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Identifying Young People at Risk of becoming 'Not in Employment, Education or Training'

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Views expressed in this report are those of the researchers and not necessarily those of the Welsh Government

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Section 1: Introduction

Policy Context

The Welsh Government has a long standing commitment to increase the engagement and progression of young people. It is a commitment in the Programme for Government and the *'Tackling Poverty Action Plan 2012-2016'*. A key part of that plan was a commitment to reduce the number of young people who are not in education, employment and training (NEET). New targets were set out in the plan to:

- Reduce the numbers of NEETs aged 16 - 18 to 9% by 2017, and
- Reduce the proportion of young people aged 19-24 who are NEET in Wales relative to the UK as a whole by 2017.

The approach to meeting these targets is set out in the new Youth Engagement and Progression Framework. The framework is focused on developing a delivery system centred on the needs of young people, which strengthens the accountability of different agencies in the system for delivering better outcomes for young people. The framework has six key elements:

- Identifying young people most at risk of disengagement,
- Better brokerage and co-ordination of support for them,
- Stronger tracking and transitions of young people through the system,
- Ensuring provision meets the needs of young people,
- Strengthening employability skills and opportunities for employment, and
- Greater accountability for local authorities.

Early identification of young people at risk of disengagement is the foundation of the framework. Early identification will enable targeted support to be put in place to increase engagement, improve attainment and develop positive pathways to employment for those most in need of support. It will also enable the effectiveness of this support to be tracked to see if young people's risk of disengagement has reduced.

As part of implementing the actions for early identification of young people at risk of disengagement, the Welsh Government is setting core standards for early identification in Wales to support local authorities in developing their own approach. The analysis in this paper has been used to inform guidelines for developing effective pre-16 early identification systems, which are set out in the new Youth Engagement and Progression Framework.

Aims of the paper

While the value of being able to identify pupils at risk of disengagement is set out above, there has been little consensus on how such systems should be designed and what variables should be used to identify young people at risk of disengagement. Variables used fall into the following classifications:

- **Demographic characteristics:** where whole groups of pupils are considered at risk of disengaging due to demographic characteristics they share. For example, socio-economic status and being looked after (LAC).
- **School-based indicators:** where individual pupils are identified at risk of disengagement based on attainment, attendance and behaviour at school.
- **Personal or attitudinal indicators:** where specific pupils are identified based on personal or family circumstances (e.g. family breakup), as well as more qualitative information on attitudes and aspirations (e.g. self-esteem, resilience, willingness to engage in lessons).

Focusing on indicators where *data are routinely collected* in Wales, this paper aims to assess the extent to which demographic characteristics and school-based indicators would be effective in predicting young people at risk of becoming NEET in Wales. Although personal or attitudinal indicators are important, as data on these are not routinely available at a national level, they are out of scope of this paper. The paper begins with a literature review on the variables for predicting young people at risk of disengaging from learning and becoming NEET. The review focused on literature from the United Kingdom and the United States. This was used to inform the design of an analysis of Careers Wales destination data and Welsh Government Pupil Level Annual

School Census (PLASC) data[1]. The literature review was not based on systematic review methodology and the purpose of the review was to provide an understanding of the potential strengths and limitations of using specific variables, rather than a more robust assessment.

Structure of the paper

Section 2: sets out definitions of disengagement from learning, how this relates to NEETs and the levels of NEETs in Wales.
Section 3: compares demographic characteristics with school-based indicators for identifying young people at risk of disengaging and becoming NEET.
Section 4: presents the results of the analysis of Welsh based data to explore the accuracy of demographic characteristics and school-based indicators in predicting pupils at risk of becoming NEET.
Section 5: provides a brief conclusion.

[1] Careers Wales data for year 11 leavers (aged 15-16), records pupils' known activity (employment, further/higher education or training) on 31 October.

Section 2: Disengagement from Learning

Definitions

Disengagement from learning is a serious concern. It is associated with a range of negative outcomes for both young people themselves and for society as a whole, including lower levels of achievement; an increased risk of being not in employment, education or training (NEET); and increased risks of anti-social and criminal behaviour, poor health, substance misuse and teenage pregnancy (Burgette et al, 2011; Balfanz et al, 2009; Lehr et al, 2004; Dale, 2010; Welsh Government, 2010).

Disengagement from learning is not an easily defined or measurable term. It is not a clearly defined category and there are many definitions of disengagement provided in the literature. Disengagement generally refers to a set of attitudes relating to a young person's motivation, the value they see in school and the importance attributed to school attainment. These attitudes are then translated into behaviours including effort made in completing work, attendance, behaviour and ultimately staying on in education or not. Thus many of the indicators used to measure disengagement relate to the symptoms of a young person switching off or disconnecting from their learning rather than the act itself. A study by Callanan et al (2009) identified three broad levels of disengagement (see boxed text below).

Levels of disengagement

Underachieving but not disengaged: where underachievement was the result of an event/crisis or a more a gradual drop-off in attainment.
Moderate disengagement: where KS4 attainment and enjoyment of school varied. Factors contributing to disengagement were often complex, but less severe than those who completely disengaged. This is often prevented by the presence of some protective factors

Severe or complete disengagement: Those that suffered a serious drop in attainment. Those who become NEET and did not pass any KS4 courses... this group often had a range of complex and multifaceted factors contributing to their disengagement.
Adapted from Callanan, et al, 2009, pp. 34-36

This paper is predominately concerned with the final category of disengagement above and focussed on those who are at risk of becoming NEET. However, the other categories are of interest too, as the route for a young person becoming NEET can be a gradual process and early signs of disengagement need to be addressed to prevent a young person becoming NEET.

Young people described as NEET are not a homogeneous group. The inability of some young people to engage in labour markets or educational opportunities is complex. The term NEET spans a core of young people with deep-rooted problems; an element who are short term and who are generally able to re-engage; and those at risk either because of personal lack of direction, or because they are adversely impacted by shifting economic circumstances. Research has helped to differentiate between these circumstances (Allen *et al*., 2012):

- **Cyclical, in transition or open to learning**: young people who are likely to re-engage in education, training and the workforce in the short term, tending to have higher attainment and a more positive attitude to exploiting opportunity.
- **Floating, 'at risk' or undecided**: young people who may be dissatisfied with available opportunities or are most vulnerable to economic downturn. This group also includes those young people who find themselves lacking direction and/or motivation and move in and out of the NEET group.
- **Core or sustained**: young people experiencing longer-term disengagement in education, training and the labour market, and linked to a wider pattern of poor attainment and experience.

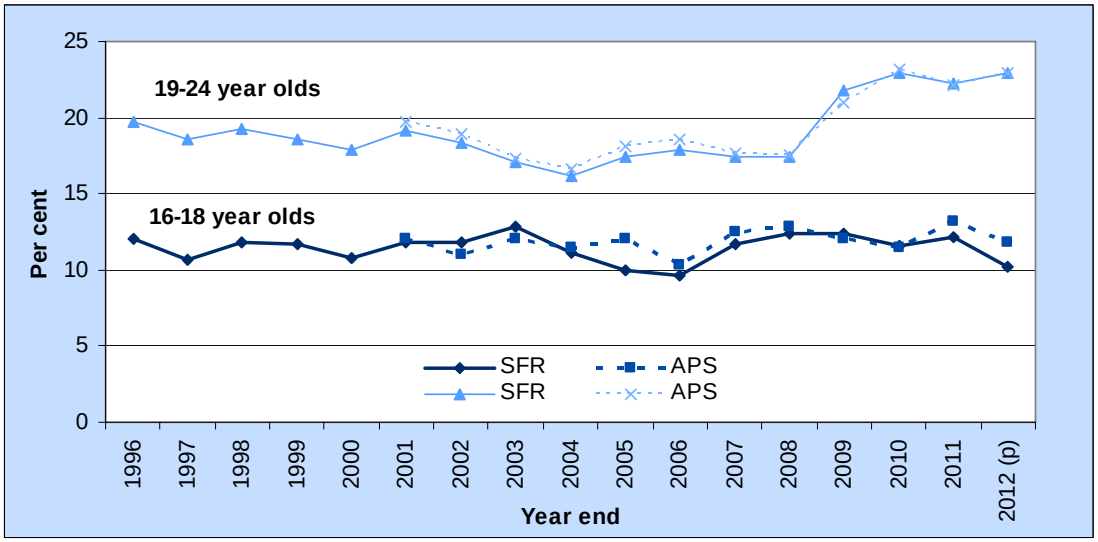
The above classification suggests, for resources to be targeted most effectively, systems designed to identify young people at risk need to be able to distinguish which NEET group a young person is at risk of falling into:

- Young people within first group are unlikely to require any support as in most cases they are highly qualified and are not engaged in learning by choice.
- Young people within the second group do not have substantive barriers to employment or learning. They have relatively good qualification levels and, generally, require advice about how to secure appropriate education, employment or training (DELNI, 2010). It is appropriate to identify this group in their final year of education through determining whether they have a realistic post-school destination and understand how best to realise their preferred destination.
- Young people within the core NEET group have considerable barriers to participation which, in some cases, result from generations of disadvantage (DELNI, 2010). Identifying young people at risk of falling into the core NEET group will require early intervention, as the main characteristic of this group is a lack of qualifications.

Prevalence

Across developed nations a significant number of young people do not go on to employment, education or training following mandatory education. Across OECD nations in 2010, an average of 8 per cent of young people aged 15-19 were NEET (OECD, 2012). In the US, 7.6 per cent of young aged 15-19 were NEET in 2010 (OECD, 2012). In the UK, 10 per cent of young people aged 15-19 were NEET in 2010 (OECD, 2012). In Wales, the chart below shows that the proportion of 16-18 year olds who are NEET has remained fairly constant at a rate of between 10-13 per cent over the years 1996 to 2012, albeit with a slight improvement over the latest period.

Figure 1: Participation of young people in education and the labour market



Source: SDR 117/2013 - Participation of young people in education and the labour market (year end 2011 and 2012 (provisional))
(p) SFR: year end 2012 is provisional and will be updated at the end of July 2014 with final figures for 2012 and provisional figures for 2013

The NEET figure for 19-24 year olds shows a big increase in 2009 following the impact of the recession on youth unemployment in Wales and consequently the decrease in participation in employment for 19-24 year olds in Wales. Therefore the figure for 19-24 year olds is probably driven more by the wider economic cycle.

In Wales, 21 per cent of 16-18 year olds who were NEET had no qualifications compared with eight per cent of the population as a whole between 2008 and 2010 (Welsh Government, 2012a). For 19-24 year olds in the same period, 26 per cent of those who were NEET had no qualifications compared with nine per cent of the population as a whole (Welsh Government, 2012a).

Tracking Systems

Governments across OECD nations have developed strategies and policies to reduce the number of young people who become NEET. One such approach is the identification and tracking of young people at risk of disengaging (also

referred to as early warning systems)[2]. Tracking systems are adopted for a number of reasons, including: identifying, referring and monitoring young people at risk of disengaging; targeting resources to young people at risk of disengaging; and assessing the effectiveness of initiatives designed to prevent young people from becoming disengaged. Related developments have also taken place in England regarding preparation for Raising the Participation Age. A key issue for policy makers in designing tracking systems is the lack of consensus regarding what young people are at risk of disengaging from and how to identify those young people.

[2] In Wales, tracking systems have also been referred to as Keeping in Touch (KIT) systems.

Section 3: Identifying young people at risk of disengaging and becoming NEET

Demographic characteristics

Identifying of young people at risk of disengaging and becoming NEET using demographic characteristics are generally informed by practitioner experience and/or observation (Batten and Russell, 1995) and findings from research. Numerous studies have sought to identify the characteristics of young people who are disengaged and the factors that trigger young people to become NEET. These studies (see for example, Dale, 2010; DELNI, 2010; Coles et al, 2002) have identified the following demographic characteristics that are shared by young people who have become NEET:

- are in care, have left care or who are on the edge of care (LAC),
- are carers,
- are young parents,
- have a physical disability/learning disability/chronic illness,
- have a mental illness,
- experience economic disadvantage,
- have experienced homelessness and/or lived in rented accommodation,
- have parent(s) who is unemployed or in unskilled manual occupations,
- Live in high unemployment areas, and
- Are members of some minority ethnic groups.

These characteristics have been interpreted as risk factors (NAfW, 2011; Social Exclusion Unit, 2000, 1999; WAG, 2009) and have been used at the local level to develop systems to identify pupils at risk of becoming NEET. Since little evidence exists on the effectiveness of using demographic characteristics to predict pupils at risk of disengaging (Hull, 2005), these systems have been described in the literature as being vague, impressionistic and, to a large extent, pre-empirical (Brader and McGinty, 2005). Using demographic characteristics as a way of identifying pupils at risk of becoming NEET is problematic for a number of practical reasons and for accuracy.

a) Practical issues associated with using demographic factors

A key issue for practitioners seeking to identify pupils at risk of disengaging and becoming NEET is the scope of data required to undertake a systematic assessment of risk for all young people. Dale (2010) analysed a series of research studies[3] on factors which increase the risk of early school leaving and found 43 major categories, with 190 sub-categories.

The range and volume of identified 'at risk' demographic characteristics has led Hull (2005) to conclude that it is not possible to assess every pupil against every 'at risk' characteristic. Rather, Hull (2005) argues the focus should be those characteristics which are present in *most* pupils who disengage, leaving the rest to teacher/parent judgement. As Hull acknowledges, this approach relies on teachers noticing pupils at risk of disengaging for a range of reasons.

Whilst some demographic data will be available to schools - such as LAC pupils or those with a disability, other data will not be routinely collected, such as parental occupation or the tenure of their living accommodation. Some data may not be routinely shared with schools for confidentiality/data protection reasons. Where systems rely on demographic characteristics to identify pupils at risk of disengaging, not having comprehensive data about all pupils will result in a system which is likely to miss some pupils who are at risk of disengaging and becoming NEET.

b) Accuracy

There is little evidence to suggest that using demographic characteristics is an accurate way to identify young people at risk of disengaging. Whilst the literature provides a range of risk factors that indicate whether a young person is likely to disengage, the distinction between the *concept* of risk and *indicators* of those at risk of disengaging is not necessarily clear (Batten and Russell, 1995). This distinction is important for the accuracy of systems which are designed to identify pupils at risk of becoming NEET. In particular, issues

[3] The studies include Ferguson, et al, 2005; GHK, 2005; Kendall and Kinder, 2005; Walther and Pohl, 2005; ReStart, 2007; and Raymond, 2008.

arise in attempting to use groups who are over or under represented in the NEET groups to identify individual pupils at risk of becoming NEET.

Demographic variables can be used to identify groups of individuals at risk of becoming NEET by examining how over-represented certain groups are within the NEET group, in relation to the cohort as a whole. This is often easier than identifying individuals (Walker and Donaldson 2010) but can result in over-targeting, which is when someone within a group identified as being at risk does not go on to become NEET. An example of this is eligibility for free schools meals (FSM), a proxy indicator for socio-economic disadvantage. Research in England (DfE, 2010)[4], found that 20 per cent of young people who were eligible for FSM in year 11 (2005/06) were long term[5] NEET at age 18 in 2009. In contrast, only seven per cent of young people not eligible for FSM were long term NEET at age 18 (DfE, 2010). Whilst this data shows that a disproportionate number of young people who were eligible for FSM went on to become NEET when compared to the whole school population, this is not an effective indicator for allocating resources.

Using demographic characteristics in this way with the possibility of inaccurate targeting can have unintended impacts in terms of taking effective action at the school level. Over-targeting could make the problem of disengagement so large that it is perceived by schools as being too big to address or that pupils are labeled as being at risk and unnecessarily 'treated' as being at risk of becoming NEET.

In addition, there is a risk that schools will not perceive disengagement as something they can have an impact on, since demographic variables such as socio-economic status, disability and family structure are difficult, and unlikely, to be alterable (Lehr et al, 2004). As a consequence, Lehr et al (2004) suggest that systems to identify young people at risk of disengaging should focus on factors which are alterable and which schools and practitioners can

[4] The responses to both surveys come from the same cohort of young people, that is, they refer to young people who were in Year 11 (academic age 15) in 2005/06.
[5] Greater than 12 months.

have an impact upon. Alterable variables are indicators which are behavioural signs or manifestations of vulnerability (Waxman et al, 2003). Alterable variables associated with disengagement can be classified into two groups: school-based and resilience related factors. School-based indicators include attainment, attendance and behaviour. Resilience factors include parenting and parental support, sense of belonging, attitude towards school, and response to stressful life events (Lehr et al, 2004).

It is possible to increase the accuracy with which demographic characteristics identify pupils at risk of disengaging through understanding the relationship between school based indicators and resilience factors. These relate back to the personal and attitudinal indicators that were mentioned at the outset of the report. The factors related to resilience include: (McMillan and Reed, 1994):

- **Personal attributes:** such as motivation and goal orientation.
- **Positive use of time:** including on-task behaviour, homework completion, and participation in extra-curricular experiences.
- **Family life:** such as family support and expectations.
- **School and classroom learning environment:** including facilities, exposure to technology, leadership, and overall climate.

While the examination of personal and attitudinal indicators is largely out of scope of this report, their importance should not be underestimated. Chowdry et al (2010) found that aspirations and behaviours account for approximately a quarter of the difference in attainment between rich and poor pupils at age 16. Given the link between attainment and becoming NEET, it seems reasonable that attitudinal indicators will also be important predictors of becoming NEET. Such factors were included in a study by Britton et al (2011), which is expanded upon on page 20 of this report.

Where resilience factors are not assessed, demographic characteristics alone will be unhelpful in identifying pupils who are at risk of disengaging, who might benefit from targeted support. In response to these issues, some researchers have argued that using school-based indicators to identify pupils at risk of

disengaging is more useful than using demographic characteristics since they can be observed by schools (Waxman et al, 2003), are easier to change, and can usually be influenced by pupils, parents, educators, and community members who are prepared to take action.

School-based indicators

Research has found that key warning signals of disengaging include school attendance, behaviour, course performance (completing assignments and passing courses) and, in the United States, on-grade promotion (Burgette et al, 2011; Balfanz et al, 2009; Mac Iver and Mac Iver, 2009; Neild et al, 2007; Jerald, 2006; Lehr et al, 2004). A number of large studies have been undertaken in the United States to identify the accuracy with which indicators are able to predict young people who have become disengaged (see for example, Allensworth and Easton, 2007; Balfanz et al, 2007; Neild and Balfanz, 2006). Annex 1 provides a useful discussion on the different terminology that is used in studies from the United States. In the these studies, school-based indicators have been found to be better predictors of dropping out of secondary education than demographic characteristics such as gender, ethnicity and poverty (Kennelly and Monrad, 2007 cited Burgette et al, 2011). Hull (2005) argues that since research indicates that absenteeism/truancy and low levels of academic achievement are the most significant common characteristics of early school leavers, if a system is only going to use a small amount of data, this is the data that will catch the majority of the at risk cohort.

On-grade promotion, course performance and absenteeism are often inter-related. In the United States, prior retentions in grade are linked to a higher probability of dropping out (Rumberger and Lim, 2008[6] cited Mac Iver and Mac Iver, 2009). Course failures prior to high school, associated with retentions, also have a close association (much closer than test scores) to a

[6] The review included 203 published studies that analysed a variety of national, state, and local data to identify statistically significant predictors of high school dropout and graduation.

dropout outcome (Mac Iver and Mac Iver, 2009) [7]. Chronic absenteeism, often beginning at the elementary level (ages 5-6 to 10-11), is a strong predictor of course failure. In ninth grade (age 14-15), this is a strong predictor of dropping out (Mac Iver and Mac Iver, 2009).

Similar conclusions have been drawn in Wales. Young people considered most at risk of becoming NEET are those who have disengaged from school, regularly played truant, have low basic skills levels, or have achieved no or low qualifications (Welsh Assembly Government, 2009).

Evidence from the United States about the effectiveness of using attainment, attendance and behaviour to identify specific young people at risk of disengaging is detailed below.

a) Attainment

- As early as fourth grade (age 9-10), future dropouts received lower grades than did future graduates (Roderick, 1993[8] cited Pinkus, 2008).
- By the end of ninth grade (age 14-15), eventual graduates and dropouts were accurately identified 80 per cent of the time using an 'on track' indicator based on the number of credits earned and the number of failures in core courses (Allensworth and Easton, 2007[9]).
- Failing ninth grade (age 14-15) is one of the most important predictors of dropping out (Neild and Balfanz, 2006). More students fail ninth grade than any other grade and a disproportionate number of students who are held back in ninth grade subsequently drop out (Herlihy, 2007).
- Not achieving on-grade promotion earlier than ninth grade has a similar long term impact. Alexander et al (1997)[10] found 64 per cent of students

[7] Mac Iver and Mac Iver (2009) summarise the findings of research on dropouts undertaken over a 25 year period.
[8] Based on an analysis of school transcript data for one cohort of seventh grade students from a small, urban school district in Massachusetts in the 1980s. This included analysis of academic grades, social grades, and attendance from the fourth grade until students left school.
[9] The study included 24,894 first-time ninth-graders (ages 4-15 years) in the 2004/05 school year at Chicago public high schools.
[10] Based on data from the Beginning School Study, which monitored academic progress and personal development of a representative random sample of school children in the Baltimore

who had repeated a grade in elementary school (ages 5-6 to 10-11) and 63 per cent of those who had been held back in middle school (ages 11-12 to 13-14) left school without a diploma.

Patterns of attainment are also significant. Middle school (ages 11-12 to 13-14) achievement scores, for example, are not by themselves a predictor of future disengagement. Students (aged 13-14) who are in the highest quartile in eighth grade scores but fall off track in ninth grade (aged 14-15), are far less likely to graduate than students who were in the lowest quartile in eighth grade (aged 13-14) achievement but are on track at the end of ninth grade (aged 14-15) (Allensworth and Easton, 2007).

b) Attendance

Heppen and Therriault's (2008)[11] review of factors which indicate whether a student is at risk of dropping out of high school found that missing more than 10 per cent of instructional time is a cause for concern (see Allensworth and Easton, 2007). Specifically, the review found that the first year of high school (ninth grade, age 14-15) is a 'make or break year'. The review concludes that:

- The biggest risk factor for failing ninth grade is the number of absences during the first 30 days of high school (see Neild and Balfanz, 2006)[12].
- Even moderate levels of absences, one to two weeks, in the first semester of ninth grade, are associated with lower rates of high school graduation (see Allensworth and Easton, 2007).
- By the end of the first semester of high school, course grades and failure rates are slightly better predictors of whether students will graduate (see Allensworth and Easton, 2007).

City Public Schools since they began first grade in autumn 1982. The study includes data from entrance into first grade in autumn 1982 through to early spring 1996.

[11] Based on research into indicators for predicting drop outs undertaken in large urban school districts in the United States.

[12] Based on an analysis of individual-level student record data from the Philadelphia school district of 14,747 first-time freshman (aged 14-15) attending Philadelphia public schools during the 1998/99 school year and 23,423 ninth graders (first time or repeating) during the 1999/00 school year.

c) Behaviour

Research suggests it is possible to identify young people who are likely to disengage at a young age using behaviour as an indicator. Balfanz et al (2007)[13], for example, used longitudinal analyses to follow almost 13,000 sixth grade (aged 11-12) students from 1996 until 2004 and found:

- Receiving an unsatisfactory final behaviour mark in any subject in sixth grade was able to predict 71 per cent of young people flagged not to graduate on time and also identified 50 per cent of the school district's future non-graduates.
- Receiving an unsatisfactory final behaviour mark in any subject alone, is as predictive of falling off the graduation path as being suspended.

Early identification

There is evidence to suggest it is possible to use school-based indicators to identify young people who are at risk of disengaging as early as sixth grade (ages 11/12):

- Students in the sixth grade, who failed either maths or English, had an attendance rate of under 80 per cent or had a final 'unsatisfactory' behaviour mark in at least one class, had at least a 75 per cent chance of dropping out of secondary school (Neild et al, 2007[14]).
- Indicators reflecting poor attendance, misbehaviour, and course failures in sixth grade can be used to identify 60 per cent of the students who will not graduate from high school (Balfanz et al, 2007).

Some research findings suggest that leaving prediction to later years may only have a marginal impact on the accuracy of prediction. Using attainment indicators, for example, Neild et al (2007) found it was possible to identify 75

[13] Based on individual-level data provided by the School District of Philadelphia. A sample of 12,972 students enrolled in sixth grade (aged 11-12) in 1996/97 were followed for an eight year period through to 2003/04, or one year beyond expected graduation for the cohort.
[14] Based on analysis of data of an entire cohort of students (approximately 14,000 students) in Philadelphia who entered the sixth grade in September 1996.

per cent of drop-outs at age 11/12[15]. Waiting until age 14/15 may only increase prediction by 5 per cent.

There is also mixed evidence on whether combining school-based indicators and demographic characteristics, is more effective than using school-based indicators alone. Such evidence needs to be interpreted with caution because of the correlation between school-based indicators and certain demographic characteristics. For example pupils with SEN and with eligibility for FSM, on average have lower levels of attainment (Welsh Government, 2013a and 2013b).

Analysis by Britton et al (2011) used 14 key characteristics that could be collected from pupils to assess their likelihood of becoming NEET. These include the pupils' Key Stage 2 scores, whether English is their first language, living in social housing, having parents in low class occupations or out of work, pupil working in a part-time job while at school, and aspirations for staying on at school, teen smoking, truanting and exclusion. They found that using low KS2 scores (measured at age 11) alone would identify 1 in 10 of pupils likely become a core NEET after leaving school. Increasing the number of characteristics in the model that the pupil has to 5 or more improves this targeting to 1 in 5 individuals who are likely to become core NEET and 2 in 5 who are likely to be NEET at some point after leaving school.

Advantages and disadvantages of using school-based indicators

The advantages of using school-based indicators to identify pupils at risk of disengaging include:

- the data required is routinely collected,
- the data will identify pupils at risk of becoming core NEETs, as the data can identify those unlikely to gain qualifications, and
- using these indicators focuses on alterable variables and places responsibility with those who can detect, and who have potential to

[15] Using an indicator based on either failing a maths or English course.

change, the destinations of young people. In particular, responsibility is placed within schools. Pinkus (2008), for example, goes as far as stating:

> 'recent research is consistently revealing *academic* factors [or school-based indicators] - more accurately predict whether or not a student is likely to drop out than *socioeconomic* factors do. This knowledge puts power in the hands of educators ….. to strategically focus on the academic factors of success they can positively impact. The power of early-warning indicators lies in the willingness and capacity of school leaders and educators to transform insightful data into strategic decision making that leads to improved student outcomes'
> (Pinkus, 2008:1, emphasis original).

Using school-based indictors alone is likely to have some limitations. Whilst school-based indicators are likely to catch pupils who are at risk of falling into the core NEET group, using such indicators alone is unlikely to identify floating NEETs. Thus, it would be useful to add indicators about pupil's attitudes and intentions following compulsory education and capacity of the pupil to follow this through.

Summary of literature

The literature review aimed to assess the extent to which specific demographic characteristics and school-based indicators are effective in predicting pupils at risk of disengaging and becoming NEET. The review suggests there is little evidence that using demographic characteristics alone is effective. The review found evidence from the United States that school-based indicators are effective in accurately identifying young people at risk of disengaging.

There was some evidence to suggest that leaving prediction to later years and combining demographic-based indicators and school-based indicators would have a marginal effect on the accuracy of prediction. There were instances where using combined indicators, including attitudinal variables did have an effect on the level of prediction. The review also highlighted that some indicators are more significant at specific points and that patterns in data can be used to indicate a young person at risk of disengaging.

Whilst there is evidence from studies from the United States that using school-based indicators can identify up to 80 per cent of young people who disengage, there is a lack of clarity about:

- The extent to which analysis of Welsh data would result in similar findings.
- Whether the findings relating to patterns of achievement data are replicated in Wales.
- Which specific aspects of attainment and attendance most accurately predict young people at risk of becoming NEET in Wales.
- The extent to which using school-based indicators over-identify young people who are at risk.
- Whether all data required to run an accurate predictive system in Wales is available.

In response to this lack of certainty, a retrospective analysis of pupil-level data was undertaken and these findings are discussed in the next section.

Section 4: Analysis of pupil-level data

Approach

Logistic regression analysis of matched data from the Welsh Government Pupil Level Annual School Census (PLASC) and the Careers Wales Pupil Destinations Survey, 2011[16] was undertaken with the aim of exploring the accuracy of demographic variables and school-based indicators in predicting pupils at risk of becoming NEET[17]. The analysis included 32 variables which covered the following:

- Eligibility for free school meals.
- Special educational needs.
- In Care (LAC)
- Welsh Index of Multiple Deprivation (WIMD) 2011 deprivation tenths (as a proxy for poverty).
- NEET status.
- Attendance.
- Unauthorised absence.
- Key Stages 2, 3 and 4 attainment (see table one below for full list of variable used).

Study limitations

This analysis of Welsh data was unable to replicate the US studies referenced earlier in this paper, due to structural differences in education systems and differences in data that are routinely collected. For example,

- attendance data submitted to the Welsh Government is not disaggregated by term or by week and therefore it was not possible to assess whether

[16] The survey captures data on the extent to which year 11 leavers make a successful transition from compulsory education into further/higher education, employment or training.
[17] The matching process resulted in 29,606 complete unique pupil records for year 11 leavers (aged 15/56) (85 per cent of the original 34,916 records supplied by Careers Wales), of which 3.7 per cent (1,106) were NEET, 95.1 per cent (28,159) were not NEET and 1.2 per cent (341) had an unknown destination. Records with an unknown destination were removed from the database. Thus, 29,265 individual pupil records were included in the analysis.

attendance at specific times of the school year is linked with becoming NEET.

- attainment data is based on the level of achievement at the end of each Key Stage at ages 10/11 (KS2), 13/14 (KS3) and 15/16 (KS4). Therefore, it was not possible to replicate studies in the US that a drop in grades between the end of middle school and first year of high school (aged 13-14 to 14-15) for high achieving students is effective in predicting pupils who become NEET.
- A lack of data on behaviour - unlike the United States, pupils in Wales are not given a behaviour mark. It was not possible to use exclusion data as a proxy for behaviour as exclusion data are not available at individual pupil level[18]. While it is likely this data will be collected in future, using exclusion data as a proxy for behaviour would be problematic. Since exclusion policies differ from one school to another, what constitutes behavioural grounds for exclusion in one school may not do so in another. Exclusion data would also not identify minor breaches of school policy and/or small changes in behaviour. Therefore, exclusion data would not provide an effective indicator which is consistent across all pupils.

To replicate the US based studies, consideration should be given to using data disaggregated by school weeks and school terms to assess whether changes in attainment and attendance levels over time are strong indicators of future disengagement.

Given the studies referenced earlier demonstrate the strength of behaviour in predicting pupils who drop out of school (especially for younger pupils), thought should be given to introducing a trial for a behaviour grade in year 7. If behaviour was found to be a strong predictor for identifying pupils who go on to disengage, consideration should be given to introducing behaviour grades more widely.

[18] It is, however, possible to use attendance data to identify a young person who is absence as a result of being excluded.

Findings

'Risk' of becoming NEET: groups of pupils who are disproportionately represented in the NEET group

The analysis found significant relationships between both demographic characteristics and school-based indicators, and NEET status. That is, pupils who have certain demographic characteristics or specific school-based indicators are disproportionately represented in the NEET group, compared to the whole school population.

Consistent with the literature, the analysis found pupils aged 15/16 years who are over-represented in the NEET group include:

- Pupils that live in the most deprived areas are more than five times more likely to become NEET than pupils living in the least deprived areas.
- Pupils with School Action Plus (identified as having Special Educational Needs) are almost five times more likely to become NEET than pupils with without SEN.
- Pupils in care (LAC) are around four times more likely to become NEET than other pupils.
- Pupils who are eligible for free school meals are almost three times more likely to become NEET than pupils who are not eligible[19].

Significant relationships were also found between pupils who had low attainment or attendance and being in the NEET group. For example, pupils aged 15/16:

- Who are in the lowest scoring Key Stage 4 points decile are almost 120 times more likely to become NEET than a pupil in either of the two highest scoring points decile.
- Who do not achieve Key Stage 4 level 1 are 10 times more likely to become NEET than pupils who achieve level 1.

[19] The relative risk of becoming NEET generally increases as the number of years of eligibility increases. Young people who have been eligible for free school meals for eight 8 years are around five times more likely to become NEET than young people not in receipt of FSM

- Who do not achieve Key Stage 4 level 2 are almost 10 times more likely to become NEET than pupils who achieve Key Stage 4 level 2.
- With an attendance rate of 50 per cent or less are around 15 times more likely to become NEET than pupils with an attendance rate of 90 per cent or more.
- Pupils with an unauthorised rate of above 30 per cent are almost 11 times more likely to become NEET than pupils with an unauthorised absence rate of 10 per cent or less.

The analysis found that school-based indicators show the strongest association with being NEET.

Table one below ranks the ratio of the percentage of persons NEET per person who is not NEET, identified by each variable. This enables those variables most focused on the NEET group to be identified. For example, 52.6 per cent of the NEET group had a Key Stage 4 points score of 198.8 or less compared to 8.0 per cent of the non-NEET group. So for every 1.0 per cent of the non-NEET group identified by the variable, 6.6 per cent of the NEET group are identified. As the table shows, the 10 variables most focused on the NEET group, other than being in care (LAC) (ranked 6), are school-based indicators.

Table 1: Percentages of the NEET and non-NEET groups identified by each indicator, sorted by rank of ratio

	Rank of ratio	Rank of percentage of NEET group identified	Percentage of NEET group identified	Percentage of non-NEET group identified	Ratio of NEET to non-NEET group identified
Unauthorised absence rate greater than 30%	1	27	11.8	1.0	11.8
Attendance rate less than, or equal to, 50%	2	26	12.0	1.1	10.9
Unauthorised attendance rate greater than 20% but less than or equal to 30%	3	37	6.6	0.9	7.3
Attendance rate greater than 50% but less than, or equal to 60%	4	36	7.2	1.0	7.2
Key Stage 4 points score less than, or equal to, 198.8	5	1	52.6	8.0	6.6
In care (LAC)	6	46	3.8	0.8	4.8
Attendance rate less than 60% but greater than, or equal to, 70%	7	31	10.8	2.4	4.5
Key Stage 3 Science level achieved: 3	8	24	14.1	3.4	4.1

Key Stage 3 Maths level achieved: 1-2	9	48	3.7	0.9	4.1
Unauthorised absence rate greater than 10% but less than, or equal to, 20%	10	29	11.1	2.8	4.0
Key Stage 2 to 3 change in Maths: -2 or more levels	11	42	5.8	1.6	3.6
SEN provision: School Action Plus	12	17	19.1	5.3	3.6
Key Stage 3 Science level achieved: 1-2	13	49	1.4	0.4	3.5
Key Stage 3 Maths level achieved: 3	14	19	17.8	5.1	3.5
Key Stage 3 English/Welsh level achieved: 1-2	15	46	3.8	1.1	3.5
Years eligible for free school meals: 7	16	32	9.2	2.7	3.4
Key Stage 2-3 change in English/Welsh: -2 or more levels	17	39	6.4	1.9	3.4
Key Stage 3 English/Welsh level achieved: 3	18	22	16.2	5.0	3.2
Key Stage 2 Maths level achieved: 1-2	19	32	9.2	2.9	3.2
Key Stage 2 English/Welsh level achieved: 1-2	20	30	10.9	3.5	3.1
Years eligible for free school meals: 6	21	34	7.7	2.6	3.0
Key Stage 2 Science level achieved: 1-2	22	45	4.3	1.5	2.9
Key Stage 2 to 3 change in Science: -2 or more levels	23	28	11.5	4.3	2.7
Years eligible for free school meals: 8	24	20	17.3	6.6	2.6
Key Stage 2 Science level achieved: 3	25	13	25.7	10.1	2.5
Not achieving Key Stage 2, 3 or 4 Core Subject Indicator	26	3	48.0	18.9	2.5
Years eligible for free school meals: 4	27	42	5.8	2.3	2.5
Eligible for free school meals 2011	28	8	35.4	14.7	2.4
Attendance rate of greater than 70% but less than or equal to 80%	29	23	15.8	6.6	2.4
Key Stage 3 Science level achieved: 4	30	6	39.0	16.5	2.4
Years eligible for free school meals: 3	31	40	6.1	2.7	2.3
Key Stage 2 Maths level achieved: 3	32	12	29.5	13.3	2.2
Key Stage 3 Maths level achieved: 4	33	7	36.8	16.6	2.2
Key Stage 2 English/Welsh level achieved: 3	34	9	32.8	14.8	2.2
Welsh Index of Multiple Deprivation decile: 1*	35	14	24.1	10.9	2.2
Key Stage 3 English/Welsh level achieved: 4	36	4	41.6	19.1	2.2
Years eligible for free school meals: 5	37	44	5.7	2.7	2.1
Key Stage 4 points greater than 198.8 < but less than or equal to 302.0	38	16	20.0	9.6	2.1
Years eligible for free school meals: 2	39	38	6.5	3.4	1.9
SEN: Statemented	40	35	7.3	3.9	1.9
Key Stage 2-3 change in English/Welsh: -1 level	41	11	29.9	16.4	1.8
SEN: School Action	42	18	18.5	10.3	1.8
Key Stage 2 to 3 change in Maths: -1 level	43	10	32.20	18.00	1.8
Welsh Index of Multiple Deprivation decile: 2	44	21	16.9	10.2	1.7
Key Stage 2 to 3 change in Science: -1 level	45	5	41.5	26.4	1.6
Years eligible for free school meals: 1	46	41	5.9	4.0	1.5
Welsh Index of Multiple Deprivation decile: 3	47	25	12.7	10.1	1.3
Fall in attainment from Key Stage 3 to 4	48	15	20.8	17.4	1.2
Can not speak Welsh	49	2	50.7	43.7	1.2

Source: Bird, J. (2013) Unpublished Masters Dissertation

Predictive power of school-based indicators and demographic characteristics

Further analysis was undertaken to establish the strength of relationships between both demographic characteristics and school-based indicators and being NEET, with the aim of identifying which variables are the most accurate in predicting pupils at risk of becoming NEET[20].

In terms of demographic characteristics, the analysis in table one is useful as it demonstrates that, whilst a demographic characteristic might identify a high proportion of the NEET group (for example, not being able to speak Welsh, 50.7 per cent), the characteristic might also identify a high proportion of the non-NEET group (43.7 per cent).

Table two overleaf shows there was a weak association between being NEET and persistent FSM eligibility, having special educational needs and living in deprived areas. The remaining demographic variables had a negligible association with NEET status. That is, none of the individual demographic characteristics analysed are likely to be effective in identifying pupils at risk of becoming NEET. In contrast to demographic characteristics, the variables with the strongest associations with NEET status were found to be school-based indicators. In particular, Key Stage 4 wider points score, level 1 and level 2 achievement and unauthorised absence and attendance rates. These school-based indicators would, therefore, be more accurate in predicting pupils at age 15/16 who are likely to go on to become NEET than demographic indicators. As table two and figure two show, the most accurate school-based indicator was Key Stage 4 wider points score.

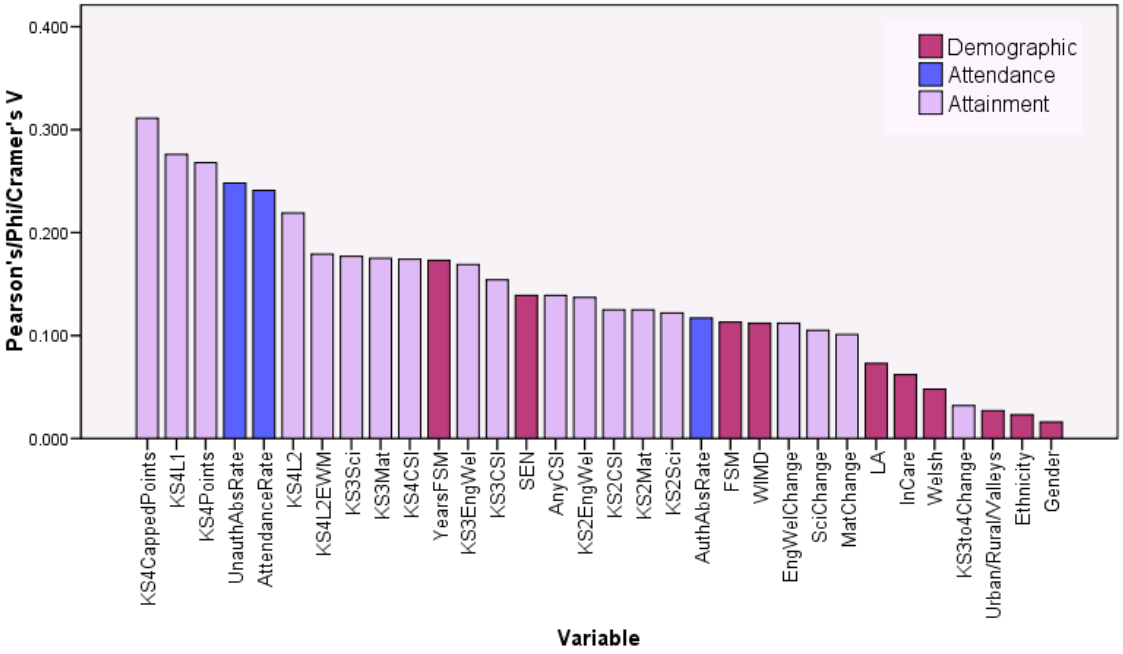
[20] Phi and Cramer's V tests were used to measure the strength of association between variables. The convention developed by Rea and Parker (1992) is adopted for describing the strength of association.

Table 2: Phi/Cramer's V statistics for association with NEET status

	Association with NEET status
Key Stage 4 capped points score	0.307
Key Stage 4 level 1 achievement	0.268
Key Stage 4 points score	0.268
Unauthorised absence rate	0.248
Attendance rate	0.241
Key Stage 4 level 2 achievement	0.221
Key Stage 3 Science level achieved	0.184
Key Stage 4 level 2 achievement (inc. English/Welsh and Maths)	0.180
Key Stage 3 Maths level achieved	0.180
Key Stage 4 CSI	0.175
Number of years eligible for FSM	0.173
Key Stage 3 English/Welsh level achieved	0.173
Key Stage 3 CSI	0.159
Key Stage 2 English/Welsh level achieved	0.143
SEN	0.139
Achieved any of Key Stage 2, 3 or 4 CSI	0.139
Key Stage 2 Maths level achieved	0.131
Key Stage 2 CSI	0.131
Key Stage 2 Science level achieved	0.127
Change in level from Key Stage 2 to 3 in Maths	0.114
2011 FSM eligibility	0.113
Change in level from Key Stage 2 to 3 in English/Welsh	0.113
WIMD decile	0.112
Change in level from Key Stage 2 to 3 in Science	0.106
Local authority	0.073
In care (LAC)	0.062
Speak Welsh	0.048
Change from Key Stage 3 to 4	0.032
Urban/rural/valleys classification	0.027
Ethnicity	0.024
Gender	0.016

Source: Bird, J. (2013) Unpublished Masters Dissertation

Figure 2: Strength of association between being NEET and variables sorted by strength of association



Source: Bird, J. (2013) Unpublished Masters Dissertation

Change in attainment

Analysis of changes in attainment between Key Stages found a relationship between changes in attainment levels at Key Stages 2 and 3 in English/Welsh, maths, science and being NEET. Pupils whose Key Stage 3 attainment is two levels below their Key Stage 2 attainment levels in all three subject areas are around three times more likely to be NEET than pupils with no change in attainment level. Further analysis, however, found the strength of the association was weak and, therefore, changes in attainment levels between Key Stages 2 and 3 would not be effective in predicting pupils aged 11-14 years, who are likely to become NEET. Similar results were found for changes in attainment levels between Key Stages 3 and 4.

Combining school-based indicators and demographic characteristics

There was mixed evidence in the literature on whether a combination of school-based and demographic indicators would be more accurate at

predicting pupils likely to disengage than using school-based indicators alone. When the predictive power of school-based indicators across Key Stages 3-4 is compared to a combination of school-based indicators and demographic characteristics[21] there is very little difference (see table three below). Therefore, using just attainment and attendance data is as effective in predicting pupils at risk of disengaging as using a combination of attainment, attendance and demographic data.

A different picture emerged from the analysis of Key Stage 2. As table three shows, adding demographic characteristics to school-based indictors increases the model's ability to correctly classify a NEET person by five percentage points. Further research is required to determine why this is the case.

Identifying young people at a young age

Table three shows that accuracy in predicting pupils likely to become NEET increases as pupils get older. At the end of Key Stage 2 (age 11), it is possible to identify between 63 and 68 per cent of pupils who are likely to become NEET, this rises to around 73 per cent at the end of Key State 3 (age 14) and to almost 80 per cent at the end of Key Stage 4 (age 16). However, further research is required to assess the extent to which including behaviour indicators would increase the accuracy of prediction, particularly in predicting pupils during Key Stage 2. Further research is also required to assess the extent to which it would be effective to identify pupils at risk of disengaging as early as the Foundation Phase.

[21] All demographic variables were submitted for inclusion in the model. However, in the process of modelling, the most effective demographic characteristics were selected by the programme.

Table 3: Accuracy of school-based indicators and demographic characteristics in predicting pupils at risk of becoming NEET across Key Stages

Model code	Variables used	% NEET young people identified	% non-NEET young people identified
A1	Key stage 2 attainment and attendance	63.0	78.0
A2	Key stage 2 attainment, attendance and demographic characteristics	68.2	78.7
B1	Key stage 3 attainment and attendance	72.9	75.1
B2	Key stage 3 attainment, attendance and demographic characteristics	72.3	76.7
C1	Key stages 2 and 3 attainment and attendance	73.2	74.9
C2	Key stages 2 and 3 attainment, attendance and demographic characteristics	73.5	75.9
D1	Key stage 4 attainment and attendance	78.2	78.8
D2	Key stage 4 attainment, attendance and demographic characteristics	79.0	79.1
E1	Key stages 2, 3 and 4 attainment and attendance	79.9	78.5
E2	Key stages 2, 3 and 4 attainment, attendance and demographic characteristics	79.3	79.0

Source: Bird, J. (2013) Unpublished Masters Dissertation

Section 5: Conclusion

Key Stage 4 variables along with attendance variables were the most effective in identifying a pupil's NEET status. However, it may be necessary to identify a pupil at risk of becoming NEET at an earlier age so that preventative measures can be put in place. The best model was at age 15/16, which uses the most recent attainment data. However, the differences in the predictive measures between the models at 10/11, 13/14 and 15/16 were small, which showed that should a model need to be constructed to identify someone at risk of becoming NEET at an earlier age, it would still perform well. Therefore, it may be more important to develop a model which loses some predictive accuracy but identifies those at risk of becoming NEET at a younger age.

While the analysis found school-based indicators were more effective in predicting pupils at risk of becoming NEET, the addition of demographic variables was more crucial in the improvement of accuracy of the model when identifying those at risk at age 10/11.

These findings are supportive of those discussed in the literature review. This analysis adds to the evidence that attendance and attainment variables, are more effective at predicting someone's NEET status than demographic variables such as FSM eligibility, SEN or ethnic background.

The evidence shows that a focus on attendance, behaviour and attainment will identify the majority of young people who are at risk of becoming NEET and therefore should be used by early identification systems. However, the importance of personal and attitudinal indicators should not be underplayed. If local level data on these indicators are available to practitioners, then they will also have a role to play in identifying pupils at risk of becoming NEET.

Annex 1: Definition of Young people who drop out from education in the United States

Structure of the School System in the United States: Grade Levels

Age	Level of Study	US Grade	UK Year Group
3 - 4/5	Nursery School	N/A	N/A
4/5 - 11	Primary School	Kindergarten - 5th	Years 1 - 6
12 - 16	Secondary School	6th - 10th	Years 7 - 11
17 - 18	Sixth Form	11th - 12th (Junior - Senior)	Years 12-13

Young people who become disengaged in the United States are defined as early school leavers or dropouts. That is, those young people who have not graduated from high school and do not, therefore, have any qualifications. Young people in the United States typically graduate from high school at age 17/18 years. However, the requirement that students pass each school year prior to progressing to the next school year, means that young people can be retained in grade and, consequentially, students can be older than 17/18 years on graduation. Young people who drop out of school are given the opportunity to return to school to complete their high school diploma. Whilst education provision differs across the states, the US Census Bureau collects data on young people who graduate up to 24 years of age.

Systems for identifying young people at risk of disengaging aim to identify, at an early age, young people who are at risk of not graduating from high school. Identifying young people at risk of disengaging is centered on school-based indicators. Systems and practices are put in place to identify young people at risk of dropping out of school at an early age to allow sufficient time for interventions to support young people to get back on track. Defining disengagement as not graduating from high school has the benefit of providing a single benchmark, attainment of a High School Diploma, which covers the whole of the United States education system and provides a clear idea of the policy implications - get young people re-enrolled and graduated if, and when, they drop out (Dale, 2010).

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