2007), or it could be that this type of job is offered to more successful students. Future studies should seek to clarify which direction the correlation is headed (e.g., by studying which students are offered a domain-relevant job) and could integrate these findings in a broader theory that is suited for vocational education and universities of applied science. Before generalizing to a broader theory that includes field outside of the educational domain, studies should first explore what specific type of work students perform in a specific domain during the different years of their study.

Several aspects of this study influence what conclusions can be drawn. The sample in our study only contained students who did not drop out of the study program. There might be effects of student employment on dropping-out that were thus not taken into account. The demographic and study progress variables in this study are directly generated from the university administration, which makes their reliability optimal. But the number of hours that students spend on work is based on self-report through a survey at one point in time, which is generally less reliable. Students might overreport or underreport how much time they spent on work because of desirability or because they may have trouble remembering exactly how many hours they worked in a given time span. During the time span of the study, there was a teacher shortage in The Netherlands. With fewer vacant positions, the percentage of students who had a paid job as a teacher during their study might be significantly lower.

Practical implications

This study has two main implications. First, we falsified the assumption that accepting a paid job as a teacher hinders study progress. On the contrary, a paid job as a teacher during the study seems to slightly enhance study progress. Possibly because of job congruence and because it allows students to quit their paid job outside of education. This is relevant information for policymakers who deal with a teacher shortage, teacher educators who worry about study progress, school boards that consider hiring pre-service teachers, and pre-service teachers who might wonder whether they should accept the job offer. Secondly, we found a curvilinear relationship for paid work outside of education during specific semesters of college. With our method of analysis, we could deduce that respectively 7.75 and 8.25 hours per week is optimal and that more than 15.5 and 16.5 hours relates to less study progress during the first and third semesters. This is useful information for study advisors and aspiring pre-service teachers who wonder how much time they should preferably spend on paid work outside of education at the start of their study.

Conclusion

This study found that many pre-service teachers trade a job outside of education for a paid job as a teacher during the course of their study. Nearly none of the students has a paid job as a teacher during the first two years, while most do have one during the third and fourth year. Additionally, the majority of pre-service teachers spend time on unpaid internship overtime. During the first semester and the third semester, when paid jobs as a teacher do not yet occur, having a paid job outside of education roughly one day a week relates to optimal study progress. During the fifth semester, time spent on a paid job as a teacher relates to more study progress. Although further examinations of replicability in other types of education are needed, our findings suggest two important additions to role-based resource theory. Not only does it matter whether or not student employment is congruent with the study, but it also matters whether students get paid and in which of the four years of college these effects are studied. Students and policymakers alike should take note of these findings in order to optimize both study progress and student employment.

CRediT roles

Izaak Dekker: Conceptualization; Investigation; Formal analysis; Data curation; Methodology; Project administration; Writing - original draft **Chun Fai Chong**: Data wrangling; Visualization **Michaéla Schippers:** Writing - review & editing **Erik van Schooten:** Formal analysis; Methodology; Writing - review & editing

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