Abstract  Current higher education is characterized by a proliferation of distance education programs and by an increasing inclusion of nontraditional students. In this study we investigated whether and to what extent nontraditional students are particularly at risk for attrition (vs. graduating) from distance education programs. We conducted a secondary analysis of cross-sectional institutional surveys deployed in the context of a public German distance teaching university among university graduates and dropouts ($N = 4,599$). Using binary-logistic multiple regression analyses, we predicted the likelihood of program attrition by students’ membership in sociodemographic groups, their goal orientations, and the corresponding interactions. Results revealed higher risks to drop out from university for female, migrant, and fully-employed students, but lower risks for older and parent students. A higher importance of career development or personal development goals related to a lower risk for attrition. Moreover, data also provide evidence that among some student groups the likelihood to graduate (or to drop out) significantly depends on students’ goal orientations. Results were robust across different academic faculties and were complemented by an analysis of dropout reasons. The practical implications of our findings are discussed with regard to designing equitable distance learning environments that value human diversity and quality of opportunity.

Keywords  Diversity inclusion · Higher education · Attrition · Sociodemographic groups · Academic goals

Introduction

In countries all around the globe higher education is currently characterized by two major trends. The first concerns a constant increase in the percentage of nontraditional students in
higher education (i.e., part-time students, students of higher age, students from historically underrepresented social/cultural groups). The European Union, for instance, witnessed a steady increase in the proportion of part-time students so that in 2006 almost one out of five students studied part-time. Part-time students are also typically older than full-time students with about one in two part-time students being 30 years of age or older (48%; European Commission 2009). However, nontraditional students also have been shown to have a higher risk for dropping out from higher education institutions (see Choy 2002 for a longitudinal analysis of US education statistics). A second trend is the proliferation of online courses or distance education programs. In the US, for example, the percentage of undergraduates enrolled in an online education course increased from 8 to 20 % between 2000 and 2008, the percentage of those being enrolled in a full distance education program from 2 to 4 % (National Center for Education Statistics 2011).

Openness, flexibility and accessibility—the hallmarks of distance education—offer promising prospects for the inclusion of nontraditional students in higher education (UNESCO 2009). In the US, for instance, nontraditional students such as students over age 30, students with dependents or full-time employed students, participate in distance education courses and programs more often than their counterparts (National Center for Education Statistics 2011). For higher education institutions, distance education programs are also financially attractive, because, once established, distance teaching is often less resource intensive than traditional class-room teaching (Hülsmann 2004; Jung 2003). Thus, an increasing number of campus-based colleges and universities in the European Union and internationally perceive the provision of distance education programs as critical for their strategic planning (Allen and Seaman 2008; UNESCO 2002).

Being a successful distance student can be a demanding endeavor, however, and accordingly dropout rates for distance education has been reported to be higher as for classroom teaching (Carr 2000). In addition to regular academic demands and workloads, distance students have to self-organize and self-regulate in autonomous learning environments (e.g., Bothma and Monteith 2004), to overcome potential social isolation in virtual teaching environments (e.g., Kim et al. 2011; Slagter van Tryon and Bishop 2009), and have to deal effectively with a variety of technologies needed for teaching and learning as well as for social integration (e.g., Poellhuber and Anderson 2011; Finch and Jacobs 2012) in order to succeed at university. Nontraditional students, on the other hand, have to deal with a variety of additional challenges above and beyond academic demands such as professional or family obligations (e.g., Fairchild 2003; Kohler Giancola et al. 2009), and relatedly, with the need for adequate resources or support systems for succeeding at university (e.g., Quimby and O’Brien 2004; Chartrand 1992). Thus, there are good theoretical and empirical reasons to assume that nontraditional students not only show higher enrollment rates in distance education programs, but also face a particularly high risk to drop out from these programs.

Sociodemographic Diversity and Attrition in Higher Distance Education

The issue of student attrition has long been at the heart of distance education research (Carr 2000). Taxonomies of factors causing attrition in distance education distinguish between three conceptual categories (Powell et al. 1990; Berge and Huang 2004): The first concerns predisposing characteristics students bring into educational processes such as their sociodemographic characteristics, personality traits or entry level competencies, and motivations. The second category consists of critical events in students’ life or circumstantial factors, such as occupational and family obligations, that disrupt individual entry level
goals and aspirations and/or alter their personal learning environments. The third category pertains to institutional factors such as distance teaching methodologies, teaching technologies, support systems or administrative services.

A traditional focus of the distance learning literature concerns the role of institutional factors in attrition from distance education. Research examined, for instance, the impact of the length of degree programs (e.g., Carnoy et al. 2012), effects of learning approaches and of course materials (e.g., Ojokheta 2010; Chetwynd and Dobbyn 2011), the connectedness with and feedback from the faculty (e.g., Chetwynd and Dobbyn 2011; Hughes 2007; Tait 2004), or the provision of student support services and of targeted intervention programs (e.g., Ojokheta 2010; Boyle et al. 2010; Hughes 2007; Simpson 2004). The relations between students’ predisposing characteristics and attrition, on the other hand, have been relatively neglected. This is particularly true for the link between students’ sociodemographic characteristics and attrition. For example, searches of the abstracts of peer-reviewed journal articles published until July 2013 using “distance education” AND “demographics” AND “attrition”/“dropout”/“persistence”/“retention” as search terms (in Psychology and Behavioral Sciences Collection, ERIC, PsycINFO, and PsycARTICLES) retrieved just five empirical research publications addressing these relationships. Likewise, an inspection of review papers on online learning (Hart 2012; Kerr et al. 2006; Lee and Choi 2011) or distance learning (Koch 2006; Berge and Mrozowski 2001; Phipps and Merisotis 1999) suggest that there exist only a few empirical studies on the relationship between students’ sociodemographic characteristics and dropout from distance teaching. With the present research we aimed to fill in this gap in the research literature. Specifically, we investigated whether and to what extent students’ sociodemographic characteristics predict attrition from full distance education programs.

Understanding the impact of students’ sociodemographic characteristics on attrition from academic programs is relevant for several reasons. First, sociodemographic characteristics are not simple properties of the individual. Rather, they determine individual’s memberships in social and cultural groups that differ with regard to their status, resources and power within the wider society. Understanding the impact of students’ sociodemographics on their academic success is thus a necessary precondition for creating equitable distance learning environments that value human diversity and quality of opportunity. Second, understanding the impact of students’ sociodemographic characteristics on attrition has also economic implications. From the perspective of the institution, each dropout is a financial loss. When we knew which characteristics increase the likelihood of dropout and why, then, ideally, we would also be in a better position to devise adequate institutional measures (e.g., support systems and intervention programs) to prevent or reduce the impact of these variables (Simpson 2004).

From reviewing the existing literature on the role of sociodemographic characteristics in program attrition, three caveats are evident. First, the studies are rather heterogeneous with respect to their samples, predictors, criteria, and control variables so that findings are difficult to compare (see also Lee and Choi 2011, p. 603). For instance, using a large sample of undergraduate and graduate students at a US distance teaching university a study reported better grades for females, older, non-minority, and for more educated students (Koch 2006). In a small sample of distance students at a US university, on the other hand, there was no significant relation to sociodemographic factors such as age, gender, and ethnic background (Willgging and Johnson 2009), while a study at the National Open University in India suggests higher risks to drop out for male, older, and employed students (Yasmin 2013). Second, even though there exists a number of studies investigating the role of students’ sociodemographic characteristics in attrition from specific online courses (for a
review, see Lee and Choi 2011) the conclusions that can be drawn from these studies regarding risks for attrition from full distance education programs remain largely unclear (see Berge and Mrozowski 2001; Phipps and Merisotis 1999). Most importantly, the majority of studies on online-course attrition that we know of recruited their research participants in the context of campus-based institutions in which online-courses complemented traditional face-to-face teaching (see Lee and Choi 2011 for an overview). The variety of differences between campus-based universities or colleges and distance learning institutions raises serious doubts about the generalizability of these (often highly context-specific) findings to full distance education programs at distance learning institutions (Guri-Rosenblit 2005).

Finally and third, existing studies remain largely speculative as to why students’ sociodemographic characteristics affect attrition in online or distance teaching. One reason for this is that research typically focuses on additive or main effects of sociodemographic variables, but neglects potential interactive effects with other relevant predictors. From a psychological perspective, students’ sociodemographic characteristics reflect their membership in different social or cultural populations shaping individual goal orientations, motivations and needs related to their education and career development (Mau and Bikos 2000; Mello 2008; Howard et al. 2011). It thus seems reasonable to assume, for instance, that sociodemographic group memberships affect attrition by shaping the role of students’ academic goals and aspirations (e.g., Oyserman and Destin 2010; Oyserman et al. 1995), also in online education settings (Lee and Choi 2011). Still, to our knowledge, this issue has received little attention in the distance education research.

The Present Research

As indicated above, with a few exceptions, previous research on attrition in distance education has primarily focused on attrition at the course level (Berge and Mrozowski 2001; Phipps and Merisotis 1999). A first objective of the present research was thus to overcome this limitation and to examine the role of students’ sociodemographic characteristics in attrition at the level of full academic programs. Towards this end, we conducted a secondary analysis of cross-sectional institutional surveys conducted at a large public distance learning institution among university graduates and dropouts. We set up a regression model to determine whether and to what extent sociodemographic characteristics commonly used to describe nontraditional students (i.e., gender, age, parenthood, migration background, and employment status) predicted the likelihood of attrition (vs. graduating). To further enhance the validity and generalizability of our conclusions, we controlled in our statistical analyses for factors potentially confounded with students’ sociodemographic characteristics (e.g., type of university entrance qualification). Further, we explored whether our findings were generalizable across the four different university faculties.

A second main objective of our research was to advance our understanding why some sociodemographic characteristics make students more likely to drop out than others. To do so, we examined the following three issues: First, sociodemographic groups are not homogeneous. For instance, female students with children may face different challenges than male parent students (Taniguchi and Kaufman 2007). Therefore, to delineate students at risk to drop out more precisely we examined not only the additive effects of sociodemographic variables, but also potential interactive effects resulting from their various combinations (e.g., the interaction between gender and parenthood). Moreover, we
explored the relationship between students’ sociodemographic characteristics and their academic goal orientations. One orientation reflected students desire to prepare for a new career or to improve career relevant knowledge and competencies, the other orientation reflected students desire to develop their personality through gaining further education. To advance our understanding of the effects of students’ sociodemographic characteristics on program attrition we tested whether and to what extent students’ sociodemographic characteristics strengthen (or attenuate) the relationship between students’ goal orientations and dropout. Finally, we also examined whether and to what extent dropout reasons meaningfully complemented our results on sociodemographic data and goals.

Because of the sparse literature on the relationship between single sociodemographic characteristics and attrition at the level of full academic programs, it would be premature to go beyond the basic prediction that sociodemographics relate to student dropout. We therefore offered no specific hypotheses on the relative importance of single sociodemographic categories nor did we specify specific moderational hypotheses for each sociodemographic characteristic or academic goal.

Methods

Institutional Context

The data used in this study was collected by the Institutional Research and Quality Monitoring Office of the FernUniversität in Hagen (Germany). For the purpose of the present analyses the FernUniversität provides a particularly interesting institution because it shares many institutional features with other large-scale and nation-wide operating higher education universities dedicated to distance teaching, such as, for instance, the British Open University, the Spanish National Distance Teaching University, or the Athabasca University in Canada (Guri-Rosenblit 1999). All these institutions were funded in the 1960s and 1970s (typically by governments), are financed by public funds, and are non-campus-based. With regard to distance teaching all institutions apply a blended-learning approach combining online-based resources, courses, and activities with print-based course materials and in-class teaching. For the present research these institutional communalities are particularly relevant because they strengthen our confidence in the generalizability of our findings to other institutional contexts.

With currently almost 90,000 students enrolled, the FernUniversität in Hagen is Germany’s largest university and one of the largest universities in Europe. Except for the enrollment fees, the university charges no further tuitions. The four university faculties (i.e., Business Administration and Economics, Cultural and Social Sciences, Law, and Mathematics and Computer Sciences) award undergraduate and postgraduate degrees (bachelor’s, master’s, doctorate and habilitation), which are equivalent to those awarded by German campus-based universities. Academic programs offered by the university are based on a blended-learning approach. This includes in-class tutoring and teaching offered in a nation-wide structure of regional study centers as well as the provision of print-based materials. Online instruction is based on a huge variety of resources including video streams, virtual class-rooms, and a learning platform offering learning materials, tests, and interaction with co-students and faculty via chats and forums. Moreover, the university offers support systems such as online-based peer-tutored programs.
Procedure and Sample

We conducted a secondary analysis of a series of cross-sectional institutional surveys deployed by the Institutional Research and Quality Monitoring Office of the Fern-Universität in Hagen (Germany). These institutional surveys are conducted on a regular basis among the total populations of university graduates and dropouts. Each semester, the Institutional Research and Quality Monitoring Office sends e-mails to former students who just left the university asking them to participate in online-surveys on their goals and experiences during studies. Participation in these surveys is voluntary and no incentives are offered. For the purpose of the present analysis, we referred to data of 6,822 graduates and dropouts who complied with this request on six different occasions in 2010 and 2011. The rate of response to the institutional surveys (on average: 19.1 %) corresponds to response rates typically found in the context of web-based surveys that rely on voluntary participation, do not offer incentives, use a non-personalized email-distribution mode, and address academic populations (e.g., Kaplowitz et al. 2004; Cook et al. 2000). 4,599 respondents had valid entries on all theoretically relevant variables (i.e., sociodemographics, control variables, academic goal orientations, and faculty of studies), and were thus eligible for the present analyses. 2,727 of respondents in this sample were dropouts, while 1,872 respondents were graduates.

Measures

Table 1 presents descriptives for sociodemographic characteristics among dropouts and graduates; Table 2 displays descriptives and intercorrelations for students’ goal orientations and reasons for attrition.

Sociodemographics

We focused our analyses on five sociodemographic characteristics that have been identified in previous research as significant predictors of student dropout from online or distance teaching (Koch 2006; Lee and Choi 2011): gender (0 = male, 1 = female), age (0 = less than 50 years of age, 1 = 50 years of age or older), parent status (0 = no children, 1 = children), migration background (0 = no, 1 = yes), and full-time employment (0 = less than 35 professional working hours per week, 1 = 35 h or more). The distribution of sociodemographic characteristics in the sample (see Table 1) closely reflects the distribution of these variables in the active student body of the FernUniversität in Hagen (e.g., female students: 46.2 %; students 50 years of age or older: 4.8 %; migrant students: 5.3 %); our sample can thus be deemed representative for students of this institution.

Controls

We controlled in our statistical analyses for the influences of three distinct factors potentially confounded with students’ sociodemographic characteristics: type of university entrance qualification (0 = informal and nontraditional routes to entry, 1 = formal university entrance qualification), aspired degree level (0 = bachelor’s degree program, 1 = master’s degree program and equivalents), and prior university degree (0 = no, 1 = yes).
Goal Orientations

The surveys included ten items pertaining to two broad classes of students’ academic goals. Five items referred to career development (e.g., “opening new career prospects” or “achieving higher income levels”), another five items referred to personal development (e.g., “gaining new perspectives and experiences” or “gaining new knowledge and insights”). Respondents rated for each item how important the specific issue was for their decision to pursue an academic degree in the specific program by using 5-point rating scales ranging from 1 (low importance) to 5 (high importance). A principle component analysis with subsequent varimax rotation confirmed that the five items targeting career development and the five items targeting personal development fell into two distinct classes. The five career-development items showed loadings ≥.56 on the first factor, whereas the five personal-development items showed loadings ≥.58 on the second. Item loadings on the other factor reached .32 at most. Factor 1 explained 30.3 %, factor 2 accounted for 22.7 % of the total variance. For each respondent we computed separate career-development and personal-development scales by averaging across the corresponding items (αs = .80 and .70; for further descriptives, see Table 2).

Reasons for Attrition

Dropout students worked through a list of items pertaining to conceptually different reasons for attrition. Three items referred to dissatisfaction with program requirements and offers (e.g., “too high workloads”), another three items referred to a perceived lack of support (e.g., “lack of support by partner or family”). Respondents rated for each item how relevant the specific issue was for their decision to drop out by using 5-point rating scales ranging from 0 (no agreement) to 5 (high agreement). To reduce the skew in the distribution of respondents’ ratings we first transformed each rating into a dichotomous coding (0 = no to low agreement, 1 = modest to high agreement). We then computed for each dropout student two separate indexes for dissatisfaction with program and lack of support by summarizing across the corresponding items (for descriptives, see Table 2).

Program Attrition

To create a measure of program attrition from the institutional data, graduate respondents were coded with 0 and dropouts were coded with 1.
<table>
<thead>
<tr>
<th>Scale</th>
<th>M</th>
<th>SD</th>
<th>Correlation with dichotomous variables</th>
<th>Intercorrelations of continuous variables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Attrition</td>
<td>Women</td>
</tr>
<tr>
<td>1. Career development</td>
<td>1–5</td>
<td>3.53</td>
<td>1.01</td>
<td>-.15***</td>
</tr>
<tr>
<td>2. Personal development</td>
<td>1–5</td>
<td>3.84</td>
<td>.79</td>
<td>-.09***</td>
</tr>
<tr>
<td>3. Dissatisfaction with programa</td>
<td>0–3</td>
<td>1.44</td>
<td>1.08</td>
<td>b</td>
</tr>
<tr>
<td>4. Lack of supporta</td>
<td>0–3</td>
<td>1.19</td>
<td>1.02</td>
<td>b</td>
</tr>
</tbody>
</table>

N = 4,599

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

a Variables were only measured in the dropout subsample (n = 2,727)
b Statistic is not available as the variable attrition is a constant among dropouts
Results

The Unique Predictive Value of Students’ Sociodemographic Characteristics

To examine the unique predictive value of students’ sociodemographic characteristics, we performed a three-step hierarchical logistic regression analysis with the dichotomous coding of program attrition as the criterion variable. The three control variables were entered in step 1, the five sociodemographics were entered in step 2, and the ten two-way interaction terms between the five sociodemographic variables were added in step 3. Following recommendations from the literature (e.g., Peng et al. 2002) we used likelihood ratio tests for overall model evaluation; Nagelkerke’s $R^2$ was employed as a goodness-of-fit statistic, and the proportion of correctly classified cases was used as a validation of predicted probabilities. For individual predictors, we report logit coefficients, standard errors, the change in predicted probability delta-P, odds ratios, and Wald’s $\chi^2$s associated ps (see Table 3).

Replicating previous findings on the role of academic background on student success in online or distance teaching settings (Lee and Choi 2011; Koch 2006), when entered in a first step, formal university entrance qualification, higher level of aspired degree and a prior university degree were all significant and negative predictors of the probability of program attrition (for all Wald’s $\chi^2$s associated ps < .001; see Model 1 in Table 3), overall model’s $\chi^2 (3, N = 4,599) = 2,286.79, p < .001$, Nagelkerke’s $R^2 = .53$, correctly classified cases = 83 % (intercept-only model: 59.3 %).

Entering students’ sociodemographics in a second step added significantly to the prediction of program attrition, overall model’s $\chi^2 (5, N = 4,599) = 107.07, p < .001$, Nagelkerke’s $R^2 = .55$, correctly classified cases = 83 %. Supporting the assumed predictive role of students’ sociodemographic characteristics, each of the five sociodemographic variables had a significant and unique predictive value (for all Wald’s $\chi^2$s associated ps < .05; see Model 2 in Table 3). Individual regression coefficients suggest that attrition was more likely for females (with associated odds ratios being 1.23 times than for males), for migrants (with associated odds ratios being 1.85 times higher than for non-migrants), and for fully-employed students (with odds ratios being 1.49 times than for students working less than 35 h per week). Attrition was less likely, on the other hand, for students aged 50 years or older (with associated odds ratios being .35 times lower than for students under 50 years of age) and for students with children (with associated odds being .75 times lower than for students without children).

Adding the ten sociodemographic $\times$ sociodemographic interaction terms in an additional step to the regression equation did not yield a significant improvement of the overall model, $\chi^2 (9, N = 4,599) = 15.17, p = .086$, Nagelkerke’s $R^2 = .55$, correctly classified cases = 83 % (see Model 3, Table 3). Nevertheless, two of the nine interaction terms were at least marginally significant (for the remaining interactions, all Wald’s $\chi^2$s associated ps $\geq .348$). First, there was a significant interaction between gender and migration background suggesting that migrant students had a higher risk for attrition when they were male than when they were female, Wald’s $\chi^2$ associated $p = .010$. Second, there was a marginally significant interaction between age and migration background suggesting that migrant students had a higher risk for attrition when they were 50 years or older than when they were younger, Wald’s $\chi^2$ associated $p = .058$. These interactions are interesting as they suggest that it is not migration status per se which increases students’ likelihood of dropping out from academic programs. Rather, risk for attrition is particularly pronounced among two distinct subgroups of migrant students, namely male or older migrants.
Table 3 Predicting the probability of attrition from university by sociodemographics: results from hierarchical logistic regression

| Block | Variables | Model 1 | | | Model 2 | | | Model 3 | | |
|-------|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
|       |           | B       | SE      | ΔP      | OR      | p       | B       | SE      | ΔP      | OR      | p       | B       | SE      | ΔP      | OR      | p       |   |
| Intercept |         | 3.33    | .14     |         | ***     | 3.19    | .17     | ***     | 3.23    | .20     | ***     |         |         |         |         |         |   |
| Controls | Qualification: formal | −.85    | .11     | −.04    | .43     | ***     | −.87    | .11     | −.05    | .42     | ***     | −.88    | .11     | −.05    | .42     | ***     |   |
|         | Aspired degree: master | −3.64   | .10     | −.54    | .03     | ***     | −3.73   | .10     | −.59    | .02     | ***     | −3.74   | .10     | −.59    | .02     | ***     |   |
|         | Prior degree: yes | −1.27   | .10     | −.08    | .28     | ***     | −1.27   | .10     | −.09    | .28     | ***     | −1.28   | .10     | −.09    | .28     | ***     |   |
| Demo   | Female | .21     | .09     | .01     | 1.23    | *       | .17     | .17     | .01     | 1.18    | .34     |         |         |         |         |         |   |
|         | Elder | −1.05   | .15     | −.07    | .35     | ***     | −.92    | .32     | −.05    | .40     | **      |         |         |         |         |         |   |
|         | Parent | −.28    | .09     | −.01    | .75     | **      | −.19    | .23     | −.01    | .83     | .42     |         |         |         |         |         |   |
|         | Migrant | .62     | .22     | .02     | 1.85    | **      | 1.10    | .55     | .03     | 3.01    | *       |         |         |         |         |         |   |
|         | Fully-employed | .40     | .09     | .01     | 1.49    | ***     | .33     | .16     | .01     | 1.39    | *       |         |         |         |         |         |   |
| Demo × demo | Female × elder |         |         |         |         |         |         |         |         |         |         | .03     | .31     | .00     | 1.03    | .92     |   |
|         | Female × parent |         |         |         |         |         |         |         |         |         |         | −.09    | .21     | .00     | .92     | .68     |   |
|         | Female × migrant |         |         |         |         |         |         |         |         |         |         | −1.20   | .46     | −.08    | .30     | *       |   |
|         | Female × fully-employed |         |         |         |         |         |         |         |         |         |         | .16     | .20     | .01     | 1.18    | .40     |   |
|         | Elder × parent |         |         |         |         |         |         |         |         |         |         | −.28    | .30     | −.01    | .76     | .35     |   |
|         | Elder × migrant |         |         |         |         |         |         |         |         |         |         | 2.47    | 1.31    | .04     | 11.87   | .06     |   |
|         | Elder × fully-employed |         |         |         |         |         |         |         |         |         |         | −.14    | .30     | −.01    | .87     | .64     |   |
|         | Parent × migrant |         |         |         |         |         |         |         |         |         |         | .39     | .45     | .01     | 1.47    | .39     |   |
|         | Parent × fully-employed |         |         |         |         |         |         |         |         |         |         | −.03    | .21     | .00     | .97     | .89     |   |
|         | Migrant × fully-employed |         |         |         |         |         |         |         |         |         |         | −.16    | .47     | −.01    | .85     | .74     |   |
| Model fit | Nagelkerke’s $R^2$ | .53     | .55     | .55     |         |         |         |         |         |         |         |         |         |         |         |         |   |
|         | Classification accuracy (%) | 83      | 83      | 83      |         |         |         |         |         |         |         |         |         |         |         |         |   |

B: logit coefficient; SE: standard error; ΔP: delta-P statistic; OR: odds ratio; p: Wald’s $\chi^2$’s associated p

* p < .05; ** p < .01; *** p < .001
Sociodemographic Characteristics, Goal Orientations, and Program Attrition

A MANOVA with the five sociodemographic variables as independent variables and the two goal orientations (i.e., career development, personal development) as dependent variables yielded two significant main effects for age: Students aged 50 years or older indicated a higher importance of personal development for their decision to pursue an academic degree than students below age 50, $M = 4.16$ versus $M = 3.81$, $F(1, 4,567) = 10.66$, $p = .001$, $\eta^2 = .002$. Conversely, career development was more important for students below age 50 than for students aged 50 years or older, $M = 3.03$, $F(1, 4,567) = 8.38$, $p = .004$, $\eta^2 = .002$. The remaining main or interaction effects were non-significant with all $ps \geq .077$ and $\eta^2 \leq .001$.

To further advance our understanding of the relationship between students’ sociodemographic characteristics and their goal orientations we tested whether and to what extent students’ sociodemographic characteristics strengthened (or attenuated) the relationship between students’ goal orientations and attrition. To do so, we used the logistic regression model reported above regressing program attrition on control variables and sociodemographic variables (Model 2 in Table 3). In two subsequent steps, we added the two goal orientation variables (Model 4 in Table 4) and the 10 sociodemographic $\times$ goal orientation interaction terms (Model 5 in Table 4) as additional predictors.

Entering the two indicators of students’ goal orientations after controlling for the influences of control and sociodemographic variables added significantly to the prediction of program attrition, overall model’s $\chi^2 (2, N = 4,599) = 60.52$, $p < .001$, Nagelkerke’s $R^2 = .56$, correctly classified cases $= 84 \%$. Individual regression coefficients indicated that both high levels in career-development orientation and high levels in personal-development orientation significantly reduced the probability of attrition. For career development, an increase of one scale point was related to a .85 times lower probability of attrition, Wald’s $\chi^2$ associated $p < .001$. Similarly, an increase of one scale point in personal-development orientation lead to a .71 times lower probability of attrition, Wald’s $\chi^2$ associated $p < .001$. The predictive values for controls and sociodemographics obtained in this analysis were virtually identical to the ones yielded without the two goal orientations in the regression equation (for details, see Model 2 and Model 4 in Tables 3, 4).

Entering the 10 two-way interactions between students’ sociodemographics and the two (mean-centered) goal orientation indexes added significantly to the model’s predictive power, $\chi^2 (10, N = 4,599) = 24.52$, $p = .006$, Nagelkerke’s $R^2 = .56$, correctly classified cases $= 83 \%$. Three interaction terms reached statistical significance (the corresponding simple slopes for each interaction are depicted in Fig. 1): First, there was a significant gender $\times$ career development interaction, Wald’s $\chi^2$ associated $p = .033$, indicating that the attrition reducing effect of pursuing career-development goals was stronger among male students, $B = -.24$, $p = .017$ than among female students, $B = -.05$, $p = .556$. In fact, among female students levels of career-development orientation and attrition were entirely unrelated. Second, there was a significant age $\times$ personal development interaction, Wald’s $\chi^2$ associated $p = .025$, indicating that the attrition reducing effect of pursuing personal-development goals was more pronounced among students aged 50 years or older, $B = -.72$, $p = .002$, than among students younger than 50 years, $B = -.25$, $p = .047$. Third and finally, we also observed a significant migration status $\times$ personal development interaction, Wald’s $\chi^2$ associated $p = .003$, suggesting reverse relationships between personal-development orientation and attrition among migrant and non-migrant students. Specifically, whereas higher levels in personal-development orientation were associated with lower attrition risks among non-migrant students, $B = -.25$, $p = .047$, among...
Table 4 Predicting the probability of attrition from university by sociodemographics and goal orientations: results from hierarchical logistic regression

<table>
<thead>
<tr>
<th>Block</th>
<th>Variables</th>
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Model fit

| Nagelkerke’s $R^2$ | .56 | .56 |
| Classification accuracy (%) | 84 | 83 |

B: logit coefficient; SE: standard error; ΔP: delta-P statistic; OR: odds ratio; p: Wald’s $X^2$'s associated $p$

*p < .05; ** p < .01; *** p < .001
Fig. 1 Prediction of attrition from university by sociodemographics and goal orientations (results of hierarchic logistic regression)
students with a migrant background the opposite pattern of relationships occurred, 
\( B = .61, p = .044 \). Taken together, our analyses including students’ goal orientations as additional predictors provided sound support for the idea that one way how sociodemographic variables affect attrition is by strengthening (or attenuating) the protective effects of distinct goal orientations on attrition.

To check whether and to what extent the regression model obtained in the total sample also held for each of the four university faculties (i.e., Business Administration and Economics, Cultural and Social Sciences, Law, and Mathematics and Computer Sciences) we used multi-group structural equation modeling and compared the fit of the regression model across faculties. A restrictive model assuming that the 17 regression coefficients relating attrition on one hand side and sociodemographics, goal orientations, and their interactions on the other were equal across faculties fitted the data very well, RMSEA = .00, CFI = 1.00, \( \chi^2 (54, N = 4,599) = 44.46, p = .819 \). Moreover, this model with equality constraints fitted the data as well as an alternative model that allowed free estimation of regression coefficients for each faculty, RMSEA = .00, CFI = 1.00, \( \chi^2 (3, N = 4,599) = 1.66, p = .647 \). The critical \( \chi^2 \)-difference test yielded a non-significant result, \( \Delta \chi^2 (51, N = 4,599) = 42.81, p = .786 \), suggesting that relationships did not differ significantly across the four faculties of university. Taken together, these analyses strengthened our confidence that findings are robust and can be generalized across different academic faculties and programs.

**Supplementary Analyses: Prediction of Self-reported Reasons for Attrition**

In a set of supplementary multiple regression analyses among the subsample of dropout students we explored the relationship between students’ sociodemographics and their self-reported reasons for dropping out (i.e., dissatisfaction with the program or lack of social support). The conceptually most interesting finding of these analyses concerned women: Specifically, analyses revealed that compared to men women attributed their dropout to a stronger extent to their dissatisfaction with the program, Beta = .11, \( p < .001 \). In addition, compared to men women also reported to a higher extent that they dropped out due to a lack of social support, Beta = .13, \( p < .001 \). Both findings fall clearly in line with our previous results suggesting that for various reasons women are at higher risk to drop out from distance education programs than men.

**Discussion**

The main objective of the present research was to investigate the predictive power of students’ sociodemographics with regard to attrition from full distance teaching programs. To do so and to enhance the generalizability of our findings, we analyzed institutional data from a large-scale, nation-wide operating higher education university dedicated to distance teaching (FernUniversität in Hagen, Germany) that shares many features with other major distance teaching universities (e.g., the British Open University, the Spanish National Distance Teaching University, or the Athabasca University in Canada, see Guri-Rosenblit 1999). In our analyses we considered five characteristics that have been identified in previous research as significant predictors of student dropout from online or distance teaching: gender, higher age, parent status, migration background and full-time employment. To advance our understanding of when and why sociodemographic characteristics predict dropout we also investigated the relationships between these sociodemographics
and students’ goal orientations while controlling for potential alternative predictors of dropout (type of university entrance qualification, aspired degree level, prior university degree).

Higher-Risk Groups

Logistic multiple regression analyses with institutional reports on attrition or successful graduation as criterion revealed that three out of five sociodemographic student groups are at increased risk of dropping out from academic programs: Full-time employed students, migrant students, and female students. Our findings on full-time employed students are consistent with previous data or narrative reports. Full-time employed students face considerable challenges above and beyond academic demands (e.g., Fairchild 2003; Kohler Giancola et al. 2009), which, in turn, make dropout from distance education programs more likely (Quimby and O’Brien 2004; Chartrand 1992). Our findings on students with migration background are also in line with previous research suggesting a higher dropout risk for students from ethnic minority groups (Koch 2006). Importantly, our analyses in which we examined the interaction effects between sociodemographic characteristics also identified two subgroups of migrant students that are particularly at risk: One concerns male students with a migrant background and another concerns older students’ migrant background. The perhaps most surprising finding of our analyses concerns women. Specifically, our analyses suggest a higher risk for women to drop out. This pattern was independent of the four faculties examined in our research and it was also unrelated to students’ previous qualifications or the level of the aspired degree (the control variables included in our analyses). At a first glance, the finding that women have a higher dropout risk than males seem at odds with findings reported in other work suggesting a reversed gender effect (Yasmin 2013). Nevertheless, additional aspects in our data strengthen our confidence in the present observation: First, we observed that, compared to men, women did not benefit to a similar extent from career-related goal orientations—a factor that was associated with a significantly reduced dropout risk in our analyses. Specifically, our analyses revealed that even though male and female students endorsed similar levels of career-related goal orientations, career-related goal orientation only reduced the likelihood to dropout among male students, but not among female students. In fact, among female students career-related goal orientation was entirely ineffective in reducing dropout (see Fig. 1). Second, supplementary analyses also point to significant gender differences with regard to self-reported dropout risks. Compared to men, women indicated a higher dissatisfaction with the program requirements and offers. Further, they also perceived a greater lack of social support. Both findings—program dissatisfaction and perceived lack of support—suggest that female students may have special needs and expectations and that these are not sufficiently considered in the teaching and learning environments.

Lower-Risk Groups

Our analyses also produced some more optimistic results, however. Specifically, our data suggest that, at least in the context of the institution in which we conducted our analyses, two groups face a lower risk to drop out than one would intuitively expect: One concerns older students (50 years and above) and another concerns parent students. With regard to older students our analyses on students’ goals suggest that one reason for reduced dropout risks in this student group revolves around their orientation towards personal development. Our analyses revealed that, compared to younger students, older students were generally...
more strongly motivated by the opportunity for personal growth and development (a finding which resonated with research suggesting that intrinsic motivation increases with age, see Morgan and Robinson 2013). Further, and as indicated by a significant age × development orientation interaction, among older students personal development orientation had a significant reducing effect on the likelihood to dropout, whereas among younger students this effect was much less pronounced (see Fig. 1). Taken together, these findings suggest that one reason for the higher success of older students consists in their distinct and intrinsic motivations fueling their academic engagement.

With regard to parent students, on the other hand, interpretation of our findings is more complex. Our data suggests that parent students have a lower dropout risk. The literature suggests some reasons for why this might be the case. Specifically, one could speculate that children provide a source of support for effectively dealing with the variety of technologies employed in distance education environments (e.g., Poellhuber and Anderson 2011; Finch and Jacobs 2012). Unfortunately, however, our study did not include additional data that would allow us to delineate more precisely why parent students face a lower risk to drop out. Therefore, even though an interpretation of our finding in terms of a cross-generational knowledge transfer seems tempting, the present finding has thus to be interpreted with appropriate caution.

Limitations

Our study has multiple strengths—the usage of institutional data, the comparability of the institutional context, the investigation of students’ sociodemographic characteristics, their goals and their interactions. Still, and of course, our study is not without limitations. Two potential limitations seem particularly relevant. First, even though the main criterion variable of this study (dropout vs. graduation) based on objective information from institutional records, the measurement of our predictor variables had to rely on self-reports. Accordingly, we cannot rule out that at least some students adjusted their responses on the goal orientation measures to make them more coherent with their personal explanations for success or failure. With regard to this issue, it should be taken into account, however, that, if at all, such self-presentational biases may have affected the direct and linear relationships that we observed between students’ goals and dropout. The operation of such biases provides no alternative explanation, however, for the sociodemographics × goals interaction effects we observed in our analyses. A second potential limitation concerns the cross-sectional nature of our study. Although there are good theoretical and empirical reasons to assume that sociodemographic group memberships play a causal role in students’ academic success (Powell et al. 1990; Berge and Huang 2004), the cross-sectional nature of our study does not allow us to draw definite conclusions about cause-effect relationships. For example, and we consider this to be a major limitation of the present work, we cannot rule out, on the basis of our research design, the opposite direction of causality where some groups of respondents were more likely to complete the institutional survey when they dropped out while others were more likely to complete the survey when they graduated. It is important to note, however, that even though such reversed relationships may seem practically possible, they seem rather unlikely on a theoretical level. For instance, we are not aware of any compelling theoretical reason that would explain such group-specific patterns of response. Given the lack of a satisfying theoretical alternative, we thus feel confident that the pattern of relationships between students’ sociodemographic characteristics and dropout observed in the present study can be interpreted most parsimoniously in terms of sociodemographic characteristics as antecedents of
Practical Implications

Before closing we also wish to outline some practical implications of our work for designing equitable distance learning environments that value human diversity and quality of opportunity. Our results indicate that some sociodemographic student groups face, in fact, a higher risk for attrition from distance education programs than others (i.e., female students, fully-employed students, male as well as older migrant students). Distance teaching institutions may thus follow the example of campus-based universities and establish formal or professional services (e.g., counseling or specific virtual support networks) to assist their students in coping with their group-specific challenges. One lesson to learn from experiences with such services is, however, that they are often relatively underutilized (Nilsson et al. 2004; Russell et al. 2008) as students tend to associate specific services with stigma or deviance. A potential alternative approach to increase students’ success is provided by peer-pairing programs in which students are matched to other students on the basis of their needs, interests or group memberships (e.g., Boyle et al. 2010; Siem and Stürmer 2012). From the perspective of students, there is a low threshold for participation in such programs that offer the opportunity to establish contact with like-minded others on an equal footing rather than as dependents. In fact, a recent evaluation of a virtual study-buddy program designed at the FernUniversität provided promising empirical evidence that participation in a structured virtual study-buddy program has the potential to improve students’ social integration, their satisfaction with their study experiences, and their academic achievements—and this independent of their sociodemographic characteristics (Stürmer et al. 2014).

Concluding Comments

In closing, and based on the results of the present research, we wish to emphasize and encourage further theoretical and empirical integration of research on students’ predisposing characteristics, especially their socio-demographic group memberships, in attempting to explain success and failure in distance learning programs. So far, this issue has been explored less systematically than other aspects of distance learning. Further investigations along the lines of the research reported here has the potential, we believe, to produce practical knowledge about how to increase the likelihood of students’ success in distance learning programs, thereby increasing equal opportunities for various social and cultural groups.

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References


