

# Tests of new instrument for measuring Dublin descriptors

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# Tests of new instrument for measuring Dublin Descriptors

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## Contents

1	Introduction	1
2	Item non-response	9
3	Distribution	13
4	Differentiation between categories	20
5	Predictive validity	28
6	Required level versus importance	35
7	General versus specific items	38
8	Conclusions	46
	Appendix 1: Operationalisatie Dublin descriptoren	51
	Appendix 2: Original O*NET items	72



# 1 Introduction

In the summer of 2007 a new instrument was developed which aimed at providing an operationalisation of the Dublin descriptors (Appendix 1). Special attention was paid thereby to the so-called ‘anchor problem’ inherent in most self-assessments: the lack of an objective frame of reference against which different respondents can assess their own level of competence.

The instrument consists of a combination of general and specific items. First of all a general item was formulated for each of the 5 Dublin descriptors. The general items were formulated in such a way as to match the original descriptors as closely as possible. Anchors were developed for each of these items which correspond to junior college, bachelors and masters levels. For example, for the item “communication” the junior college level was indicated by the anchor “is able to transmit information”, the bachelors level by “is able to communicate ideas and transmit solutions” and the master level by “is able to communicate conclusions and the knowledge, motivations and considerations that underlie these conclusions in a convincing manner”. The anchors for the bachelors and masters level are derived more or less directly from the Dublin descriptors, and those for the junior college level are based on the European Qualification Framework. For practical reasons it was decided not to develop anchors for the PhD level. The anchors were placed in a scale ranging from 1 to 8, with the junior college level being assigned a scale value of 2, the bachelors level the value 5 and the masters level the value 7. This allowed respondents the option of choosing a level above masters level or below junior college level if they find that appropriate. The distances between junior college, bachelors and masters level approximates the mean differences in years of education corresponding to each level.

In addition to these general items, 2 or 3 more specific questions were included for each descriptor. These were borrowed from the O\*NET survey (Appendix 2), a large-scale study carried out in the United States among a large sample of the workforce (see <http://www.onetcenter.org>). For several reasons it was necessary to

adapt the O\*NET anchors. First of all it was necessary to restrict the range, to avoid very low levels which would more or less obviously not apply to bachelors and masters. Secondly, the O\*NET anchors are not specifically designed to correspond to the junior college, bachelors and masters levels. In consultation with a Dutch occupational specialist, changes were made to the anchors to make them correspond as closely as possible to these three levels in Dutch education.

The advantage of the general items is that they correspond more or less exactly to the Dublin descriptors and are as such immediately recognizable for respondents. There are however several disadvantages: a 'halo-effect' may occur, whereby answers to earlier questions influence answers to later questions), and the anchors may be formulated in such general terms that they can be interpreted in several ways. The advantage of the specifically formulated O\*NET items is that they concern concrete situations, and are thus more strongly fixed. There are again several disadvantages: they may sometimes refer to situations that are unfamiliar to some respondents, and they may be more demanding for respondents, because they require them to 'translate' the specific situation described in the anchor to an equivalent situation from their own experience or knowledge. Finally, the specific items cover only part of the descriptors.

For each of the items 4 questions were asked:

1. How important is the aspect for performing your current job? (score ranging from 1 'not important' to 5 'extremely important');
2. What level is necessary on this aspect for adequate performance of your current job? (8-point scales with anchors at the junior college (2), bachelors (5) and masters (7) level;
3. How would you assess your own level on this aspect? (same scale as 2);
4. Would you have preferred more or less attention to have been paid to developing this aspect in your study program (score ranging from 1 'much more attention' to 5 'much less attention).

The tests described in this note focus mainly on questions 2 and 3, which form the key innovation aimed for measuring the Dublin descriptors. The first question was included because it is a much simpler question used in many studies, and can serve as something of a benchmark for question 2. In order to merit further development this more complicated question of required level must yield information over and above what can be obtained by simply asking how important the aspect in question is. In combination, questions 2 and 3 can yield information on shortages and surpluses. Of course, a shortage need not mean that the item in question was insufficiently developed in education. It may be that some aspects are better developed at work or in private life. For this reason the last question was added, to see explicitly whether sufficient attention was paid to the aspect in question.

In the autumn of 2007 a pilot study was carried out among a random 10% sample of Higher Vocational Education (HBO) and university (WO) graduates approached for the annual graduate surveys (the HBO-Monitor and WO-Monitor). To glean more information from the pilot study, 4 versions of the questionnaire were developed:

1. the list as described above, with anchors for junior college, bachelors (HBO) and masters (university) level, with for each item first the question on importance, followed by a combined question on required and own level, and closing with the question on preferred level of attention;
2. the same as 1, starting with own level, followed by importance, required level and attention;
3. the same as 1, but with a fixed scale without anchors for the questions on required and own level;
4. the same as 1, but with the original O\*NET anchors.

Scheme 1 summarizes the characteristics of the regular list and the four above mentioned list from the pilot study.



**Scheme 1**

## The lists

	Regular list	List 1	List 2	List 3	List 4
Anchors for level	No	MBO/HBO/WO	MBO/HBO/WO	No	O*NET
Scale for level	5-point	8-point	8-point	8-point	8-point for 5 items; 7-point for 11 items
1st question	Required level	Importance	Own level	Importance	Importance
2nd question	Own level	Required level	Importance	Required level	Required level
3d question		Own level	Required level	Own level	Own level
4th question		Attention	Attention	Attention	Attention

In the pilot we want to research the psychometric properties of the different types of questions: do we measure the same? How does it sit with the construct and predictive validity in relation to other variables? Can a reduction of the number of questions be reached?

By comparing the outcomes of these 4 versions of the new instrument with each other and with the instrument currently used in the rest of the HBO-Monitor and WO-Monitor, it is possible to test a number of explicit hypotheses:

#### *Anchors versus no anchors*

*Item non-response (null) hypothesis 1:* Scales using clearly defined anchors representing the hypothetical range of competences in the population do not lead to more item non-response than scales without anchors.

*Overestimation hypothesis 1:* Scales using clearly defined anchors representing the hypothetical range of competences in the population will be less susceptible to overestimation than scales without anchors.

*Distribution hypothesis 1:* Scales using anchors representing the hypothetical range of competences in the population will more closely approximate a normal distribution than scales without anchors.

*Distribution hypothesis 2:* Scales using anchors representing the hypothetical range of competences in the population will be more likely to elicit answers across the full range than scales without anchors.

*Distribution hypothesis 3:* Scales using anchors representing the hypothetical range of competences in the population will be less susceptible to left or right censoring than scales without anchors.

*Differentiation hypothesis 1 (weak version):* Scales using anchors representing the hypothetical range of competences in the population will differentiate more on own level between bachelors and masters graduates than scales without anchors.

*Differentiation hypothesis 1 (strong version):* Scales using anchors representing the hypothetical range of competences in the population will yield a mean own level of close to 5 for bachelors and close to 7 for masters; scales without anchors will yield no consistent mean level for bachelors or masters.

*Differentiation hypothesis 2:* Scales using anchors representing the hypothetical range of competences in the population will differentiate more on own level between study programs than scales without anchors.

*Differentiation hypothesis 3 (weak version):* Scales using anchors representing the hypothetical range of competences in the population will differentiate more on required level between graduates holding jobs that require bachelors level and those holding jobs requiring masters level qualifications than scales without anchors.

*Differentiation hypothesis 3 (strong version):* Scales using anchors representing the hypothetical range of competences in the population will yield a required own level of close to 5 for graduates holding bachelors-level jobs and close to 7 for graduates holding masters-level jobs; scales without anchors will yield no consistent mean required level for bachelors or masters level jobs.

*Differentiation hypothesis 4:* Scales using anchors representing the hypothetical range of competences in the population will differentiate more on required level between occupations than scales without anchors.

*Prediction hypothesis 1:* Scales using clearly defined anchors representing the hypothetical range of competences in the population to measure own competences will be better predictors of graduates' general evaluation of the study program than scales without anchors.

*Prediction hypothesis 2:* Scales using clearly defined anchors representing the hypothetical range of competences in the population to measure own and required competences will be better predictors of graduates' labour market outcomes than scales without anchors.

#### *O\*NET anchors versus adapted anchors*

*Distribution hypothesis 4:* Scales using anchors adapted to the Dublin descriptors will show better distributional characteristics than scales using the original O\*NET anchors.

*Differentiation hypothesis 5:* Scales using anchors adapted to the Dublin descriptors will differentiate more between educational and occupational levels and fields than scales using the original O\*NET anchors.

*Prediction hypothesis 3:* Scales using anchors adapted to the Dublin descriptors to measure own and required competences will be better predictors of educational and labour market outcomes than scales using the original O\*NET anchors.

*Item non-response hypothesis 2:* Scales using anchors adapted to the Dublin descriptors lead to less item non-response than scales using the original O\*NET anchors.

### *Importance versus required level*

*Distribution hypothesis 5:* Required level based on anchors representing the hypothetical range of competences in the population will show better distributional characteristics than importance based on scales without anchors.

*Differentiation hypothesis 6:* Required level based on anchors representing the hypothetical range of competences in the population will differentiate more between educational and occupational levels and fields than importance based on scales without anchors.

*Prediction hypothesis 4:* Required level based on anchors representing the hypothetical range of competences in the population to measure own competences will be better predictors of labour market outcomes than importance based on scales without anchors.

*Item non-response (null) hypothesis 3:* Required level based on anchors representing the hypothetical range of competences in the population does not lead to more item non-response than importance based on scales without anchors.

*Discrepancy hypothesis 1:* Discrepancies (shortages and surpluses) between own and required level based on anchors representing the hypothetical range of competences in the population are better indicators of overall shortages and surpluses than discrepancies between (standardized) importance and (standardized) own level.

### *General versus specific items*

*Overestimation hypothesis 2:* Items with situation-specific anchors for own and required level will be less susceptible to overestimation than items with generalized anchors.

*Distribution hypothesis 4:* Items with situation-specific anchors for own and required level will show better distributional characteristics than items with generalized anchors.

*Differentiation hypothesis 5:* Items with situation-specific anchors for own and required level will differentiate more between educational and occupational levels and fields than items with generalized anchors.

*Prediction hypothesis 3:* Items with situation-specific anchors for own and required level will be better predictors of educational and labour market outcomes than items with generalized anchors.

### *Question order*

*Distribution (null) hypothesis 6:* It makes no difference for the distribution of answers whether the question on own level or the question on importance is asked first.

*Differentiation (null) hypothesis 7:* It makes no difference for the differentiation between educational and occupational levels and fields whether the question on own level or the question on importance is asked first.

*Prediction (null) hypothesis 5:* It makes no difference for the prediction of graduates' general evaluation of the study program or labour market outcomes whether the question on own level or the question on importance is asked first.

*Item non-response (null) hypothesis 4:* It makes no difference for item non-response whether the question on own level or the question on importance is asked first.

## **2 Item non-response**

Table 1 summarizes the progressive number of item missing values immediately preceding, during and immediately following the competence block. Since the progression is more or less linear over the course of the block (almost, but not quite; see discussion below), we limit the presentation to the first and last items in the competence list, and the questions immediately preceding the competence block.

Somewhat puzzlingly, prior to the competence block, the respondents who were selected to complete one of the four new lists of ‘Dublin’ competences already showed a higher level of item non-response. However, the difference is not statistically significant and can probably be put down to random sampling differences. Turning to the competence block, a second seemingly strange finding appears, namely that the item non-response on the dimensions importance and required level for the first ‘Dublin’ item drops substantially with respect to the immediately preceding question in all four versions. This finding is a little misleading however, since these percentages exclude those not currently in paid employment. When we turn to the first answers on the dimensions own level and attention wanted – for which no such selection applied – we see that the percentages are similar or slightly higher to that on the preceding item. For the regular list, the item non-response for required and own level on the first items is substantially higher than that on the comparable ‘Dublin’ questions, despite the lower level on the preceding item. This may be attributable to the fact that the regular list is programmed to show several items together on one screen.

**Table 1**

Item non-response at different stages

	List				
	Regular list	Dublin 1	Dublin 2	Dublin 3	Dublin 4
Question immediately preceding competence block(a)	10.9	13.3	13.1	12.7	12.2
Competence block					
Importance (first item)(b)	n.a.	9.7	6.4	8.3	7.8
Required level (first item)(b)	11.7	9.7	6.7	8.8	8.0
Own level (first item)	16.6	14.0	13.1	13.1	13.8
Attention wanted (first item)	n.a.	14.0	13.5	13.5	13.8
Importance (last item)(b)	n.a.	21.2	15.5	12.4	12.9
Required level (last item)(b)	15.5	21.2	15.8	12.7	13.1
Own level (last item)	19.7	25.0	21.6	17.0	18.6
Attention wanted (last item)	n.a.	25.0	21.4	17.4	18.6
Question immediately following competence block(c)	16.8	22.9	19.8	15.3	16.9

## Notes:

(a) 'Grade' assigned to study program by respondent for didactical skills of lecturers

(b) Restricted to graduates in paid employment

(c) 'Looking back, if you could choose again, would you choose the same study program?'

More interesting for our purposes is the progression of the item non-response between the first and the last items in the competence block. Whereas the item non-response is similar at the start, by the end of the block substantial differences between the lists are apparent. The best list in this respect is Dublin list 3, in which no anchors were used, closely followed by list 4, containing the original O\*NET anchors. The highest item non-response by far is seen for Dublin list 1, followed by list 2. The difference between list 1 and list 2 may be attributable to the less complicated layout of the latter list. There is no way of confirming this definitively, but this may suggest that the item non-response of list 3 and 4 – which share the complicated layout of list 1 – could be reduced even further. The regular list occupies an intermediate position. As predicted in *Item non-response (null) hypothesis 3*, there is little or no difference between the item non response to the importance and required level questions at any stage in any list. Finally, the last

row of Table 1 shows that few of those who stopped responding to the competence items return to continue with the questionnaire afterwards.

In order to give a clearer picture of the development of item non-response, Table 2 shows the incremental change in item non-response per stage of the questionnaire. To avoid unnecessary cluttering, we limit the presentation of competence items to the dimension own level.

**Table 2**  
Incremental change in item non-response at different stages

	List				
	Regular list	Dublin 1	Dublin 2	Dublin 3	Dublin 4
Question immediately preceding competence block	10.9	13.3	13.1	12.7	12.2
Competence block					
Own level (first item)	+5.7	+0.6	+0.0	+0.4	+1.7
Own level (last item)	+3.1	+11.0	+8.6	+3.9	+4.8
Question immediately following competence block	-2.9	-2.1	-1.8	-1.7	-1.7

Table 2 underscores the great impact of Dublin list 1, and to a lesser extent list 2. Lists 3 and 4 show much less reduction in response. The regular list elicits much more of a ‘blanket’ non- response – almost 6% of graduates do not even start to answer it – but only a modest increase is seen as the list progresses.

The large difference between the lists is difficult to understand. Only one of the lists using anchors (list 4, with the original O\*NET anchors) has a satisfactorily modest impact on response, but it is not immediately clear why this should be the case. In most respects list 4 is not inherently less complicated than list 1, and is arguably more complicated than list 2, which separates the questions on own and required level. One possibility is that the O\*NET anchors, which have been extensively tested (albeit among the US labour force rather than Dutch higher



education graduates), make more sense to graduates than the hitherto untested new anchors. As we shall see however, in subsequent tests the O\*NET anchors do not perform better than those in lists 1 and 2. The good news is that the item non-response for list 4 is lower than that for the regular list, and is only marginally higher than list 3 which uses no anchors. Although *Item non-response (null) hypothesis 1* - which predicts no difference in item non-response between lists 1 and 2 on one hand and list 3 on the other - and *Item non-response hypothesis 2* - which predicts less item non-response for lists 1 and 2 than for list 4 - are not supported by the data, the relatively low item non-response for list 4 suggests that scales using anchors are not inherently less likely to induce a response than scales without anchors. The large differences between the lists do however suggest that this is highly sensitive to the precise way in which the question is formulated and presented.

Despite this reassuring conclusion, one additional detail should be mentioned before moving on to a discussion of the distribution of answers to the competence questions. As mentioned above, the progression of non-response over the competence block is almost, but not quite, linear. Figure 1 shows the detailed non-response per item, again for the dimension own level.

**Figure 1**  
Item non-response per competence item (own level)

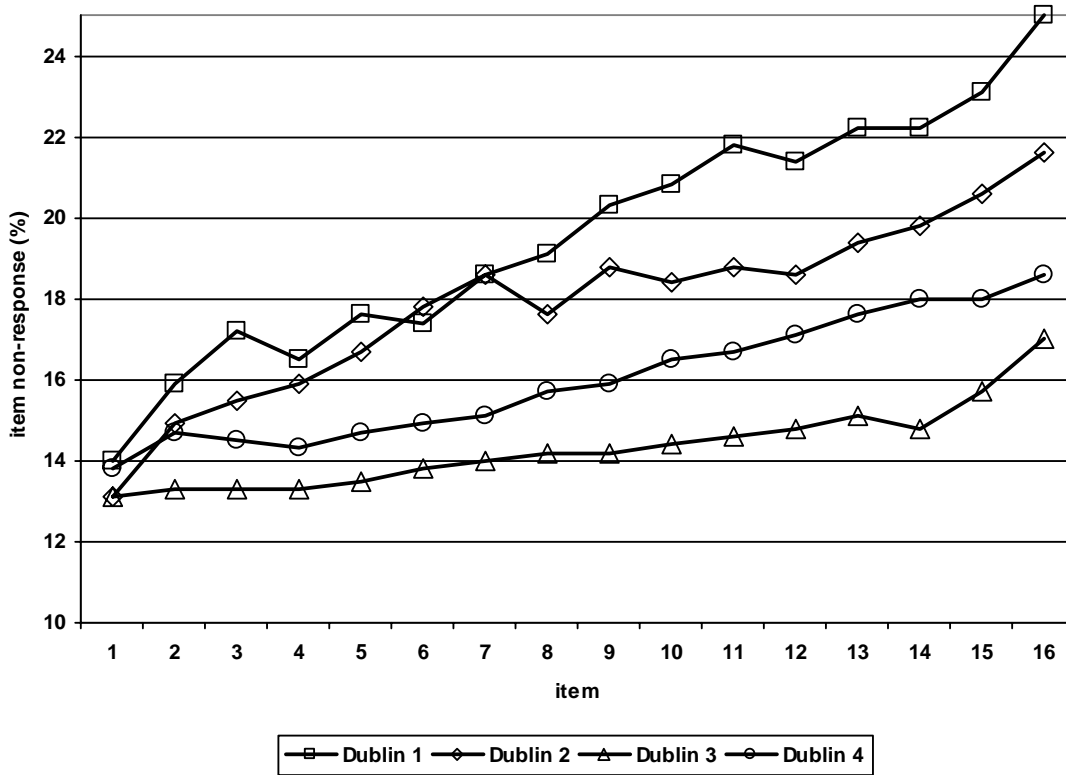


Figure 1 shows that the progression is indeed linear until about the 13th item, but that after that the rate of attrition appears to accelerate. This is especially the case for lists 1 and 4. This suggests that it would be unwise to seek to extend the length of the list beyond the current length, and that it may pay dividends to reduce the number of items.

### 3 Distribution

Tables 3 to 6 summarize some salient features of the distribution of answers to the competence questions. We look at the mean, the standard deviation, the kurtosis and the skewness of the distribution. To avoid cluttering the tables, for each list

and each dimension (importance, required level, own level and attention) we present the minimum, maximum and mean item score of the measure in question.

### Mean

Table 3 summarizes the results with respect to the means.

**Table 3**

Item means (minimum, maximum and overall mean per list)

		List				
		Regular list <sup>^</sup>	Dublin 1	Dublin 2	Dublin 3	Dublin 4 <sup>#</sup>
Importance*	Minimum		2.7	2.7	2.7	2.8
	Maximum		4.1	3.9	4.2	4.2
	Mean		3.5	3.3	3.6	3.5
Required level*	Minimum	2.5	4.0	4.3	4.5	4.9
	Maximum	4.3	6.3	6.0	6.5	6.4
	Mean	3.7	5.0	5.0	5.7	5.4
Own level	Minimum	3.2	4.4	4.7	5.2	4.7
	Maximum	4.2	5.9	6.0	6.3	6.1
	Mean	3.8	5.1	5.3	5.9	5.4
Attention wanted	Minimum		2.3	2.3	2.3	2.3
	Maximum		2.8	2.8	2.8	2.8
	Mean		2.6	2.5	2.5	2.5

Notes:

\*: Restricted to graduates in paid employment

<sup>^</sup>: 5 point scales

<sup>#</sup>: Required and own level based on 5 8-point items

One of the major concerns of the regular list without anchors is that, in the absence of a clear frame of reference, respondents would overestimate their own, and possibly their required, level of competence. A direct comparison with the regular list is difficult, because this list uses 5-point scales rather than 8-point

14

scales. List 4 is also not really suitable for comparison, since only 5 of the 16 items use 5-point scales. However, a comparison between lists 1 and 2 on one hand with list 3 on the other hand, reveals that the use of anchors does reduce the mean level considerably, as predicted in *Overestimation hypothesis 1*. In contrast, on the dimensions importance and attention, there is almost no difference between the four lists. This finding provides a first indication that the use of anchors reduces self-overestimation.

### Standard deviation

Table 4 summarizes the results for the standard deviations.

**Table 4**

Item standard deviation (minimum, maximum and overall mean per list)

		List				
		Regular list <sup>^</sup>	Dublin 1	Dublin 2	Dublin 3	Dublin 4 <sup>#</sup>
Importance*	Minimum		0.8	0.8	0.8	0.8
	Maximum		1.0	1.0	1.1	1.0
	Mean		0.9	0.9	0.9	0.9
Required level*	Minimum	0.7	1.3	1.3	1.2	1.2
	Maximum	1.2	1.8	1.7	1.7	1.5
	Mean	0.9	1.5	1.5	1.4	1.4
Own level	Minimum	0.6	1.2	1.1	1.0	1.1
	Maximum	1.0	1.6	1.6	1.3	1.4
	Mean	0.7	1.4	1.3	1.1	1.2
Attention wanted	Minimum		0.5	0.5	0.5	0.5
	Maximum		0.7	0.7	0.7	0.7
	Mean		0.6	0.6	0.6	0.6

Notes:

\*: Restricted to graduates in paid employment

<sup>^</sup>: 5 point scales

<sup>#</sup>: Required and own level based on 5 8-point items

Related to the above-mentioned issue of overestimation, a further argument for the use of anchors was that it would lead to a greater spread in answers. Again, the relevant comparison is between lists 1 and 2 on one hand and list 3 on the other. There seems to be a moderate increase in the standard deviation of own level, but only a rather slight increase for required level, providing at best only rather weak support for *Distribution hypothesis 1*. However, the standard deviation for the latter is higher than that for the former in all cases, suggesting that this dimension is less sensitive to ‘bunching’ than own level is. We look in more detail at the form of the distribution in Tables 5 and 6.

### *Kurtosis*

**Table 5**

Item kurtosis (minimum, maximum and overall mean per list)

		List				
		Regular list <sup>^</sup>	Dublin 1	Dublin 2	Dublin 3	Dublin 4 <sup>#</sup>
Importance*	Minimum		-0.6	-0.6	-0.7	-0.6
	Maximum		0.6	0.6	0.6	1.1
	Mean		-0.1	-0.1	-0.2	0.0
Required level*	Minimum	-0.9	-0.9	-0.8	-0.5	-0.5
	Maximum	2.4	1.3	1.8	1.5	1.7
	Mean	0.6	0.0	0.1	0.4	0.4
Own level	Minimum	-0.4	-0.6	-0.7	0.0	-0.6
	Maximum	1.2	1.7	0.5	1.6	0.4
	Mean	0.0	0.0	-0.2	0.5	-0.2
Attention wanted	Minimum		-0.6	-0.6	-0.4	-0.7
	Maximum		3.4	2.0	3.3	1.7
	Mean		0.5	0.1	0.6	0.1

Notes:

\*: Restricted to graduates in paid employment

<sup>^</sup>: 5 point scales

<sup>#</sup>: Required and own level based on 5 8-point items

Table 5 summarizes the results for the kurtosis or peakedness of the distribution. A positive kurtosis means that the distribution is concentrated around a few values in the centre, while a negative kurtosis means that the distribution is broad. A zero kurtosis indicates a (more or less) normal distribution.

As predicted in *Distribution hypothesis 1*, Table 5 confirms that the own and required levels according to list 3 are clearly more peaked than those for lists 1 and 2. Curiously, attention is quite strongly peaked for lists 1 and 3, but scarcely at all for lists 2 and 4.

### Skewness

**Table 6**

Item skewness (minimum, maximum and overall mean per list)

		Regular list <sup>^</sup>	Dublin 1	List Dublin 2	Dublin 3	Dublin 4 <sup>#</sup>
Importance*	Minimum		-0.8	-0.8	-0.9	-0.9
	Maximum		0.1	0.1	0.2	0.2
	Mean		-0.4	-0.4	-0.4	-0.5
Required level*	Minimum	-1.1	-1.1	-1.1	-1.1	-1.1
	Maximum	0.4	0.2	0.0	-0.2	-0.3
	Mean	-0.6	-0.4	-0.5	-0.8	-0.6
Own level	Minimum	-0.5	-1.0	-0.7	-1.0	-0.5
	Maximum	-0.1	0.0	0.0	-0.3	0.0
	Mean	-0.3	-0.3	-0.3	-0.6	-0.2
Attention wanted	Minimum		-1.4	-1.1	-1.0	-1.0
	Maximum		0.2	0.3	0.3	0.0
	Mean		-0.6	-0.5	-0.4	-0.5

Notes:

\*: Restricted to graduates in paid employment

<sup>^</sup>: 5 point scales

<sup>#</sup>: Required and own level based on 5 8-point items

Finally, Table 6 shows the skewness of the distributions. Systematic over-estimation of own and required competences would be expected to lead to a negative (left) skewing, in which most of the distribution is concentrated on the right, with a long tail on the left.

Although all the lists are at least somewhat skewed to the left, this is more pronounced for own and required level for list 3 than for lists 1 and 2. This is again consistent with the prediction of *Distribution hypothesis 1*.

### *Extreme values*

In the case of distributions that are heavily peaked and/or skewed, a major concern is that the extreme values will be over- or underrepresented. Tables 7 and 8 summarize the proportions of the distributions that are located in respectively the lowest and the highest possible values. A normally distributed pattern of answers on an 8-point scale should contain around 2% of answers at both extremes.

Table 7 reveals that the lowest possible value is strongly represented in all Dublin Lists for required and particularly own level. Although a slightly higher percentage might have been desirable, this result is in a sense rather encouraging, since there was some concern that the deliberately truncated lists 1 and 2 might have led to left-censuring.<sup>1</sup> The results offer little support for *Distribution hypothesis 2*, which predicted that lists 1 and 2 would elicit more responses across the full range of possible values than list 3. The low percentage across the board render *Distribution hypothesis 3*, which predicted that lists 1 and 2 would be less sensitive to left censoring than list 3, irrelevant.

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1. The original O\*NET items were formulated to apply across the entire range of capabilities of the work-force. Because the current questionnaire is aimed at higher education graduates, it was decided to truncate the lower end of the scale.

**Table 7**

Percentage of respondents who answered the lowest possible value for an item (minimum, maximum and overall mean per list)

		Regular list <sup>^</sup>	List			
			Dublin 1	Dublin 2	Dublin 3	Dublin 4
Importance*	Minimum		0.0	1.3	0.0	0.0
	Maximum		13.6	13.3	14.2	9.8
	Mean		3.3	4.3	2.5	3.0
Required level*	Minimum	0.6	0.0	0.8	0.0	0.3
	Maximum	27.9	4.8	5.0	6.1	3.2
	Mean	3.1	2.1	2.6	1.3	1.5
Own level	Minimum	0.0	0.0	0.0	0.0	0.0
	Maximum	5.9	2.3	1.4	1.2	1.2
	Mean	0.5	0.7	0.2	0.2	0.4
Attention wanted	Minimum		2.2	1.8	2.3	1.8
	Maximum		13.7	9.7	13.4	10.6
	Mean		6.1	4.7	6.5	5.3

Notes:

\*: Restricted to graduates in paid employment

<sup>^</sup>: 5 point scales

Table 8 shows that the answers to own and required competences are slightly more concentrated in the highest possible value for list 3 than for lists 1 and 2. On average, all three lists are probably within an acceptable range. However, we see that at least 1 item shows a very high proportion (20.5%) for required competences on list 3, while one or more items on lists 1 and 2 show a perhaps unacceptably low level.<sup>2</sup> The results offer some support for *Distribution hypothesis 3*, which predicted that lists 1 and 2 would be less sensitive to right censoring than list 3, but are

2. Closer inspections reveals that 20.5% of graduates answered the highest possible value to item 10 on list 3 (communication, general item), and 15.3% gave the maximum answer to item 13 (explaining information to others). The highest possible value was rarely used on item 1 in list 2 (field-specific knowledge, general item; 0.5%) and item 16 in list 1 (learning strategy; 0.6%).



inconsistent with *Distribution hypothesis 2*, which predicted that lists 1 and 2 would elicit more responses across the full range of possible values than list 3.

**Table 8**

Percentage of respondents who answered the highest possible value for an item (minimum, maximum and overall mean per list)

		Regular list <sup>^</sup>	Dublin 1	List Dublin 2	Dublin 3	Dublin 4
Importance*	Minimum		3.6	2.8	5.6	3.2
	Maximum		35.0	27.0	42.2	39.3
	Mean		13.5	9.1	17.7	14.0
Required level*	Minimum	3.5	0.6	0.5	2.9	1.1
	Maximum	41.7	11.1	8.7	20.5	12.3
	Mean	20.3	3.1	3.1	7.6	3.6
Own level	Minimum	1.5	0.6	0.5	1.0	0.5
	Maximum	32.7	4.1	4.5	8.4	5.2
	Mean	15.4	2.3	2.4	4.8	2.6
Attention wanted	Minimum		0.0	0.0	0.0	0.0
	Maximum		0.7	0.5	0.7	0.3
	Mean		0.2	0.1	0.3	0.1

Notes:

\*: Restricted to graduates in paid employment

<sup>^</sup>: 5 point scales

## 4 Differentiation between categories

### *Differentiation between HBO and WO*

Although the results so far show a generally positive impact of anchors on the distribution of answers, a more important claim of this approach is that it differentiates better between relevant groups. The most salient distinction hereby is that between graduates of universities and HBO colleges.

**Table 9**

Item difference between university and HBO graduates (minimum, maximum and overall mean per list)

		List				
		Regular list <sup>^</sup>	Dublin 1	Dublin 2	Dublin 3	Dublin 4
Importance*	Minimum		-0.5	-0.4	-0.6	-0.4
	Maximum		0.3	0.3	0.3	0.1
	Mean		0.0	0.0	-0.1	-0.2
Required level*	Minimum	-0.4	-0.7	-0.4	-0.9	-0.6
	Maximum	0.2	0.9	0.7	0.3	0.1
	Mean	0.0	0.1	0.1	-0.2	-0.2
Own level	Minimum	-0.1	-0.5	-0.3	-0.5	-0.6
	Maximum	0.3	0.7	0.6	0.2	0.3
	Mean	0.0	0.1	0.2	-0.1	0.0
Attention wanted	Minimum		-0.2	-0.1	-0.1	-0.1
	Maximum		0.3	0.2	0.3	0.3
	Mean		0.0	0.0	0.1	0.0

Notes:

\*: Restricted to graduates in paid employment

<sup>^</sup>: 5 point scales

There is disappointingly little difference between HBO and WO for own and required levels. The mean answers on own and required levels are slightly higher for WO on lists 1 and 2 than for the other lists, but the difference is minimal. These results clearly contradict the predictions in the weak and especially the strong version of *Differentiation hypothesis 1*. Closer inspection reveals that there are items in these lists on which the difference is between a half and a whole point. It may be that a better selection of items would work better, but it should be

remarked that even these differences fall far short of the 2 points difference that would be expected on the basis of the levels that were theoretically assigned.<sup>3</sup>

### *Differentiation between study programs*

Another criterion for the items is that they should differentiate more between study programs. Tables 10 and 11 describe the between-program variance for items.

**Table 10**

Between-program variance for an item (minimum, maximum and overall mean per list)

		List				
		Regular list <sup>^</sup>	Dublin 1	Dublin 2	Dublin 3	Dublin 4
Importance*	Minimum		0.000	0.000	0.000	0.000
	Maximum		0.152	0.281	0.223	0.024
	Mean		0.000	0.088	0.063	0.005
Required level*	Minimum	0.000	0.000	0.000	0.000	0.000
	Maximum	0.312	0.159	0.344	0.158	0.022
	Mean	0.031	0.044	0.087	0.060	0.007
Own level	Minimum	0.000	0.000	0.000	0.000	0.000
	Maximum	0.079	0.182	0.376	0.149	0.060
	Mean	0.015	0.057	0.146	0.042	0.011
Attention wanted	Minimum		0.000	0.000	0.000	0.000
	Maximum		0.199	0.190	0.096	0.031
	Mean		0.054	0.068	0.036	0.006

Notes:

\*: Restricted to graduates in paid employment

<sup>^</sup>: 5 point scales

3. As a quick check of this expectation, several colleagues not involved in developing and/or testing the instrument were asked to assess the items in lists 1 and 2 in terms of their clarity. When the difference between HBO and university graduates (as well as other outcomes) is plotted these colleagues' assessment, it appears that items that are assessed as being more clearly formulated show more differentiation between university and HBO graduates. Clearer items also perform better in terms of the shape of the distribution and the percentage of variance that is located between study programs.

**Table 11**

Between-program variance as percentage of all variance for an item (minimum, maximum and overall mean per list)

		List				
		Regular list <sup>^</sup>	Dublin 1	Dublin 2	Dublin 3	Dublin 4
Importance*	Minimum		0.0	0.0	0.0	0.0
	Maximum		15.9	12.1	12.3	5.8
	Mean		0.0	3.9	3.1	1.2
Required level*	Minimum	0.0	0.0	0.0	0.0	0.0
	Maximum	19.6	14.4	13.2	9.0	5.8
	Mean	3.1	4.5	3.3	3.3	1.8
Own level	Minimum	0.0	0.0	0.0	0.0	0.0
	Maximum	7.9	15.5	14.1	10.5	11.7
	Mean	2.6	6.2	6.7	3.3	2.5
Attention wanted	Minimum		0.0	0.0	0.0	0.0
	Maximum		22.4	12.3	8.1	7.7
	Mean		6.3	4.2	3.1	1.5

Notes:

\*: Restricted to graduates in paid employment

<sup>^</sup>: 5 point scales

Table 10 shows the absolute variance between study programs, and Table 11 the same variance as a percentage of all variance. Although the proportion of variance that is located at this level is quite modest in all the lists, lists 1 and 2 show around twice as large a proportion at that level than the other lists for the own level of competence. This result is consistent with the prediction in *Differentiation hypothesis 2*. However, these lists also show a relatively high degree of differentiation between programs for the dimension attention, which does not have anchors. There is less difference for the other dimensions, but this is to be expected.

## Differentiation between occupations

**Table 12**

Between-occupation variance for an item (minimum, maximum and overall mean per list)

		List				
		Regular list <sup>^</sup>	Dublin 1	Dublin 2	Dublin 3	Dublin 4
<i>Occupational level</i>						
Importance*	Minimum		0.000	0.000	0.000	0.000
	Maximum		0.739	0.580	0.066	0.192
	Mean		0.238	0.292	0.013	0.039
Required level*	Minimum	0.000	0.000	0.000	0.000	0.000
	Maximum	0.253	1.855	2.131	1.511	0.578
	Mean	0.068	0.637	1.192	0.118	0.199
Own level	Minimum	0.000	0.000	0.000	0.000	0.000
	Maximum	0.014	0.205	0.042	0.131	0.061
	Mean	0.001	0.030	0.010	0.005	0.010
Attention wanted	Minimum		0.000	0.000	0.000	0.000
	Maximum		0.015	0.004	0.022	0.016
	Mean		0.003	0.001	0.004	0.003
<i>Occupational group</i>						
Importance*	Minimum		0.000	0.000	0.000	0.011
	Maximum		0.115	0.091	0.198	0.187
	Mean		0.038	0.043	0.052	0.093
Required level*	Minimum	0.000	0.000	0.000	0.000	0.000
	Maximum	0.312	0.323	0.233	0.323	0.248
	Mean	0.031	0.070	0.072	0.098	0.133
Own level	Minimum	0.000	0.000	0.000	0.000	0.000
	Maximum	0.079	0.155	0.143	0.131	0.216
	Mean	0.015	0.037	0.028	0.036	0.054
Attention wanted	Minimum		0.000	0.000	0.000	0.000
	Maximum		0.022	0.029	0.026	0.015
	Mean		0.007	0.006	0.007	0.003

Notes:

\*: Restricted to graduates in paid employment

<sup>^</sup>: 5 point scales

**Table 13**

Between-occupation variance as percentage of all variance for an item (minimum, maximum and overall mean per list)

		Regular list <sup>^</sup>	List			
			Dublin 1	Dublin 2	Dublin 3	Dublin 4
<i>Occupational level</i>						
Importance*	Minimum		0.0	0.0	0.0	0.0
	Maximum		49.0	50.4	7.0	19.9
	Mean		20.1	26.4	1.5	4.2
Required level*	Minimum	0.0	0.0	0.0	0.0	0.0
	Maximum	29.2	50.3	52.4	43.8	28.2
	Mean	7.7	19.4	36.5	3.8	10.5
Own level	Minimum	0.0	0.0	0.0	0.0	0.0
	Maximum	3.6	10.3	2.1	7.7	5.2
	Mean	0.3	1.5	0.5	0.4	0.7
Attention wanted	Minimum		0.0	0.0	0.0	0.0
	Maximum		3.7	1.1	5.0	4.0
	Mean		0.7	0.2	0.9	0.8
<i>Occupational group</i>						
Importance*	Minimum		0.0	0.0	0.0	1.3
	Maximum		11.9	8.1	18.4	23.9
	Mean		3.5	4.0	5.6	10.4
Required level*	Minimum	0.0	0.0	0.0	0.0	0.0
	Maximum	19.6	14.1	7.5	12.6	15.5
	Mean	3.1	2.5	2.2	4.4	7.8
Own level	Minimum	0.0	0.0	0.0	0.0	0.0
	Maximum	7.9	7.1	7.0	8.2	15.3
	Mean	2.6	1.8	1.5	2.7	4.2
Attention wanted	Minimum		0.0	0.0	0.0	0.0
	Maximum		4.4	8.0	5.9	3.6
	Mean		1.6	1.8	1.6	0.8

Notes:

\*: Restricted to graduates in paid employment

<sup>^</sup>: 5 point scales

Importance and required level should differentiate more between occupations than between study programs. Tables 12 and 13 show the variance between occupations for the items. In the case of occupations, it was useful to distinguish between occupational level (analogous to the university-HBO distinction for study programs) and, within those levels, the different occupational groups that may be distinguished. Variance at both levels is shown in Tables 12 and 13.

Table 12 shows the absolute variance between occupational levels and groups, and Table 13 the same variance as a percentage of all variance. As expected, there is generally more variance between occupations (both levels and groups) for importance and required level than for own level and attention wanted. In general the greatest variance in required level is between levels, but the variance between groups is also sizable. Lists 1 and 2 show the greatest variance between occupational levels, and lists 3 and 4 the greatest variance between occupational groups. All the Dublin lists show more variance than the regular list.

#### *Differentiation between jobs below and jobs on own educational level*

Table 14 shows the difference between graduates working in jobs requiring at least their own educational level and graduates in jobs requiring one level lower.

As predicted in the weak version of *Differentiation hypothesis 3*, there is more difference between the required level of those working at compared to below their own level for lists 1 and 2 (and list 4 as well) than for list 3 and the regular list. However, the differences fall far short of the 2 or (in the case of HBO graduates working at junior college level) 3 scale points difference between bachelors-level jobs and masters-level jobs as predicted in the strong version of this hypothesis. Further inspection of the data (not shown in the table) reveals the somewhat mysterious result that, according to all the lists, HBO graduates working at HBO level report a higher mean required level than university graduates working at the same level.

**Table 14**

Item difference between graduates working in a job requiring at least their own level and graduates working one level lower (minimum, maximum and overall mean per list)

			Regular list <sup>^</sup>	List			
				Dublin 1	Dublin 2	Dublin 3	Dublin 4
Importance*	University	Minimum		-0.1	0.1	0.0	0.1
		Maximum		0.8	0.7	0.4	0.7
		Mean		0.2	0.4	0.2	0.4
	HBO	Minimum		-0.1	0.3	0.0	0.3
		Maximum		0.6	0.9	0.4	0.8
		Mean		0.2	0.6	0.2	0.6
Required level*	University	Minimum	0.0	0.0	0.4	0.1	0.1
		Maximum	0.7	1.4	1.2	0.6	1.0
		Mean	0.4	0.7	0.8	0.3	0.6
	HBO	Minimum	0.1	0.2	0.8	-0.1	0.4
		Maximum	0.8	1.0	1.4	0.8	1.0
		Mean	0.3	0.7	1.1	0.4	0.8
Own level	University	Minimum	-0.3	0.0	0.1	-0.2	-0.5
		Maximum	0.3	0.8	0.7	0.3	0.2
		Mean	0.1	0.4	0.4	0.1	0.0
	HBO	Minimum	-0.2	-0.2	0.0	-0.2	-0.1
		Maximum	0.4	0.6	0.6	0.6	0.5
		Mean	0.0	0.3	0.3	0.2	0.1
Attention wanted	University	Minimum		-0.2	-0.3	-0.1	-0.2
		Maximum		0.3	0.1	0.3	0.3
		Mean		0.0	-0.1	0.0	0.0
	HBO	Minimum		-0.3	-0.2	-0.2	-0.3
		Maximum		0.3	0.2	0.2	0.0
		Mean		0.0	0.0	0.0	-0.2

Notes:

\*: Restricted to graduates in paid employment

<sup>^</sup>: 5 point scales



## 5 Predictive validity

We now turn to the predictive validity of the items. In total we looked at predictions of four dependent variables. For an assessment of the performance of own level and attention, we used as the dependent variables the graduates' assessment of their study program as a basis to start working and as a basis to develop competencies on the job. The explanatory variables are the own level, the proportion preferring more attention and the proportion preferring less attention. For an assessment of the performance of required level and importance, we used the dependent variables hourly wage and job satisfaction. The explanatory variables in that case are the required level/importance, the proportion reporting a shortage and the proportion reporting a surplus. Separate analyses were run for required level and importance. No control variables were included in the main analyses, but university/HBO sector, gender and age were included in subsequent analyses to allow comparison of the contribution to explained variance. To avoid cluttering the analyses, the competence items are clustered per Dublin descriptor.

### *Study program as a basis for starting work*

Table 15 shows the results of the analysis of the graduates' assessment of the study program as a basis for starting work. Results that are significant at 10% level or better are marked in bold.

In terms of explained variance, list 1 performs best. However, it should be remarked that two of the significant coefficients show the opposite sign to what was expected. Descriptor 5 (learning abilities) is negatively correlated with the graduates' assessment of the program, and more attention preferred to descriptor 1 (knowledge and insight) is positively related to the assessment. However, such anomalies occur on most lists, and the regular list shows no significant effects.

**Table 15**

Regression coefficients, dependent variable graduates' assessment of program as basis to start working

	Regular list <sup>^</sup>	Dublin 1	List Dublin 2	Dublin 3	Dublin 4
<i>Own level</i>					
Descriptor 1	0.094	<b>0.116</b>	0.075	<b>0.110</b>	0.038
Descriptor 2	-0.006	0.028	-0.070	0.087	0.128
Descriptor 3	0.054	0.112	0.116	<b>0.144</b>	0.064
Descriptor 4	0.065	<b>0.127</b>	-0.001	-0.018	<b>0.151</b>
Descriptor 5	0.047	<b>-0.220</b>	-0.043	<b>-0.144</b>	<b>-0.292</b>
<i>More attention wanted</i>					
Descriptor 1		<b>0.099</b>	<b>-0.104</b>	-0.078	0.031
Descriptor 2		<b>-0.165</b>	-0.047	-0.010	<b>-0.157</b>
Descriptor 3		-0.006	-0.068	-0.032	0.048
Descriptor 4		0.023	-0.021	-0.014	-0.069
Descriptor 5		<b>-0.106</b>	-0.047	0.068	<b>0.152</b>
<i>Less attention wanted</i>					
Descriptor 1		-0.002	-0.022	0.027	<b>0.112</b>
Descriptor 2		<b>-0.143</b>	-0.110	-0.093	<b>-0.174</b>
Descriptor 3		0.053	-0.053	0.064	0.003
Descriptor 4		-0.011	-0.054	-0.013	0.028
Descriptor 5		<b>-0.107</b>	<b>0.108</b>	-0.032	-0.008
<i>Adjusted R-squared:</i>					
Own level competences	0.019	0.041	-0.002	0.030	0.035
Own level and attention		0.079	0.037	0.026	0.058
Competences and controls*	0.089	0.132	0.112	0.111	0.098
Only controls*	0.075	0.051	0.066	0.097	0.060

Notes:

\*: Restricted to graduates in paid employment

<sup>^</sup>: 5 point scales*Study program as a basis for developing competences*

Table 16 shows the results of the analysis of the graduates' assessment of the study program as a basis for developing competences.

**Table 16**

Regression coefficients, dependent variable graduates' assessment of program as basis to develop competences

	Regular list <sup>^</sup>	Dublin 1	List Dublin 2	Dublin 3	Dublin 4
<i>Own level</i>					
Descriptor 1	-0.026	0.003	<b>0.122</b>	<b>0.120</b>	0.079
Descriptor 2	<b>0.121</b>	<b>0.194</b>	-0.065	<b>0.148</b>	0.058
Descriptor 3	-0.080	0.058	0.063	0.014	0.071
Descriptor 4	0.101	0.084	-0.034	-0.042	0.069
Descriptor 5	-0.040	-0.076	0.030	-0.047	<b>-0.159</b>
<i>More attention wanted</i>					
Descriptor 1		0.016	<b>-0.098</b>	-0.084	-0.071
Descriptor 2		<b>-0.154</b>	-0.028	-0.035	<b>-0.138</b>
Descriptor 3		-0.018	-0.009	<b>0.134</b>	0.024
Descriptor 4		0.022	-0.066	-0.029	0.007
Descriptor 5		-0.070	-0.085	-0.043	0.066
<i>Less attention wanted</i>					
Descriptor 1		-0.013	-0.034	-0.057	<b>0.112</b>
Descriptor 2		-0.098	0.000	<b>-0.109</b>	<b>-0.218</b>
Descriptor 3		0.006	-0.072	0.077	-0.020
Descriptor 4		-0.002	<b>-0.154</b>	0.049	0.062
Descriptor 5		0.072	<b>0.100</b>	-0.040	-0.081
<i>Adjusted R-squared:</i>					
Own level competences	0.010	0.045	0.003	0.026	0.010
Own level and attention		0.069	0.045	0.032	0.051
Competences and controls*	0.074	0.134	0.103	0.081	0.090
Only controls*	0.063	0.107	0.062	0.060	0.054

Notes:

\*: Restricted to graduates in paid employment

<sup>^</sup>: 5 point scales

In terms of explained variance, list 1 again performs best, now without any significant unexpected effects.

## Gross hourly wage

Table 17 shows the results of the analysis of hourly wage, with required level, shortages and surpluses as predictors.

**Table 17**

Regression coefficients, dependent variable hourly wage (ln)

	Regular list <sup>^</sup>	List			
		Dublin 1	Dublin 2	Dublin 3	Dublin 4
<i>Required level</i>					
Descriptor 1	-0.071	0.040	-0.029	0.067	0.046
Descriptor 2	<b>0.177</b>	0.001	-0.037	0.119	<b>-0.170</b>
Descriptor 3	0.034	<b>0.336</b>	<b>0.238</b>	<b>0.265</b>	<b>0.165</b>
Descriptor 4	0.058	<b>-0.185</b>	-0.014	-0.028	<b>0.184</b>
Descriptor 5	<b>0.106</b>	0.010	0.088	-0.129	-0.033
<i>Shortage</i>					
Descriptor 1	0.068	0.006	0.003	-0.060	-0.051
Descriptor 2	-0.078	<b>-0.154</b>	-0.091	-0.011	0.020
Descriptor 3	-0.041	-0.036	<b>-0.128</b>	-0.021	-0.086
Descriptor 4	-0.038	0.018	0.047	0.032	<b>-0.132</b>
Descriptor 5	-0.060	0.098	0.015	-0.083	-0.067
<i>Surplus</i>					
Descriptor 1	0.019	-0.003	0.013	0.059	<b>-0.123</b>
Descriptor 2	-0.072	0.088	-0.094	0.084	<b>-0.198</b>
Descriptor 3	0.004	0.069	0.081	0.119	0.062
Descriptor 4	-0.129	<b>-0.196</b>	-0.057	-0.052	<b>0.222</b>
Descriptor 5	0.049	-0.086	0.038	-0.062	-0.055
<i>Adjusted R-squared:</i>					
Required level competences	0.049	0.067	0.029	0.032	0.016
Required level and shortages/surpluses	0.059	0.086	0.031	0.030	0.068
Competences and controls*	0.292	0.361	0.280	0.280	0.331
Only controls*	0.217	0.324	0.275	0.273	0.282

Notes:

\*: Restricted to graduates in paid employment

<sup>^</sup>: 5 point scales

In terms of explained variance, list 1 yet again performs best. Two effects are in an unexpected direction: descriptor 4 (communication) shows a negative effect, and a surplus of the same descriptor is penalized rather than rewarded.

**Table 18**  
Regression coefficients, dependent variable hourly wage (ln)

	List			
	Dublin 1	Dublin 2	Dublin 3	Dublin 4
<i>Importance</i>				
Descriptor 1	0.098	-0.101	-0.030	0.063
Descriptor 2	-0.071	-0.101	<b>0.161</b>	-0.075
Descriptor 3	<b>0.337</b>	0.100	<b>0.242</b>	0.122
Descriptor 4	<b>-0.216</b>	0.060	-0.022	0.045
Descriptor 5	-0.013	0.140	-0.089	0.032
<i>Shortage</i>				
Descriptor 1	0.093	0.030	-0.058	-0.005
Descriptor 2	-0.028	<b>-0.123</b>	-0.014	<b>0.134</b>
Descriptor 3	<b>-0.258</b>	-0.091	0.027	-0.107
Descriptor 4	0.009	-0.028	0.032	<b>-0.170</b>
Descriptor 5	0.042	-0.118	-0.058	-0.071
<i>Surplus</i>				
Descriptor 1	0.104	<b>-0.141</b>	0.038	-0.030
Descriptor 2	0.069	-0.019	0.001	-0.084
Descriptor 3	0.041	<b>0.133</b>	0.126	0.021
Descriptor 4	-0.071	-0.109	0.004	<b>0.121</b>
Descriptor 5	<b>-0.143</b>	0.017	-0.059	-0.092
<i>Adjusted R-squared:</i>				
Importance competences	0.031	0.011	0.048	0.002
Importance and shortages/surpluses	0.077	0.058	0.040	0.033
Competences and controls*	0.350	0.304	0.301	0.295
Only controls*	0.324	0.275	0.273	0.282

Notes:

\*: Restricted to graduates in paid employment

^: 5 point scales

Table 18 shows the results of the analysis of hourly wage, now with importance, shortages and surpluses (based on importance) as predictors. In terms of explained variance, list 3 now performs best.

### *Job satisfaction*

**Table 19**  
Regression coefficients, dependent variable job satisfaction

	Regular list <sup>^</sup>	List			
		Dublin 1	Dublin 2	Dublin 3	Dublin 4
<i>Required level</i>					
Descriptor 1	-0.038	0.017	0.004	<b>0.220</b>	0.059
Descriptor 2	0.073	0.030	<b>0.304</b>	-0.055	0.084
Descriptor 3	0.054	0.052	<b>-0.241</b>	0.110	0.045
Descriptor 4	<b>0.222</b>	-0.074	0.149	0.042	-0.003
Descriptor 5	0.029	0.056	-0.008	-0.067	0.076
<i>Shortage</i>					
Descriptor 1	-0.040	-0.028	-0.018	<b>-0.118</b>	-0.037
Descriptor 2	-0.017	0.029	-0.054	0.000	-0.060
Descriptor 3	0.013	0.053	0.080	0.021	<b>0.103</b>
Descriptor 4	0.036	-0.034	-0.086	0.005	-0.049
Descriptor 5	<b>0.104</b>	-0.036	-0.026	-0.022	-0.035
<i>Surplus</i>					
Descriptor 1	-0.073	-0.018	-0.003	-0.042	<b>-0.154</b>
Descriptor 2	-0.054	<b>-0.149</b>	-0.074	-0.073	<b>-0.155</b>
Descriptor 3	-0.021	0.054	-0.076	-0.053	<b>0.171</b>
Descriptor 4	-0.113	-0.176	0.019	0.144	0.052
Descriptor 5	<b>0.152</b>	-0.028	-0.111	-0.079	-0.148
<i>Adjusted R-squared:</i>					
Required level competences	0.177	0.023	0.104	0.060	0.077
Required level and shortages/surpluses	0.222	0.056	0.112	0.057	0.109
Competences and controls*	0.220	0.053	0.125	0.091	0.119
Only controls*	0.009	0.013	-0.003	0.012	-0.006

Notes:

\*: Restricted to graduates in paid employment

<sup>^</sup>: 5 point scales

Table 19 shows the results of the analysis of job satisfaction, with required level, shortages and surpluses as predictors. In terms of explained variance, the regular list performs best. Of the Dublin lists, list 2 shows the greatest explained variance, although this is partly based on an unexpected negative effect of descriptor 3 (judgement).

**Table 20**  
Regression coefficients, dependent variable job satisfaction

	List			
	Dublin 1	Dublin 2	Dublin 3	Dublin 4
<i>Importance</i>				
Descriptor 1	<b>0.166</b>	0.015	<b>0.154</b>	<b>0.180</b>
Descriptor 2	0.068	<b>0.246</b>	0.060	<b>0.174</b>
Descriptor 3	0.051	<b>-0.200</b>	0.035	-0.097
Descriptor 4	-0.092	<b>0.154</b>	0.017	0.121
Descriptor 5	-0.074	0.008	0.000	-0.117
<i>Shortage</i>				
Descriptor 1	-0.043	0.003	0.030	0.072
Descriptor 2	0.112	<b>-0.125</b>	-0.055	-0.014
Descriptor 3	-0.071	0.010	-0.018	0.037
Descriptor 4	-0.026	-0.021	0.022	<b>-0.149</b>
Descriptor 5	-0.010	0.046	-0.053	0.039
<i>Surplus</i>				
Descriptor 1	0.005	-0.108	<b>-0.158</b>	<b>-0.144</b>
Descriptor 2	<b>-0.148</b>	-0.127	0.020	-0.005
Descriptor 3	0.031	-0.020	-0.096	-0.104
Descriptor 4	-0.114	0.035	0.016	-0.023
Descriptor 5	-0.035	-0.010	0.032	0.006
<i>Adjusted R-squared:</i>				
Importance competences	0.043	0.089	0.080	0.112
Importance and shortages/ surpluses	0.060	0.096	0.076	0.121
Competences and controls*	0.072	0.117	0.103	0.123
Only controls*	0.013	-0.003	0.012	-0.006

Notes:

\*: Restricted to graduates in paid employment

^: 5 point scales

Table 20 shows the results of the analysis of job satisfaction, now with importance, shortages and surpluses (based on importance) as predictors.

List 4 explains slightly more variance than lists 2 and 3, and substantially more than list 1.

## 6 Required level versus importance

An important question is whether the question on required level conveys significantly other information than importance. Table 21 shows the correlations between these variables.

**Table 21**  
Correlations between importance and required level per item

item	Dublin 1	Dublin 2	Dublin 3	Dublin 4
1	0.654	0.660	0.698	0.634
2	0.525	0.698	0.776	0.683
3	0.680	0.742	0.828	0.709
4	0.589	0.679	0.745	0.689
5	0.674	0.749	0.765	0.658
6	0.722	0.811	0.831	0.772
7	0.722	0.761	0.780	0.774
8	0.669	0.718	0.800	0.722
9	0.727	0.779	0.808	0.726
10	0.599	0.685	0.745	0.632
11	0.777	0.788	0.825	0.761
12	0.707	0.766	0.829	0.713
13	0.611	0.681	0.790	0.637
14	0.691	0.730	0.808	0.661
15	0.700	0.798	0.845	0.681
16	0.782	0.757	0.872	0.809



The two dimensions appear to be highly correlated for all 4 lists and all items. What is striking is that the correlations are without exception the highest for list 3, in which a fixed scale was used rather than anchor points.

A related issue is the extent to which discrepancies between own and required level convey different information than discrepancies between (standardized) importance and (standardized) own level. Table 22 shows the correlations.

**Table 22**

Correlations between discrepancies based on importance and required level per item

item	Dublin 1	Dublin 2	Dublin 3	Dublin 4
1	0.713	0.684	0.656	0.704
2	0.563	0.701	0.675	0.631
3	0.641	0.702	0.722	0.645
4	0.641	0.731	0.676	0.688
5	0.655	0.709	0.691	0.626
6	0.655	0.770	0.711	0.707
7	0.691	0.712	0.638	0.701
8	0.611	0.711	0.754	0.701
9	0.695	0.764	0.721	0.677
10	0.612	0.706	0.746	0.669
11	0.728	0.774	0.804	0.717
12	0.634	0.719	0.752	0.703
13	0.561	0.697	0.682	0.607
14	0.687	0.726	0.789	0.609
15	0.666	0.812	0.825	0.755
16	0.710	0.704	0.809	0.729

Again, the correlations are very strong. With the exception of item 1, on which list 1 shows the highest correlations, the highest correlations are seen in lists 2 or 3.

More important for an assessment of the relative value of the two kinds of discrepancies is to see how the outcomes are related to summarizing measures of utilization and shortages of competences. Table 23 shows the correlations between the mean proportion of shortages (a shortage is defined as a case where the own

level is at least two points lower than the required level/importance) and the mean proportion of surpluses (a surplus is defined as a case where the own level is at least two points higher than the required level/importance) on one hand and the degree to which one's capacities are utilized at work and the degree to which one's capacities fall short of what is required at work on the other hand.

**Table 23**

Correlations between discrepancies and summarizing measures of shortages and utilization\*

		Regular list <sup>^</sup>	Dublin 1	List Dublin 2	Dublin 3	Dublin 4
Utilization	shortage based on required level	0.055	0.088	0.105	0.012	-0.042
	surplus based on required level	-0.472	-0.411	-0.455	-0.184	-0.418
Utilization	shortage based on importance		0.068	0.091	-0.012	0.031
	surplus based on importance		-0.356	-0.431	-0.208	-0.356
Shortfall	shortage based on required level	0.225	0.291	0.221	0.242	0.227
	surplus based on required level	-0.225	-0.271	-0.158	-0.167	-0.306
Shortfall	shortage based on importance		0.227	0.229	0.191	0.132
	surplus based on importance		-0.269	-0.174	-0.162	-0.292

Notes:

\*: Restricted to graduates in paid employment

<sup>^</sup>: 5 point scales

As we would expect, the overall measure of utilization is more strongly related to surpluses than to shortages. Interestingly, when based on required level, the strongest correlation is seen for the regular list. Lists 1, 2 and 4 also show strong correlations, but the correlation is quite weak for list 3, in which no anchors were used. In fact, list 3 is the most pure comparison, since it is practically identical to the other lists in other respects, while the regular list is different in more ways. A comparison with the results based on importance shows that - again with the exception of list 3 - the measures based on required level perform better. The differences are however quite modest.

Turning to the correlations with shortfall, we expected this to be most closely related to shortages. There are however moderately high correlations with both shortages and surpluses. List 1 performs somewhat better than the other lists. A comparison with the correlations based on importance again shows only rather modest differences, and even a slight improvement for list 2.

## **7 General versus specific items**

The basic idea of using anchors is that these will provide an objective frame of reference against which all respondents can evaluate their competence levels. If anchors indeed fulfil this role, one would expect those items that contain anchors that refer to specific, recognizable tasks or actions to perform better than items that contain more generally formulated anchors. Each of the 5 Dublin descriptors have been indicated in the questionnaire (lists 1, 2 and 4) by a single item with general anchors (e.g. knowledge of basic principles in your area of study or work), followed by two or three items with specific anchors (e.g. design new measures for reducing the level of sick leave in a firm). Since the general and specific items are intended to measure the same underlying concepts, we can compare the performance of these items in several respects.

In this section we look at the distributional characteristics, the degree of differentiation between relevant subgroups, and the predictive validity of general versus specific items. The main focus is on the items in lists 1 and 2, since list 3 contains no anchors at all, and the varying number of scale points for items in list 4 render such a comparison impracticable. In addition, only the performance of questions pertaining to own and required level are directly relevant, since the questions on importance and attention also contain no anchors. However, in performing the test, we need to keep in mind that, although the general and specific items purport to measure the same underlying concepts, the concrete substance of the items is different. It is possible that an observed difference is due not to the different nature of the anchors, but to the different substance of the item

in question. To control for this, we also present the results for list 3 (which contain the same items but without anchors). If it is specific anchors that leads to better performance, we should see a difference for lists 1 and 2, but not for list 3.

Tables 24 and 25 contain the key distributional characteristics of general versus specific items. To make it easier to see the difference between general and specific items, a difference score is presented.<sup>4</sup> A positive difference means that general items score higher on average than specific items on the measure in question, a negative score that the reverse is true.

**Table 24**

Item means and standard deviations, mean of general versus specific items

		mean			standard deviation		
		Dublin 1	Dublin 2	Dublin 3	Dublin 1	Dublin 2	Dublin 3
Required level*	General items	5.4	5.3	5.9	1.4	1.4	1.3
	Specific items	4.9	4.9	5.7	1.6	1.6	1.5
	<i>Difference</i>	<i>0.5</i>	<i>0.4</i>	<i>0.2</i>	<i>-0.1</i>	<i>-0.1</i>	<i>-0.1</i>
Own level	General items	5.3	5.5	6.0	1.3	1.2	1.1
	Specific items	5.0	5.3	5.9	1.4	1.4	1.1
	<i>Difference</i>	<i>0.3</i>	<i>0.2</i>	<i>0.1</i>	<i>-0.1</i>	<i>-0.1</i>	<i>-0.1</i>

\*: Restricted to graduates in paid employment

*Overestimation hypothesis 1* predicted that specific anchors would reduce the tendency of respondents to overestimate their own abilities. The first three columns of Table 24 provide some support for this hypothesis. This is especially true for required level, but also to some extent for own level. A difference is also observed for list 3, suggesting that some of the difference is due to differences in substance, but these differences are quite a lot smaller, suggesting that using specific anchors does help reduce self-overestimation.

4. Because of rounding errors, the difference deviates from a simple subtraction of the general and specific scores as presented. The presented difference is a more accurate reflection of the actual difference.

In *distribution hypothesis 4*, it was predicted that items containing specific anchors would show better distributional characteristics than items containing general anchors. More concretely, we would hope for a greater variance in answers (indicated by the standard deviation, see the last three columns of Table 24), and a distribution that is less peaked and/or skewed (indicated by the kurtosis and skewness as presented in Table 25).

**Table 25**

Item kurtosis and skewness, mean of general versus specific items

		Kurtosis			Skewness		
		Dublin 1	Dublin 2	Dublin 3	Dublin 1	Dublin 2	Dublin 3
Required level*	General items	0.4	0.5	0.7	-0.7	-0.7	-0.9
	Specific items	-0.2	-0.2	0.3	-0.3	-0.4	-0.7
	<i>Difference</i>	<i>0.6</i>	<i>0.7</i>	<i>0.4</i>	<i>-0.3</i>	<i>-0.3</i>	<i>-0.1</i>
Own level	General items	0.3	-0.1	0.7	-0.4	-0.4	-0.7
	Specific items	-0.2	-0.3	0.3	-0.3	-0.3	-0.6
	<i>Difference</i>	<i>0.5</i>	<i>0.2</i>	<i>0.3</i>	<i>-0.1</i>	<i>-0.1</i>	<i>-0.1</i>

\*: Restricted to graduates in paid employment

The results in terms of distributional characteristics are mixed. Although specific items show a slightly greater standard deviation than general items, this applies as well to the items in list 3. There is little reason to believe that this (in any case very small) difference is due to the anchors. Looking at the kurtosis and skewness, it seems that specific items are less peaked (in fact even somewhat flatter than a normal distribution), and less skewed than general items. Some of these differences is also seen in list 3, suggesting that it is partly due to the substance of the items, but the greatest difference is seen in lists 1 and 2, suggesting that the specific items contribute to this effect.

*Differentiation hypothesis 5* predicts that specific items will differentiate more between educational and occupational levels and fields than general items. To test

this hypothesis, Tables 26 to 28 show the mean of items differences between educational levels, and the program-level and occupation-level variance, for general versus specific items.

**Table 26**

Item difference between university and HBO graduates, mean of general versus specific items

		List		
		Dublin 1	Dublin 2	Dublin 3
Required level*	General items	0.1	0.1	-0.2
	Specific items	0.2	0.2	-0.1
	<i>Difference</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>
Own level	General items	0.2	0.2	-0.1
	Specific items	0.2	0.2	-0.1
	<i>Difference</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>

\*: Restricted to graduates in paid employment

For both general and specific items, there is virtually no difference in mean scores between university and HBO graduates. Using specific anchors does not give rise to a clearer distinction between levels of higher education.

At first sight, the results presented in Table 27 seem encouraging. Specific items show more between-program variance, mainly for required level, but also for own level. However, this is also the case for list 3. There is little reason to believe that these differences are due to the nature of the anchors, and more reason to believe that they reflect substantive differences between the items.

**Table 27**

Between-program variance for an item in absolute terms and as percentage of total item variance, mean of general versus specific items

		Absolute between-program variance			% of total variance		
		Dublin 1	Dublin 2	Dublin 3	Dublin 1	Dublin 2	Dublin 3
Required level*	General items	0.009	0.033	0.015	1.2	1.5	1.0
	Specific items	0.060	0.111	0.080	6.0	4.2	4.4
	<i>Difference</i>	<i>-0.050</i>	<i>-0.079</i>	<i>-0.065</i>	<i>-4.8</i>	<i>-2.7</i>	<i>-3.4</i>
Own level	General items	0.030	0.126	0.027	3.8	6.9	2.5
	Specific items	0.070	0.155	0.049	7.2	6.6	3.6
	<i>Difference</i>	<i>-0.040</i>	<i>-0.029</i>	<i>-0.022</i>	<i>-3.5</i>	<i>0.4</i>	<i>-1.1</i>

\*: Restricted to graduates in paid employment

The results presented in Table 28 also fail to provide convincing support for *distributional hypothesis 5*. The differences are sometimes in the reverse direction and when the expected differences show up, they are also seen in list 3.

**Table 28**

Between-occupation variance for an item in absolute terms and as percentage of total item variance, mean of general versus specific items

		Absolute between-occupation variance			% of total variance		
		Dublin 1	Dublin 2	Dublin 3	Dublin 1	Dublin 2	Dublin 3
<i>Occupational level</i>							
Required level*	General items	0.678	1.222	0.027	19.3	40.0	1.4
	Specific items	0.618	1.178	0.160	19.5	35.0	4.9
	<i>Difference</i>	<i>0.060</i>	<i>0.044</i>	<i>-0.133</i>	<i>-0.2</i>	<i>5.0</i>	<i>-3.6</i>
Own level	General items	0.001	0.000	0.005	0.1	0.0	0.5
	Specific items	0.043	0.015	0.006	2.1	0.8	0.4
	<i>Difference</i>	<i>-0.042</i>	<i>-0.015</i>	<i>-0.001</i>	<i>-2.0</i>	<i>-0.8</i>	<i>0.1</i>
<i>Occupational group</i>							
Required level*	General items	0.068	0.034	0.048	3.0	1.1	2.8
	Specific items	0.071	0.089	0.121	2.3	2.7	5.1
	<i>Difference</i>	<i>-0.002</i>	<i>-0.055</i>	<i>-0.073</i>	<i>0.7</i>	<i>-1.7</i>	<i>-2.3</i>
Own level	General items	0.013	0.000	0.015	0.8	0.0	1.3
	Specific items	0.048	0.041	0.045	2.2	2.2	3.3
	<i>Difference</i>	<i>-0.034</i>	<i>-0.041</i>	<i>-0.031</i>	<i>-1.4</i>	<i>-2.2</i>	<i>-2.0</i>

\*: Restricted to graduates in paid employment

*Prediction hypothesis 3* predicted that specific items will be better predictors of educational and labour market outcomes than general items. To test this hypothesis, separate regression analyses were run using the general and the mean of the specific items used to indicate each of the five Dublin descriptors. The results are summarized in Tables 29 and 30. Table 29 shows the regression coefficients of the indicator of own level for each of the Dublin descriptors, as predictors of the graduates' assessment of their study program as basis for starting work and for developing competences. Also included were dummies indicating that more attention was desired, and dummies indicating that less attention was desired for



each of the descriptors. The coefficients for these dummies has been omitted for the sake of brevity, but can be obtained on request from the authors.

**Table 29**

Regression coefficients, dependent variables graduates' assessment of program as basis to start working and as a basis to develop competences, general versus specific items

		Basis to start working			Basis to develop competences		
		Dublin 1	Dublin 2	Dublin 3	Dublin 1	Dublin 2	Dublin 3
Descriptor 1	General items	0.045	0.055	0.049	0.014	<b>0.102</b>	-0.052
	Specific items	<b>0.115</b>	0.063	0.089	0.040	0.042	<b>0.164</b>
	<i>Difference</i>	<i>-0.07</i>	<i>-0.008</i>	<i>-0.04</i>	<i>-0.026</i>	<i>0.06</i>	<i>-0.216</i>
Descriptor 2	General items	0.088	-0.101	<b>0.133</b>	0.081	-0.074	<b>0.116</b>
	Specific items	0.013	-0.002	0.051	0.046	0.052	<b>0.187</b>
	<i>Difference</i>	<i>0.075</i>	<i>-0.099</i>	<i>0.082</i>	<i>0.035</i>	<i>-0.126</i>	<i>-0.071</i>
Descriptor 3	General items	0.031	0.067	0.089	0.071	0.032	0.084
	Specific items	0.120	0.092	<b>0.156</b>	0.051	0.055	-0.048
	<i>Difference</i>	<i>-0.089</i>	<i>-0.025</i>	<i>-0.067</i>	<i>0.02</i>	<i>-0.023</i>	<i>0.132</i>
Descriptor 4	General items	0.061	0.022	0.014	0.044	0.017	-0.026
	Specific items	0.102	0.000	-0.035	0.053	0.068	-0.031
	<i>Difference</i>	<i>-0.041</i>	<i>0.022</i>	<i>0.049</i>	<i>-0.009</i>	<i>-0.051</i>	<i>0.005</i>
Descriptor 5	General items	-0.050	0.014	<b>-0.120</b>	0.018	0.077	-0.001
	Specific items	<b>-0.174</b>	-0.076	-0.092	0.045	0.053	-0.043
	<i>Difference</i>	<i>0.124</i>	<i>0.09</i>	<i>-0.028</i>	<i>-0.027</i>	<i>0.024</i>	<i>0.042</i>
Adjusted							
R-squared:	General items	0.082	0.104	0.123	0.118	0.084	0.063
	Specific items	0.121	0.103	0.099	0.138	0.082	0.097
	<i>Difference</i>	<i>-0.039</i>	<i>0.001</i>	<i>0.024</i>	<i>-0.02</i>	<i>0.002</i>	<i>-0.034</i>

There is little reason to go into detail on the results of the regression analyses. The differences between general and specific items appear to be quite arbitrary, and are seen as often when using list 3 as when using lists 1 and 2. Using specific anchors does not appear to improve the predictive validity of items. The same can be said

of the results presented in Table 30, showing the regression coefficients of required level on hourly wage and job satisfaction. Also included in these analyses were mean shortages and surpluses for each descriptor, full results available on request from the authors.

**Table 30**

Explained variance (adjusted R Between-program variance for an item in absolute terms and as percentage of total item variance, mean of general versus specific items

		Hourly wage			Job satisfaction		
		Dublin 1	Dublin 2	Dublin 3	Dublin 1	Dublin 2	Dublin 3
Descriptor 1	General items	0.025	-0.007	<b>0.223</b>	<b>-0.161</b>	-0.041	0.083
	Specific items	0.023	0.001	-0.003	<b>0.159</b>	0.082	<b>0.197</b>
	<i>Difference</i>	<i>0.002</i>	<i>-0.008</i>	<i>0.226</i>	<i>-0.32</i>	<i>-0.123</i>	<i>-0.114</i>
Descriptor 2	General items	0.099	-0.051	-0.081	0.101	<b>0.283</b>	0.096
	Specific items	0.037	-0.013	<b>0.216</b>	-0.023	<b>0.196</b>	-0.063
	<i>Difference</i>	<i>0.062</i>	<i>-0.038</i>	<i>-0.297</i>	<i>0.124</i>	<i>0.087</i>	<i>0.159</i>
Descriptor 3	General items	<b>0.236</b>	<b>0.170</b>	<b>0.252</b>	0.013	-0.092	0.038
	Specific items	<b>0.271</b>	<b>0.188</b>	0.139	0.054	<b>-0.177</b>	0.122
	<i>Difference</i>	<i>-0.035</i>	<i>-0.018</i>	<i>0.113</i>	<i>-0.041</i>	<i>0.085</i>	<i>-0.084</i>
Descriptor 4	General items	-0.082	0.065	0.038	0.080	0.055	0.018
	Specific items	<b>-0.200</b>	-0.077	0.002	-0.101	0.130	0.043
	<i>Difference</i>	<i>0.118</i>	<i>0.142</i>	<i>0.036</i>	<i>0.181</i>	<i>-0.075</i>	<i>-0.025</i>
Descriptor 5	General items	-0.032	0.016	<b>-0.168</b>	0.040	0.012	0.072
	Specific items	0.099	<b>0.186</b>	-0.050	0.003	0.009	-0.063
	<i>Difference</i>	<i>-0.131</i>	<i>-0.17</i>	<i>-0.118</i>	<i>0.037</i>	<i>0.003</i>	<i>0.135</i>
Adjusted R-squared:	General items	0.331	0.370	0.284	0.090	0.115	0.079
	Specific items	0.274	0.303	0.293	0.052	0.111	0.081
	<i>Difference</i>	<i>0.057</i>	<i>0.067</i>	<i>-0.009</i>	<i>0.038</i>	<i>0.004</i>	<i>-0.002</i>

## 8 Conclusions

Hypotheses	Findings
1 Anchors versus no anchors	
1.1 Item non-response	
<i>Item non-response (null) hypothesis 1:</i> Scales using clearly defined anchors representing the hypothetical range of competences in the population do not lead to more item non-response than scales without anchors.	Hypothesis is confirmed. Despite the fact that lists using anchors in the competence questions put a heavier claim on respondents, lists using anchors do not automatically lead to higher item non-response than lists without anchors. Although the best list in this respect is Dublin list 3 (in which no anchors were used), this list was not closely followed by the regular list (also containing no anchors), but by list 4, containing the original O*NET anchors.
<b>Conclusion: the use of anchors does not lead to a higher item non-response.</b>	
1.2 Distribution	
<i>Overestimation hypothesis 1:</i> Scales using clearly defined anchors representing the hypothetical range of competences in the population will be less susceptible to overestimation than scales without anchors.	Hypothesis is confirmed. A comparison between lists 1 and 2 on one hand with list 3 on the other hand, reveals that the use of anchors does reduce the mean level considerably.
<i>Distribution hypothesis 1:</i> Scales using anchors representing the hypothetical range of competences in the population will more closely approximate a normal distribution than scales without anchors.	<ul style="list-style-type: none"> <li>- Looking at the standard deviation, we found at best only rather weak support for this hypothesis: there is a moderate increase in the standard deviation of own level, but only a rather slight increase for required level.</li> <li>- However, looking at the kurtosis we found confirmation of this hypothesis: the own and required levels according to list 3 are clearly more peaked than those for lists 1 and 2.</li> <li>- Also consistent with the prediction of this hypothesis, we found that skewness to the left is more pronounced for own and required level for list 3 than for lists 1 and 2.</li> </ul>
<i>Distribution hypothesis 2:</i> Scales using anchors representing the hypothetical range of competences in the population will be more likely to elicit answers across the full range than scales without anchors.	Hypothesis is rejected: the lowest possible value is strongly represented in all Dublin Lists for required and particularly own level.
<i>Distribution hypothesis 3:</i> Scales using anchors representing the hypothetical range of competences in the population will be less susceptible to left or right censoring than scales without anchors.	The results offer some support for this hypothesis: the answers to own and required competences are slightly more concentrated in the highest possible value for list 3 than for lists 1 and 2.
<b>Conclusion: the results show a generally positive impact of anchors on the distribution of answers.</b>	

1.3 Differentiation	
<i>Differentiation hypothesis 1 (weak version):</i> Scales using anchors representing the hypothetical range of competences in the population will differentiate more on own level between bachelors and masters graduates than scales without anchors.	Hypothesis is rejected: there is disappointingly little difference between HBO and WO for own and required levels.
<i>Differentiation hypothesis 1 (strong version):</i> Scales using anchors representing the hypothetical range of competences in the population will yield a mean own level of close to 5 for bachelors and close to 7 for masters; scales without anchors will yield no consistent mean level for bachelors or masters.	Hypothesis is rejected: there is disappointingly little difference between HBO and WO for own and required levels.
<i>Differentiation hypothesis 2:</i> Scales using anchors representing the hypothetical range of competences in the population will differentiate more on own level between study programs than scales without anchors.	Hypothesis is confirmed: scales using anchors differentiate more on own level between study programs than scales without anchors.
<i>Differentiation hypothesis 3 (weak version):</i> Scales using anchors representing the hypothetical range of competences in the population will differentiate more on required level between graduates holding jobs that require bachelors level and those holding jobs requiring masters level qualifications than scales without anchors.	Hypothesis is confirmed: there is more difference between the required level of those working at compared to below their own level for lists 1 and 2 (and list 4 as well) than for list 3 and the regular list.
<i>Differentiation hypothesis 3 (strong version):</i> Scales using anchors representing the hypothetical range of competences in the population will yield a required own level of close to 5 for graduates holding bachelors-level jobs and close to 7 for graduates holding masters-level jobs; scales without anchors will yield no consistent mean required level for bachelors or masters level jobs.	Hypothesis is rejected: the differences fall far short of the 2 or (in the case of HBO graduates working at junior college level) 3 scale points difference between bachelors-level jobs and masters-level jobs.
<i>Differentiation hypothesis 4:</i> Scales using anchors representing the hypothetical range of competences in the population will differentiate more on required level between occupations than scales without anchors.	Hypothesis is not confirmed: all the Dublin lists show more variance between occupational levels and groups than the regular list: Lists 1 and 2 show the greatest variance between occupational levels, and lists 3 and 4 the greatest variance between occupational groups.
<b>Conclusion: anchors do not differentiate better between HBO and WO and between occupations. They do however differentiate better between study programs and slightly better between occupational levels.</b>	
1.4 Prediction	
<i>Prediction hypothesis 1:</i> Scales using clearly defined anchors representing the hypothetical range of competences in the population to measure own	Hypothesis is confirmed: list 1 performs best on the graduates' general evaluation of the study program.

competences will be better predictors of graduates' general evaluation of the study program than scales without anchors.	
<i>Prediction hypothesis 2:</i> Scales using clearly defined anchors representing the hypothetical range of competences in the population to measure own and required competences will be better predictors of graduates' labour market outcomes than scales without anchors.	Weak confirmation for hypothesis: a) gross hourly wage: - based on required level, list 1 performs best - based on importance, list 3 performs best b) job satisfaction: - based on required level, regular list performs best - based on importance, list 4 explains slightly more variance than lists 2 and 3, and substantially more than list 1
<b>Conclusion: anchors (list 1) predict graduates' evaluation of study program and gross hourly wage better, but regular list predicts job satisfaction better.</b>	
2 O*NET anchors versus adapted anchors	
<i>Distribution hypothesis 4:</i> Scales using anchors adapted to the Dublin descriptors will show better distributional characteristics than scales using the original O*NET anchors.	Hypothesis confirmed, looking at the larger overestimation (higher means, especially with respect to required level) and the smaller spread in answers (standard deviation) in the O*NET list.
<i>Differentiation hypothesis 5:</i> Scales using anchors adapted to the Dublin descriptors will differentiate more between educational and occupational levels and fields than scales using the original O*NET anchors.	- Not confirmed (HBO-WO; occupational groups; jobs below/on own educational level) - Confirmed (study programs; occupational levels)
<i>Prediction hypothesis 3:</i> Scales using anchors adapted to the Dublin descriptors to measure own and required competences will be better predictors of educational and labour market outcomes than scales using the original O*NET anchors.	- Hypothesis not confirmed for educational outcomes: despite the finding that list 1(adapted anchors) predicts best, list 2 (also adapted anchors) doesn't predict better than list 4. - Hypothesis not confirmed for job satisfaction: list 2 predicts best and list 4 worst. - Hypothesis confirmed for wage: list 1 and 2 better predictors than list 4.
<i>Item non-response hypothesis 2:</i> Scales using anchors adapted to the Dublin descriptors lead to less item non-response than scales using the original O*NET anchors.	Hypothesis not confirmed: list 4 lower non-response than list 1 and 2.
<b>Conclusion: The O*NET anchors and the adapted anchors do not differ much.</b>	
3 Importance versus required level	
<i>Distribution hypothesis 5:</i> Required level based on anchors representing the hypothetical range of competences in the population will show better distributional characteristics than importance based on scales without anchors.	Hypothesis not confirmed.

<i>Differentiation hypothesis 6:</i> Required level based on anchors representing the hypothetical range of competences in the population will differentiate more between educational and occupational levels and fields than importance based on scales without anchors.	- Hypothesis not confirmed for educational level and study program. - Hypothesis confirmed for occupational levels/groups and education-job level match.
<i>Prediction hypothesis 4:</i> Required level based on anchors representing the hypothetical range of competences in the population to measure own competences will be better predictors of labour market outcomes than importance based on scales without anchors.	Hypothesis confirmed in the analysis of the wage, but not in the analysis of job satisfaction.
<i>Item non-response (null) hypothesis 3:</i> Required level based on anchors representing the hypothetical range of competences in the population does not lead to more item non-response than importance based on scales without anchors.	Hypothesis confirmed.
<i>Discrepancy hypothesis 1:</i> Discrepancies (shortages and surpluses) between own and required level based on anchors representing the hypothetical range of competences in the population are better indicators of overall shortages and surpluses than discrepancies between (standardized) importance and (standardized) own level.	Hypothesis confirmed, although the differences are quite modest
<b>Conclusion: the questions on required level perform only slightly better than the questions on importance.</b>	
4 General versus specific items	
<i>Overestimation hypothesis 2:</i> Items with situation-specific anchors for own and required level will be less susceptible to overestimation than items with generalized anchors.	Hypothesis confirmed: mean scores are somewhat lower for general items than for specific items, especially on required level. The difference seems to be partly due to substantive differences between items, but part of the difference is attributable to the anchors used.
<i>Distribution hypothesis 4:</i> Items with situation-specific anchors for own and required level will show better distributional characteristics than items with generalized anchors.	Hypothesis partially confirmed: there is no effect of specific anchors on the standard deviation, but the distributions are slightly less peaked and less skewed than similar items using general anchors.
<i>Differentiation hypothesis 5:</i> Items with situation-specific anchors for own and required level will differentiate more between educational and occupational levels and fields than items with generalized anchors.	Hypothesis not confirmed: specific items do not differentiate any better between university and HBO graduates than general items. Although specific items show greater variance between programs and occupations than general items, this appears to be due to the differences in substance between the items rather than to the anchors.
<i>Prediction hypothesis 3:</i> Items with situation-specific	Hypothesis not confirmed: specific items do not

anchors for own and required level will be better predictors of educational and labour market outcomes than items with generalized anchors.	perform better or worse than general items as predictors of labour market outcomes.
<b>Conclusion: Items containing specific anchors are less susceptible to self-overestimation and show somewhat better distributional characteristics than items containing general anchors, but do not differentiate better between programs and occupations, and do not predict outcomes better.</b>	
5 Question order	
<i>Distribution (null) hypothesis 6:</i> It makes no difference for the distribution of answers whether the question on own level or the question on importance is asked first.	Hypothesis confirmed: list 1 hardly differs from list 2, looking at the mean, standard deviation, kurtosis (except for attention wanted) and skewness.
<i>Differentiation (null) hypothesis 7:</i> It makes no difference for the differentiation between educational and occupational levels and fields whether the question on own level or the question on importance is asked first.	Hypothesis confirmed: in general the differences between list 1 and list 2 in this respect are quite small.
<i>Prediction (null) hypothesis 5:</i> It makes no difference for the prediction of graduates' general evaluation of the study program or labour market outcomes whether the question on own level or the question on importance is asked first.	Hypothesis not confirmed: in terms of explained variance, list 1 performs better than list 2.
<i>Item non-response (null) hypothesis 4:</i> It makes no difference for item non-response whether the question on own level or the question on importance is asked first.	Hypothesis not confirmed: list 1 shows a higher item non-response per competence item (own level) than list 2.
<b>Conclusion: List 1's better explained variance is traded off against its higher item non-response.</b>	

### *Recommendation*

The above-mentioned results clearly show that using anchors in phrasing the questions offers no more than a weak ray of hope of improvement. The degree of improvement however is too meagre to justify an investment in the further development of an instrument with anchors. This recommendation is particularly based on the finding that phrasing the questions using anchors does differentiate not better between HBO and WO than the phrasing of the questions without anchors.

## Appendix 1: Operationalisatie Dublin descriptoren

Omschrijving Dublin descriptor 'Kennis en inzicht'

	<b>Kennis en inzicht</b>
<b>Kwalificaties MBO</b>	Heeft aantoonbare kennis en inzicht van een vakgebied, waarbij wordt voortgebouwd op het niveau bereikt in het voortgezet onderwijs. Functioneert doorgaans op een niveau waarbij het bijhouden van de nieuwste ontwikkelingen niet vereist is.
<b>Kwalificaties Bachelors</b>	Heeft aantoonbare kennis en inzicht van een vakgebied, waarbij wordt voortgebouwd op het niveau bereikt in het voortgezet onderwijs en dit wordt overtroffen; functioneert doorgaans op een niveau waarop met ondersteuning van gespecialiseerde handboeken, enige aspecten voorkomen waarvoor kennis van de laatste ontwikkelingen in het vakgebied vereist is.
<b>Kwalificaties Masters</b>	Heeft aantoonbare kennis en inzicht, gebaseerd op de kennis en het inzicht op het niveau van Bachelor en die deze overtreffen en/of verdiepen, alsmede een basis of een kans bieden om een originele bijdrage te leveren aan het ontwikkelen en/of toepassen van ideeën, vaak in onderzoeksverband.

Operationalisatie Dublin descriptor 'Kennis en inzicht'

### 1. Vakkennis: Kennis en inzicht van het werkgebied van de opleiding

- 01a Hoe belangrijk is vakkennis voor het 1 niet belangrijk  
adequaat uitoefenen van uw functie? 2 enigszins belangrijk  
3 belangrijk  
4 heel belangrijk  
5 extreem belangrijk



01b	Welk niveau van vakkennis is nodig om uw huidige functie goed uit te oefenen?	<b>Dublin lists 1, 2 and 4:<sup>5</sup></b> <b>huidige functie</b>	<b>eigen niveau</b>
		1	1
01c	Hoe schat u uw eigen niveau van vakkennis in?	2 ← kennis van basisprincipes van het vakgebied →	2
		3	3
		4	4
		5 ← uitgebreide kennis van het vakgebied en is op de hoogte van de laatste ontwikkelingen →	5
		6	6
		7 ← een originele bijdrage leveren aan het ontwikkelen van nieuwe kennis op het vakgebied →	7
		8	8
		<b>Dublin list 3:</b>	
		<b>huidige functie</b>	<b>eigen niveau</b>
		1 matig	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8 uitmuntend	8
01d	Moet in de opleiding meer of minder aandacht besteed worden aan de ontwikkeling van vakkennis?	1 veel meer aandacht 2 meer aandacht 3 niet meer en niet minder 4 minder aandacht 5 veel minder aandacht	

## 2. Originaliteit: Het vermogen om met ongewone ideeën te komen over een bepaald onderwerp of het vermogen om op een creatieve manier een probleem op te lossen

02a	Hoe belangrijk is originaliteit voor het adequaat uitoefenen van uw functie?	1 niet belangrijk 2 enigszins belangrijk 3 belangrijk 4 heel belangrijk 5 extreem belangrijk
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5 . Dublin lists 1 and 2 are identical, except for the question order. In list 1 the order is a) importance, b) required level, c) own level and d) attention wanted, whereas in list 2 the order is a) own level, b) importance, c) required level and d) attention wanted.

02b	Welk niveau van originaliteit is nodig om uw huidige functie goed uit te oefenen?	<b>Dublin lists 1 and 2:</b> <b>huidige functie</b>	<b>eigen niveau</b>
		1	1
02c	Hoe schat u uw eigen niveau van originaliteit in?	2 ← ontwerpen van nieuwe procedures in een secretariaat om de werkefficiëntie te verbeteren	→ 2
		3	3
		4	4
		5 ← ontwerp van een nieuwe maatregel om het ziekteverzuim in een bedrijf terug te dringen	→ 5
		6	6
		7 ← ontwikkelen van een nieuwe methode om patiënten sneller te laten revalideren	→ 7
		8	8
		<b>Dublin list 3:</b> <b>huidige functie</b>	<b>eigen niveau</b>
		1 matig	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8 uitmuntend	8
		<b>Dublin list 4:</b> <b>huidige functie</b>	<b>eigen niveau</b>
		1	1
		2 ← gebruiken van een creditcard om een gesloten deur te openen	→ 2
		3	3
		4 ← ontwerp van een nieuwe taakverdeling om het werk interessanter te maken voor werknemers	→ 4
		5	5
		6 ← uitvinden van een nieuw type vezel	→ 6
		7	7
02d	Moet in de opleiding meer of minder aandacht besteed worden aan de ontwikkeling van originaliteit?	1 veel meer aandacht	
		2 meer aandacht	
		3 niet meer en niet minder	
		4 minder aandacht	
		5 veel minder aandacht	

### 3. Het up-to-date houden van vakkennis: Eigen kennispeil up-to-date houden

03a	Hoe belangrijk is het up-to-date houden van vakkennis voor het adequaat uitoefenen van uw functie?	1 niet belangrijk 2 enigszins belangrijk 3 belangrijk 4 heel belangrijk 5 extreem belangrijk	
03b	Welk niveau van up-to-date houden van vakkennis is nodig om uw huidige functie goed uit te oefenen?	<b>Dublin lists 1 and 2:</b> <b>huidige functie</b> 1 2 ← op de hoogte blijven van → onderhoudsprocedures voor de meest voorkomende reparatie van auto's 3 4 5 ← op de hoogte blijven van ontwikkelingen → in boekhoudsystemen 6 7 ← bijhouden van specialistische → ontwikkelingen in de biotechnologie 8	<b>eigen niveau</b> 1 2 3 4 5 6 7 8
03c	Hoe schat u uw eigen niveau van up-to-date houden van vakkennis in?	<b>Dublin list 3:</b> <b>huidige functie</b> 1 matig 2 3 4 5 6 7 8 uitmuntend	<b>eigen niveau</b> 1 2 3 4 5 6 7 8
		<b>Dublin list 4:</b> <b>huidige functie</b> 1 2 ← bijhouden van prijsveranderingen in een → kleine winkel 3 4 ← bijhouden van veranderingen in de → onderhoudsprocedures voor de reparatie van sportwagens 5 6 ← bijhouden van informatie over een → complexe en snel veranderde technologie 7	<b>eigen niveau</b> 1 2 3 4 5 6 7

- 03d Moet in de opleiding meer of minder 1 veel meer aandacht  
aandacht besteed worden aan de 2 meer aandacht  
ontwikkeling van het vermogen om 3 niet meer en niet minder  
vakkennis up-to-date te houden? 4 minder aandacht  
5 veel minder aandacht

Omschrijving Dublin descriptor 'Toepassen kennis en inzicht'

<b>Toepassen kennis en inzicht</b>	
<b>Kwalificaties MBO</b>	Is in staat zijn/haar kennis en inzicht op dusdanige wijze toe te passen, dat dit een professionele benadering van zijn/haar werk laat zien, en beschikt bovendien over competenties die voor een correcte uitvoering van het vak zorgen.
<b>Kwalificaties Bachelors</b>	Is in staat om zijn/haar kennis en inzicht op dusdanige wijze toe te passen, dat dit een professionele benadering van zijn/haar werk of beroep laat zien, en beschikt verder over competenties voor het opstellen en verdiepen van argumentaties en voor het oplossen van problemen op het vakgebied.
<b>Kwalificaties Masters</b>	Is in staat om kennis en inzicht en probleemoplossende vermogens toe te passen in nieuwe of onbekende omstandigheden binnen een bredere (of multidisciplinaire) context die gerelateerd is aan het vakgebied; is in staat om kennis te integreren en met complexe materie om te gaan.

Operationalisatie Dublin descriptor 'Toepassen kennis en inzicht'

#### 4. Toepassen van kennis en inzicht: Het vermogen om kennis en inzicht toe te passen

- 04a Hoe belangrijk is het toepassen van kennis 1 niet belangrijk  
voor het adequaat uitoefenen van uw 2 enigszins belangrijk  
functie? 3 belangrijk  
4 heel belangrijk  
5 extreem belangrijk

04b	Welk niveau van toepassen van kennis en inzicht is nodig om uw huidige functie goed uit te oefenen?	<b>Dublin lists 1, 2 and 4:</b>	
		<b>huidige functie</b>	<b>eigen niveau</b>
		1	1
		2 ← standaardproblemen op het werkgebied →	2
		herkennen en oplossen	
04c	Hoe schat u uw eigen niveau van toepassen van kennis en inzicht in?	3	3
		4	4
		5 ← een beargumenteerde oplossing bieden →	5
		voor nieuwe problemen op het vakgebied; heeft kennis van aanpalende vakgebieden	
		6	6
		7 ← inzichten toepassen in nieuwe →	7
		omstandigheden, inzichten van aanpalende vakgebieden integreren en met complexe materie omgaan	
		8	8
		<b>Dublin list 3:</b>	
		<b>huidige functie</b>	<b>eigen niveau</b>
		1 matig	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8 uitmuntend	8
04d	Moet in de opleiding meer of minder aandacht besteed worden aan de ontwikkeling van het vermogen om kennis en inzicht toe te passen?	1	veel meer aandacht
		2	meer aandacht
		3	niet meer en niet minder
		4	minder aandacht
		5	veel minder aandacht

## 5. Probleem-oplossend vermogen: Analyseren van problemen en het evalueren van relevante informatie om oplossingen te ontwikkelen en te implementeren

05a	Hoe belangrijk is het probleemoplossend vermogen voor het adequaat uitoefenen van uw functie?	1	niet belangrijk
		2	enigszins belangrijk
		3	belangrijk
		4	heel belangrijk
		5	extreem belangrijk

05b	Welk niveau van probleemoplossend vermogen is nodig om uw huidige functie goed uit te oefenen?	<b>Dublin lists 1 and 2:</b>	
		<b>huidige functie</b>	<b>eigen niveau</b>
		1	1
		2 ← standaardreparatie van een defect → voertuig	2
05c	Hoe schat u uw eigen niveau van probleemoplossend vermogen in?	3	3
		4	4
		5 ← ontwikkelen en implementeren van een → rampenplan voor een middelgroot bedrijf	5
		6	6
		7 ← ontwerp van nieuwe verbindingen in een → bouwconstructie om te besparen op materialen	7
		8	8
		<b>Dublin list 3:</b>	
		<b>huidige functie</b>	<b>eigen niveau</b>
1 matig	1		
2	2		
3	3		
4	4		
5	5		
6	6		
7	7		
8 uitmuntend	8		
<b>Dublin list 4:</b>			
<b>huidige functie</b>	<b>eigen niveau</b>		
1	1		
2 ← bij elkaar zien van gereedschap om een → taak uit te voeren	2		
3	3		
4 ← herinrichten van de werkvloer om → gebruikt te kunnen maken van nieuwe productietechnieken	4		
5	5		
6 ← ontwikkelen en implementeren van een → rampenplan voor een grootstedelijk gebied	6		
7	7		
05d	Moet in de opleiding meer of minder aandacht besteed worden aan de ontwikkeling van probleemoplossend vermogen?	1 veel meer aandacht	
		2 meer aandacht	
		3 niet meer en niet minder	
		4 minder aandacht	
		5 veel minder aandacht	

## 6. Analyseren van gegevens en informatie: Het vermogen om betekenisvolle informatie te destilleren uit een grote hoeveelheid gegevens

06a	Hoe belangrijk is het analyseren van gegevens voor het adequaat uitoefenen van uw functie?	1 niet belangrijk 2 enigszins belangrijk 3 belangrijk 4 heel belangrijk 5 extreem belangrijk	
06b	Welk niveau van analyseren van gegevens is nodig om uw huidige functie goed uit te oefenen?	<b>Dublin lists 1 and 2:</b> <b>huidige functie</b> 1 2 ← maken van tabellen of grafieken over de bedrijfsresultaten 3 4 5 ← maken van een prognose over de winst van een kleine onderneming in het komende jaar 6 7 ← analyseren van de relatie tussen bepaalde demografische kenmerken en ziektepatronen 8	<b>eigen niveau</b> 1 2 3 4 5 6 7 8
06c	Hoe schat u uw eigen niveau van analyseren van gegevens in?	<b>Dublin list 3:</b> <b>huidige functie</b> 1 matig 2 3 4 5 6 7 8 uitmuntend	<b>eigen niveau</b> 1 2 3 4 5 6 7 8
		<b>Dublin list 4:</b> <b>huidige functie</b> 1 2 ← opsporen van een verloren geraakte bestelling 3 4 ← bepalen van de rentekosten om een nieuw gebouw te financieren 5 6 ← analyseren van de kosten van medische zorg voor alle ziekenhuizen in het land 7	<b>eigen niveau</b> 1 2 3 4 5 6 7

- 06d Moet in de opleiding meer of minder 1 veel meer aandacht  
aandacht besteed worden aan het 2 meer aandacht  
ontwikkelen van analyse van gegevens? 3 niet meer en niet minder  
4 minder aandacht  
5 veel minder aandacht

Omschrijving Dublin descriptor 'Oordeelsvorming'

	<b>Oordeelsvorming</b>
<b>Kwalificaties MBO</b>	Is in staat om relevante gegevens te interpreteren en te gebruiken om een oordeel te geven aan de hand van duidelijk gedefinieerde alsook abstracte vraagstukken.
<b>Kwalificaties Bachelors</b>	Is in staat om relevante gegevens te verzamelen en interpreteren (meestal op het vakgebied) met het doel een oordeel te vormen dat mede gebaseerd is op het afwegen van relevante sociaal- maatschappelijke, wetenschappelijke of ethische aspecten.
<b>Kwalificaties Masters</b>	Is in staat om oordelen te formuleren op grond van onvolledige of beperkte informatie en daarbij rekening te houden met sociaal-maatschappelijke en ethische verantwoordelijkheden, die zijn verbonden aan het toepassen van de eigen kennis en oordelen.

Operationalisatie Dublin descriptor 'Oordeelsvorming'

## 7. Oordeelsvorming: Verzamelen van relevante gegevens en interpreteren met het doel tot een oordeel te komen

- 07a Hoe belangrijk is oordeelsvorming voor het 1 niet belangrijk  
adequaat uitoefenen van uw functie? 2 enigszins belangrijk  
3 belangrijk  
4 heel belangrijk  
5 extreem belangrijk



07b	Welk niveau van oordeelsvorming is nodig om uw huidige functie goed uit te oefenen?	<b>Dublin lists 1, 2 and 4:</b> <b>huidige functie</b>	<b>eigen niveau</b>
		1	1
07c	Hoe schat u uw eigen niveau van oordeelsvorming in?	2 ← in standaard situaties tot een juiste oordeelsvorming komen	2
		3	3
		4	4
		5 ← relevante gegevens verzamelen en interpreteren ten einde tot een goed oordeel te komen	5
		6	6
		7 ← in een situatie van onvolledige of beperkte informatie tot een onafhankelijk oordeel komen	7
		8	8
		<b>Dublin list 3:</b> <b>huidige functie</b>	<b>eigen niveau</b>
		1 matig	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8 uitmuntend	8
07d	Moet in de opleiding meer of minder aandacht besteed worden aan het ontwikkelen van oordeelsvorming?	1 veel meer aandacht 2 meer aandacht 3 niet meer en niet minder 4 minder aandacht 5 veel minder aandacht	

## 8. Kritisch denkvermogen: Door logisch redeneren sterke en zwakke punten in een redenering of aanpak identificeren

08a	Hoe belangrijk is kritisch denkvermogen voor het adequaat uitoefenen van uw functie?	1 niet belangrijk 2 enigszins belangrijk 3 belangrijk 4 heel belangrijk 5 extreem belangrijk
-----	--	--

08b	Welk niveau van is kritisch denkvermogen is nodig om uw huidige functie goed uit te oefenen?	<b>Dublin lists 1 and 2:</b>	
		<b>huidige functie</b>	<b>eigen niveau</b>
		1	1
		2 ← evalueren van klachten van klanten en het nemen van adequate actie →	2
08c	Hoe schat u uw eigen niveau van is kritisch denkvermogen in?	3	3
		4	4
		5 ← evalueren van een conflict tussen een supervisor en een ondergeschikte en het voorstellen van een oplossing →	5
		6	6
		7 ← het schrijven van een verweerschrift →	7
		8	8
		<b>Dublin list 3:</b>	
		<b>huidige functie</b>	<b>eigen niveau</b>
1 matig	1		
2	2		
3	3		
4	4		
5	5		
6	6		
7	7		
8 uitmuntend	8		
<b>Dublin list 4:</b>			
<b>huidige functie</b>	<b>eigen niveau</b>		
1	1		
2 ← vaststellen of een ondergeschikte een goed excuus heeft om te laat te komen →	2		
3	3		
4 ← evalueren van klachten van klanten en het nemen van passende maatregelen →	4		
5	5		
6 ← schrijven van een juridische brief waarin een wettelijke maatregel wordt betwist →	6		
7	7		
08d	Moet in de opleiding meer of minder aandacht besteed worden aan het ontwikkelen van kritisch denkvermogen?	1 veel meer aandacht	
		2 meer aandacht	
		3 niet meer en niet minder	
		4 minder aandacht	
		5 veel minder aandacht	

## 9. Besluitvormingsvaardigheden: Het vermogen om op basis van een analyse en evaluatie van informatie tot een beslissing te komen over de gewenste aanpak van een probleem

09a	Hoe belangrijk zijn besluitvormingsvaardigheden voor het adequaat uitoefenen van uw functie?	1 niet belangrijk 2 enigszins belangrijk 3 belangrijk 4 heel belangrijk 5 extreem belangrijk	
09b	Welk niveau van besluitvormingsvaardigheden is nodig om uw huidige functie goed uit te oefenen?	<b>Dublin lists 1 and 2:</b> <b>huidige functie</b> 1 2 ← vaststellen van de menukaart in een restaurant → 3 4 5 ← besluitvorming over de uitbreiding van het assortiment van een lokale supermarkt → 6 7 ← besluitvorming over het marketingplan van een middelgrote onderneming → 8	<b>eigen niveau</b> 1 2 3 4 5 6 7 8
09c	Hoe schat u uw eigen niveau van besluitvormingsvaardigheden in?	<b>Dublin list 3:</b> <b>huidige functie</b> 1 matig 2 3 4 5 6 7 8 uitmuntend	<b>eigen niveau</b> 1 2 3 4 5 6 7 8
		<b>Dublin list 4:</b> <b>huidige functie</b> 1 2 ← vaststellen van het menu in een cafetaria → 3 4 ← kiezen van de locatie van een groot warehouse → 5 6 ← finale beslissing nemen over een 5-jarenplan van een onderneming → 7	<b>eigen niveau</b> 1 2 3 4 5 6 7

- 09d Moet in de opleiding meer of minder 1 veel meer aandacht  
aandacht besteed worden aan het 2 meer aandacht  
ontwikkelen van besluitvormingsvaardig- 3 niet meer en niet minder  
heden? 4 minder aandacht  
5 veel minder aandacht

Omschrijving Dublin descriptor 'Communicatie'

<b>Communicatie</b>	
<b>Kwalificaties MBO</b>	Is in staat om te communiceren over eigen inzichten, vaardigheden en activiteiten met collega's, leidinggevendenden, en klanten
<b>Kwalificaties Bachelors</b>	Is in staat om informatie, ideeën en oplossingen over te brengen op een publiek bestaande uit specialisten of niet-specialisten.
<b>Kwalificaties Masters</b>	Is in staat om conclusies, alsmede de kennis, motieven en overwegingen die hieraan ten grondslag liggen, duidelijk en ondubbelzinnig over te brengen op een publiek van specialisten of niet-specialisten.

Operationalisatie Dublin descriptor 'Communicatie'

## 10. Communicatie: Het vermogen om informatie, ideeën en oplossingen aan een publiek van specialisten en niet-specialisten over te brengen

- 10a Hoe belangrijk is communicatie voor het 1 niet belangrijk  
adequaat uitoefenen van uw functie? 2 enigszins belangrijk  
3 belangrijk  
4 heel belangrijk  
5 extreem belangrijk
- 10b Welk niveau van communicatie is nodig om **Dublin lists 1, 2 and 4:**  
uw huidige functie goed uit te oefenen? **huidige functie** **eigen niveau**
- 10c Hoe schat u uw eigen niveau van 1  
communicatie in? 2 ← informatie overbrengen → 2  
3 3  
4 4  
5 ← ideeën en oplossingen overbrengen → 5  
6 6  
7 ← conclusies alsmede de kennis, → 7  
motieven en overwegingen die hieraan ten  
grondslag liggen overtuigend overbrengen  
8 8

**Dublin list 3:**

<b>huidige functie</b>	<b>eigen niveau</b>
1 matig	1
2	2
3	3
4	4
5	5
6	6
7	7
8 uitmuntend	8

- 10d Moet in de opleiding meer of minder 1 veel meer aandacht  
aandacht besteed worden aan het 2 meer aandacht  
ontwikkelen van communicatievermogen? 3 niet meer en niet minder  
4 minder aandacht  
5 veel minder aandacht

## 11. Schriftelijke presentatie: Het vermogen om informatie schriftelijk te presenteren op een manier dat anderen het begrijpen

- 11a Hoe belangrijk is schriftelijke presentatie voor 1 niet belangrijk  
het adequaat uitoefenen van uw functie? 2 enigszins belangrijk  
3 belangrijk  
4 heel belangrijk  
5 extreem belangrijk

- 11b Welk niveau van schriftelijke presentatie is **Dublin lists 1 and 2:**  
nodig om uw huidige functie goed uit te **huidige functie** **eigen niveau**  
oefenen? 1 1  
2 ← maken van een verslag van het → 2  
directieoverleg
- 11c Hoe schat u uw eigen niveau van schriftelijke 3 3  
presentatie in? 4 4  
5 ← maken van een journalistieke bijdrage → 5  
over de resultaten van een onderzoek  
6 6  
7 ← maken van een wetenschappelijk rapport → 7  
over verricht onderzoek  
8 8

**Dublin list 3:**

<b>huidige functie</b>	<b>eigen niveau</b>
1 matig	1
2	2
3	3
4	4
5	5
6	6
7	7
8 uitmuntend	8

<b>Dublin list 4:</b>		
<b>huidige functie</b>		<b>eigen niveau</b>
1		1
2	← notitie maken om iemand eraan te → herinneren voedsel uit de ijskast te halen	2
3		3
4	← schrijven van een aanbevelingsbrief voor → een ondergeschikte	4
5		5
6	← schrijven van een geavanceerd tekstboek → in de economie	6
7		7

- 11d Moet in de opleiding meer of minder  
aandacht besteed worden aan het  
ontwikkelen van schriftelijke presentatie-  
vaardigheden?
- 1 veel meer aandacht  
2 meer aandacht  
3 niet meer en niet minder  
4 minder aandacht  
5 veel minder aandacht

## 12. Mondelinge presentatie: Het vermogen om informatie op een heldere wijze mondeling te communiceren

- 12a Hoe belangrijk is mondelinge presentatie  
voor het adequaat uitoefenen van uw  
functie?
- 1 niet belangrijk  
2 enigszins belangrijk  
3 belangrijk  
4 heel belangrijk  
5 extreem belangrijk

- 12b Welk niveau van mondelinge presentatie is  
nodig om uw huidige functie goed uit te  
oefenen?
- Dublin lists 1 and 2:**
- | <b>huidige functie</b> |   | <b>eigen niveau</b> |
|------------------------|---|---------------------|
| 1                      |   | 1                   |
| 2                      | ← uitleg aan toeristen over de belangrijke →<br>attracties in de omgeving | 2                   |
| 3                      |   | 3                   |
| 4                      |   | 4                   |
| 5                      | ← houden van een presentatie op een →<br>conferentie                      | 5                   |
| 6                      |   | 6                   |
| 7                      | ← houden van een slotpleidooi in een →<br>rechtzaak                       | 7                   |
| 8                      |   | 8                   |
- 12c Hoe schat u uw eigen niveau van mondelinge  
presentatie in?

**Dublin list 3:**

<b>huidige functie</b>	<b>eigen niveau</b>
1 matig	1
2	2
3	3
4	4
5	5
6	6
7	7
8 uitmuntend	8

**Dublin list 4:**

<b>huidige functie</b>	<b>eigen niveau</b>
1	1
2 ← begroeten van toeristen en uitleggen van → toeristische attracties	2
3	3
4 ← interviewen van sollicitanten om zicht te → krijgen op persoonlijke levensloop en arbeidsverleden	4
5	5
6 ← voeren van een rechtzaak voor de → Hoge Raad	6
7	7

- 12d Moet in de opleiding meer of minder 1 veel meer aandacht  
aandacht besteed worden aan het 2 meer aandacht  
ontwikkelen van mondelinge presentatie- 3 niet meer en niet minder  
vaardigheden? 4 minder aandacht  
5 veel minder aandacht

### 13. Het uitleggen van informatie aan anderen: Het vermogen om uit te leggen wat de informatie betekent en hoe deze gebruikt moet worden

- 13a Hoe belangrijk is het uitleggen van informatie 1 niet belangrijk  
voor het adequaat uitoefenen van uw 2 enigszins belangrijk  
functie? 3 belangrijk  
4 heel belangrijk  
5 extreem belangrijk

13b	Welk niveau van uitleggen van informatie is nodig om uw huidige functie goed uit te oefenen?	<b>Dublin lists 1 and 2:</b> <b>huidige functie</b>	<b>eigen niveau</b>
		1	1
		2 ← uitleggen aan een patiënt wat de betekenis is van de gemeten bloeddruk →	2
13c	Hoe schat u uw eigen niveau van uitleggen van informatie in?	3	3
		4	4
		5 ← uitleggen aan klant wat de gevolgen zullen zijn van een nieuwe belastingwet voor zijn eigen pensioenvoorziening →	5
		6	6
		7 ← uitleggen van een natuurwetenschappelijk experiment aan een breed publiek →	7
		8	8
		<b>Dublin list 3:</b> <b>huidige functie</b>	<b>eigen niveau</b>
		1 matig	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8 uitmuntend	8
		<b>Dublin list 4:</b> <b>huidige functie</b>	<b>eigen niveau</b>
		1	1
		2 ← uitleggen van een bloeddrukmeting →	2
		3	3
		4 ← uitleggen van buitenlandse belastingwetgeving aan Nederlandse exporteurs →	4
		5	5
		6 ← uitleggen van een complex natuurwetenschappelijk experiment aan een breed publiek →	6
		7	7
13d	Moet in de opleiding meer of minder aandacht besteed worden aan het ontwikkelen van het vermogen om informatie goed uit te leggen?	1 veel meer aandacht	
		2 meer aandacht	
		3 niet meer en niet minder	
		4 minder aandacht	
		5 veel minder aandacht	



Omschrijving Dublin descriptor 'Leervaardigheden'

	<b>Leervaardigheden</b>
<b>Kwalificaties MBO</b>	Bezit de leervaardigheden die noodzakelijk zijn voor een vervolgstudie waarbij een beperkte mate van autonomie vereist is.
<b>Kwalificaties Bachelors</b>	Bezit de leervaardigheden die noodzakelijk zijn om een vervolgstudie die een hoog niveau van autonomie veronderstelt aan te gaan.
<b>Kwalificaties Masters</b>	Bezit de leervaardigheden die hem of haar in staat stellen een vervolgstudie aan te gaan met een grotendeels zelfgestuurd of autonoom karakter.

Het probleem met deze descriptor is dat ze is toegespitst op een eventuele vervolgstudie, terwijl het concept leervaardigheden natuurlijk ook breder toepasbaar is. We hebben daarom hier geprobeerd een algemene formulering te vinden, waarbij het onderscheid vooral ligt in het zelfsturend vermogen.

Operationalisatie Dublin descriptor 'Leervaardigheden'

#### 14. Leervaardigheden: Het vermogen om nieuwe kennis te verwerven

14a	Hoe belangrijk zijn leervaardigheden voor het adequaat uitoefenen van uw functie?	1 niet belangrijk 2 enigszins belangrijk 3 belangrijk 4 heel belangrijk 5 extreem belangrijk
14b	Welk niveau van leervaardigheden is nodig om uw huidige functie goed uit te oefenen?	<b>Dublin lists 1, 2 and 4:</b> <b>huidige functie</b> <span style="float: right;"><b>eigen niveau</b></span> 1 <span style="float: right;">1</span>
14c	Hoe schat u uw eigen niveau van leervaardigheden in?	2 ← kennis en vaardigheden verder ontwikkelen → waarbij een beperkte mate van autonomie vereist is 3 <span style="float: right;">3</span> 4 <span style="float: right;">4</span> 5 ← vanuit eigen inzicht kennis en → vaardigheden verder ontwikkelen waarbij het leerproces grotendeels zelfgestuurd is 6 <span style="float: right;">6</span> 7 ← hiaten in eigen kennis onderkennen en → kennis uit nieuwe vakgebieden eigen maken 8 <span style="float: right;">8</span>

**Dublin list 3:**

<b>huidige functie</b>	<b>eigen niveau</b>
1 matig	1
2	2
3	3
4	4
5	5
6	6
7	7
8 uitmuntend	8

- 14d Moet in de opleiding meer of minder 1 veel meer aandacht  
aandacht besteed worden aan het 2 meer aandacht  
ontwikkelen van leervaardigheden? 3 niet meer en niet minder  
4 minder aandacht  
5 veel minder aandacht

## 15. Leesvaardigheden: Begrijpen van geschreven teksten in werkgerelateerde documenten

- 15a Hoe belangrijk zijn leesvaardigheden voor het 1 niet belangrijk  
adequaat uitoefenen van uw functie? 2 enigszins belangrijk  
3 belangrijk  
4 heel belangrijk  
5 extreem belangrijk

- 15b Welk niveau van leesvaardigheden is nodig **Dublin lists 1 and 2:**  
om uw huidige functie goed uit te oefenen? **huidige functie** **eigen niveau**
- |   |   |
|---|---|
| 1   | 1 |
| 2 ← begrijpen van een handleiding voor een → 2  | 2 |
| nieuw tekstverwerkingsprogramma                 |   |
| 3   | 3 |
| 4   | 4 |
| 5 ← begrijpen van een geavanceerd tekstboek → 5 | 5 |
| over bedrijfsvoering                            |   |
| 6   | 6 |
| 7 ← begrijpen van wetenschappelijke → 7         | 7 |
| artikelen in medische toptijdschriften          |   |
| 8   | 8 |

**Dublin list 3:**

<b>huidige functie</b>	<b>eigen niveau</b>
1 matig	1
2	2
3	3
4	4
5	5
6	6
7	7
8 uitmuntend	8

<b>Dublin list 4:</b>	
<b>huidige functie</b>	<b>eigen niveau</b>
1	1
2 ← stap-voor-stap lezen van de instructies → om een formulier in te vullen	2
3	3
4 ← lezen van een directie memo waarin → het nieuwe personeelsbeleid wordt beschreven	4
5	5
6 ← lezen van een wetenschappelijk artikel → waarin nieuwe operatietechnieken worden beschreven	6
7	7

- 15d Moet in de opleiding meer of minder  
aandacht besteed worden aan het ontwikke-  
len van leesvaardigheden?
- 1 veel meer aandacht  
2 meer aandacht  
3 niet meer en niet minder  
4 minder aandacht  
5 veel minder aandacht

## 16. Leerstrategieën: Selecteren en gebruiken van training- en instructiemethoden voor nieuwe leersituaties

- 16a Hoe belangrijk zijn leerstrategieën voor het  
adequaat uitoefenen van uw functie?
- 1 niet belangrijk  
2 enigszins belangrijk  
3 belangrijk  
4 heel belangrijk  
5 extreem belangrijk

- 16b Welk niveau van leerstrategieën is nodig om  
uw huidige functie goed uit te oefenen?
- Dublin lists 1 and 2:**
- | <b>huidige functie</b>   | <b>eigen niveau</b> |
|--|---------------------|
| 1  | 1                   |
| 2 ← leren van een nieuwe werkmethode aan →<br>een collega  | 2                   |
| 3  | 3                   |
| 4  | 4                   |
| 5 ←ontwikkelen van lesmateriaal voor →<br>leerlingen die moeite hebben met rekenen   | 5                   |
| 6  | 6                   |
| 7 ← op grond van inzichten uit de →<br>onderwijspsychologie ontwikkelen van een<br>nieuwe lesmethode voor achterstandskinderen | 7                   |
| 8  | 8                   |
- 16c Hoe schat u uw eigen niveau van leerstrate-  
gieën in?

**Dublin list 3:**

<b>huidige functie</b>	<b>eigen niveau</b>
1 matig	1
2	2
3	3
4	4
5	5
6	6
7	7
8 uitmuntend	8

**Dublin list 4:**

<b>huidige functie</b>	<b>eigen niveau</b>
1	1
2 ← een nieuwe werkmethode van een → collega leren	2
3	3
4 ← ontwikkelen van een nieuwe aanpak om → trainees te helpen die moeilijkheden hebben	4
5	5
6 ← toepassen van principes uit de → onderwijspsychologie om nieuwe lesmethoden te ontwikkelen	6
7	7

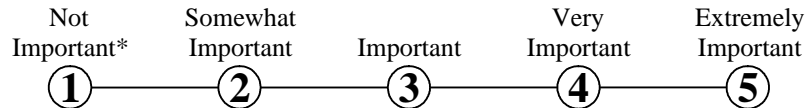
- 16d Moet in de opleiding meer of minder  
aandacht besteed worden aan het  
ontwikkelen van leerstrategieën?
- |   |                          |
|---|--------------------------|
| 1 | veel meer aandacht       |
| 2 | meer aandacht            |
| 3 | niet meer en niet minder |
| 4 | minder aandacht          |
| 5 | veel minder aandacht     |

## Appendix 2: Original O\*NET items

### 6. Originality

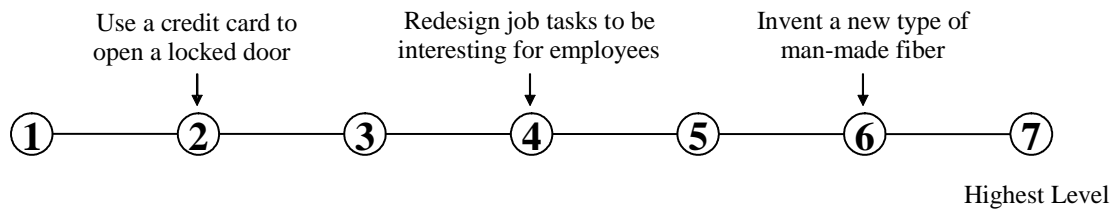
The ability to come up with unusual or clever ideas about a given topic or situation, or to develop creative ways to solve a problem.

#### A. How important is ORIGINALITY to the performance of *your current job*?



\* If you marked Not Important, skip LEVEL below and go on to the next activity.

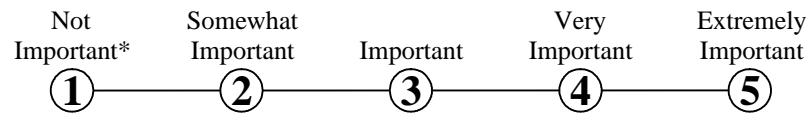
#### B. What level of ORIGINALITY is needed to perform *your current job*?



## 11. Updating and Using Relevant Knowledge

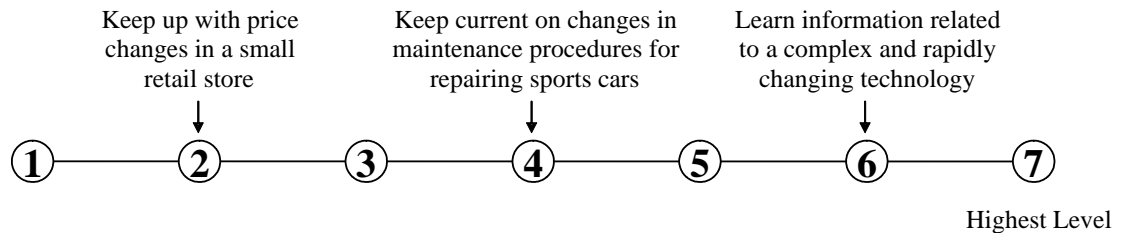
Keeping up-to-date technically and applying new knowledge to your job.

A. How important is UPDATING AND USING RELEVANT KNOWLEDGE to the performance of *your current job*?



\* If you marked Not Important, skip LEVEL below and go on to the next activity.

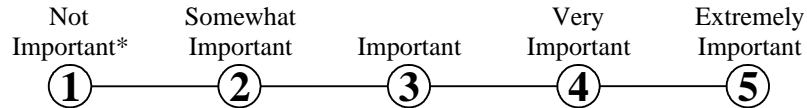
B. What level of UPDATING AND USING RELEVANT KNOWLEDGE is needed to perform *your current job*?



## 17. Complex Problem Solving

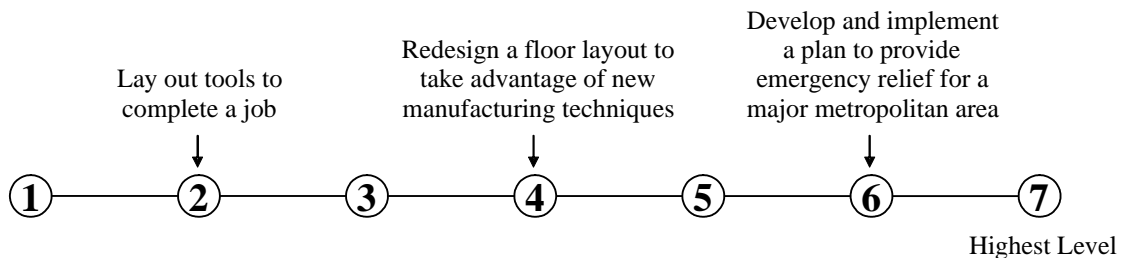
Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

A. How important is COMPLEX PROBLEM SOLVING to the performance of *your current job*?



\* If you marked Not Important, skip LEVEL below and go on to the next skill.

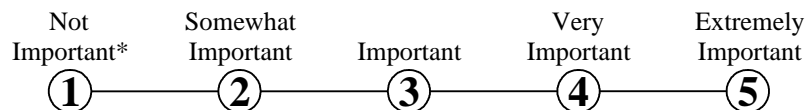
B. What level of COMPLEX PROBLEM SOLVING is needed to perform *your current job*?



## 9. Analyzing Data or Information

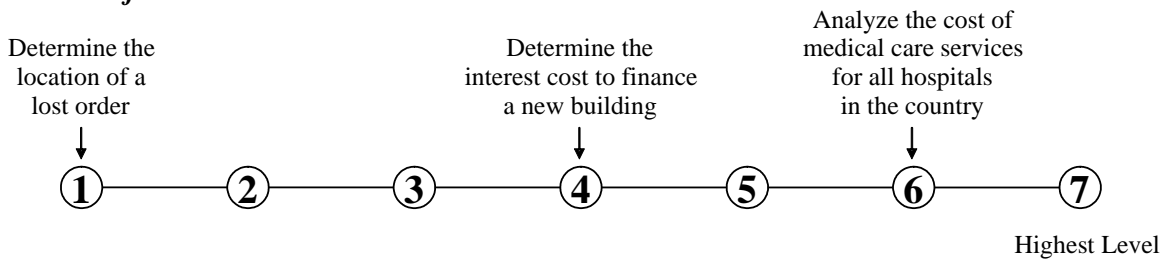
Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

A. How important is ANALYZING DATA OR INFORMATION to the performance of *your current job*?



\* If you marked Not Important, skip LEVEL below and go on to the next activity.

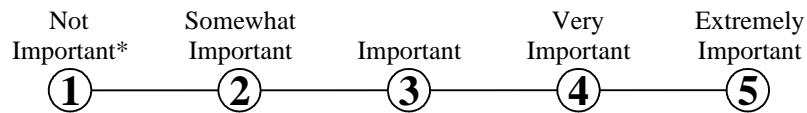
**B. What level of ANALYZING DATA OR INFORMATION is needed to perform *your current job*?**



## 7. Critical Thinking

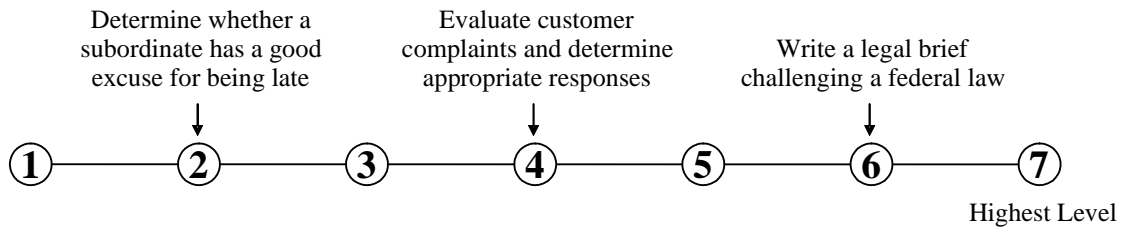
Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems.

**A. How important is CRITICAL THINKING to the performance of *your current job*?**



\* If you marked Not Important, skip LEVEL below and go on to the next skill.

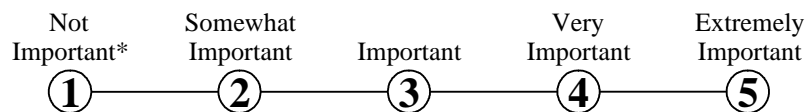
**B. What level of CRITICAL THINKING is needed to perform *your current job*?**



## 10. Making Decisions and Solving Problems

Analyzing information and evaluating results to choose the best solution and solve problems.

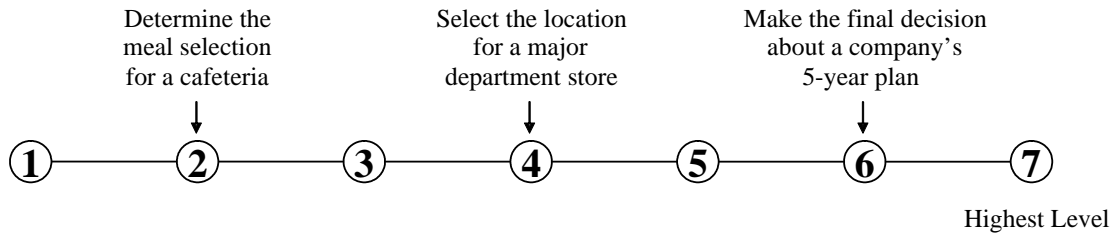
**A. How important is MAKING DECISIONS AND SOLVING PROBLEMS to the performance of *your current job*?**



\* If you marked Not Important, skip LEVEL below and go on to the next activity.



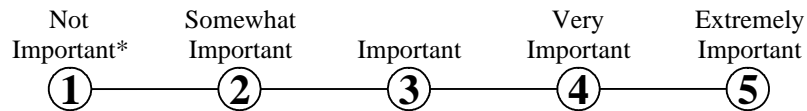
**B. What level of MAKING DECISIONS AND SOLVING PROBLEMS is needed to perform *your current job*?**



#### 4. Written Expression

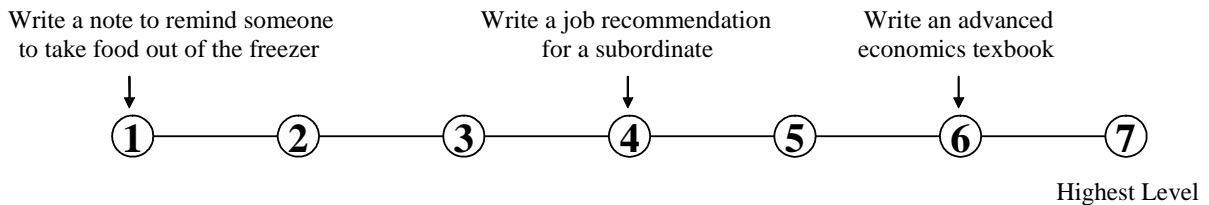
The ability to communicate information and ideas in writing so others will understand.

**A. How important is WRITTEN EXPRESSION to the performance of *your current job*?**



\* If you marked Not Important, skip LEVEL below and go on to the next activity.

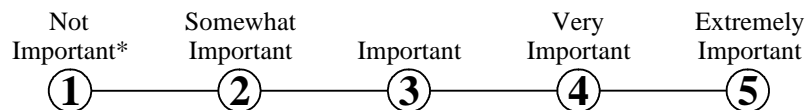
**B. What level of WRITTEN EXPRESSION is needed to perform *your current job*?**



#### 3. Speaking

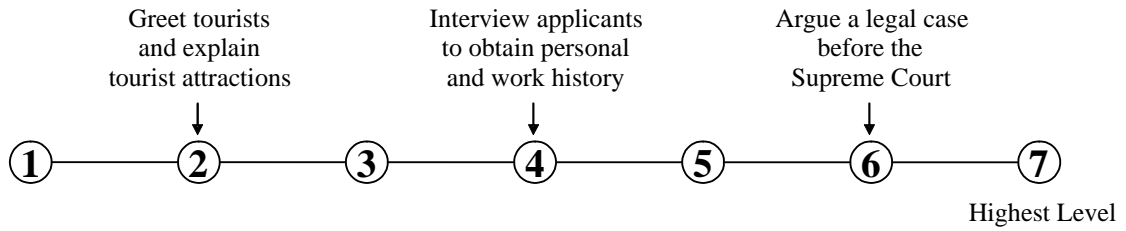
Talking to others to convey information effectively.

**A. How important is SPEAKING to the performance of *your current job*?**



\* If you marked Not Important, skip LEVEL below and go on to the next skill.

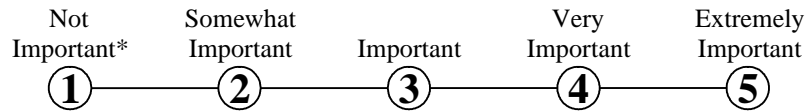
**B. What level of SPEAKING is needed to perform *your current job*?**



**25. Interpreting the Meaning of Information for Others**

Translating or explaining what information means and how it can be used.

**A. How important is INTERPRETING THE MEANING OF INFORMATION FOR OTHERS to the performance of *your current job*?**



\* If you marked Not Important, skip LEVEL below and go on to the next activity.

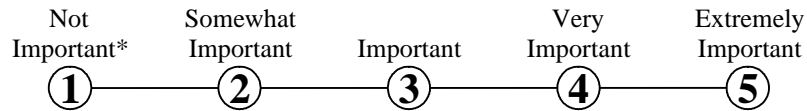
**B. What level of INTERPRETING THE MEANING OF INFORMATION FOR OTHERS is needed to perform *your current job*?**



# 1. Reading Comprehension

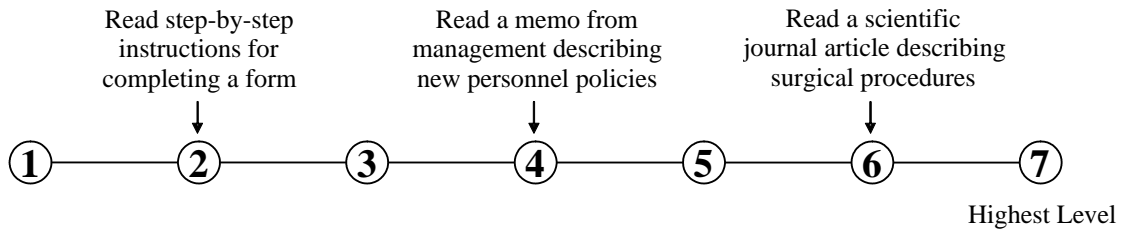
Understanding written sentences and paragraphs in work-related documents.

A. How important is READING COMPREHENSION to the performance of *your current job*?



\* If you marked Not Important, skip LEVEL below and go on to the next skill.

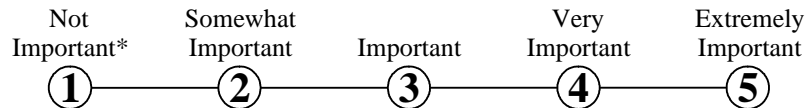
B. What level of READING COMPREHENSION is needed to perform *your current job*?



# 9. Learning Strategies

Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things.

A. How important are LEARNING STRATEGIES to the performance of *your current job*?



\* If you marked Not Important, skip LEVEL below and go on to the next skill.

**B. What level of LEARNING STRATEGIES is needed to perform *your current job*?**

