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To cite this article: Emma Weston , Jim Crilly , Liz Mossop & Tim Foster (2017) Competencies for food graduate careers: developing a language tool, Higher Education Pedagogies, 2:1, 101-115, DOI: [10.1080/23752696.2017.1366275](https://doi.org/10.1080/23752696.2017.1366275)

To link to this article: <http://dx.doi.org/10.1080/23752696.2017.1366275>



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Competencies for food graduate careers: developing a language tool

Emma Weston^a , Jim Crilly^b , Liz Mossop^c  and Tim Foster^a 

^aDivision of Food Sciences, School of Biosciences, University of Nottingham, Nottingham, UK; ^bNottingham University Business School, University of Nottingham, Nottingham, UK; ^cSchool of Veterinary Medicine and Science, University of Nottingham, Nottingham, UK

ABSTRACT

Unlike many other graduate career pathways in the UK, the food industry does not have a cohesive competency framework to support employers, students and degree providers. Food sciences-based technical graduates are a significant proportion of the industry's graduate intake; this study aims to provide such a framework. Initial work involving a sample of representative stakeholders has created a list of typical attributes and associated definitions that may be desirable in food sciences graduates. Material was gathered by semi-structured qualitative interviews and analysed by thematic analysis followed by a modified Delphi technique. The resulting framework is tailored to needs and terminology prevalent in food industry employment. The process employed could be utilised for building other vocational graduate competency frameworks. Further plans include using the framework to ascertain the important elements for typical graduate entry roles, better informing students about desirable qualities and supporting future competency-based curriculum review.

ARTICLE HISTORY

Received 26 September 2016
Revised 22 May 2017
Accepted 7 August 2017


KEYWORDS

Food science; food industry;
competency; graduate;
employability; thematic
analysis

Introduction

With 16% of its turnover, the food and drink industry is in the largest manufacturing sector in the UK and productivity in this sector has increased by 11% over the last five years compared to an overall UK productivity increase of 0.5% (Food and Drink Federation, 2016a). It employs as a whole (including manufacturing, research, retail, regulatory and academic) over 400,000 employees (Food and Drink Federation, 2016b). However, the industry suffers from a number of skills gaps, namely in science, technology and engineering-related roles. The Food and Drink Federation (2016b) forecast that by 2022 the industry will need 109,000 new recruits at all levels to meet growing demand. Within this demand, there is a requirement to enlist graduates into a wide range of fields, with a significant proportion to be deployed in the technical field and thus coming from food science or technology-based courses. The pressure is heightened in these areas by the demands and

CONTACT Emma Weston  emma.weston@nottingham.ac.uk

 Supplemental data for this article can be accessed <https://doi.org/10.1080/07924259.2017.1366275>.

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fast pace of innovation and technology. This is exemplified by the recent Wakeham Review of STEM Degree Provision and Graduate Employability (2016), highlighting that this pace of change creates additional burden on both higher education and industry to match the future demand for the number and skills of STEM (Science, Technology, Engineering and Mathematics) graduates.

Degree providers are mindful that they have a duty to provide the quantity and calibre of graduates essential to support this large, complex and evolving industry and a number of degree providers offer courses across the UK (UCAS). High-quality degree courses comply with the specific framework issued by the Quality Assurance Agency for Higher Education (QAA) for subject-specific knowledge and understanding (QAA, 2009). A certain amount of reference in the QAA benchmark statement for Agriculture, horticulture, forestry, food and consumer sciences is made to aspects of competence in components that would be described as transferrable skills, such as communication (in the generic skills section, Table 1, QAA, 2009). However, there is no defined tool or guideline such as a competency framework in place to outline the broader skills that make a desirable food sciences graduate. Other formal vocational occupations such as health care have established frameworks for use in student teaching, recruitment and development of staff (Storey, Howard, & Gillies, 2002).

The interest and application of competency-based education especially when linked to developing employability and professionalism is now a key part of curriculum design in higher education (Mossop, 2012; Perera, Babatunde, Zhou, Pearson, & Ekundayo, 2016). For example, Cole and Tibby (2013) explore Knight and Yorke's 'USEM' Model of Employability from 2003 with newer adaptations to outline the process of embedding employability topics into the curriculum. However, competency frameworks for graduate vocations can be used beyond curriculum development and degree course inclusion. They can improve students' awareness of the desirable skills and behaviours for specific career pathways and thus inform choice and plans for personal development. In addition, employers can use these frameworks for in-job evaluation (Miller, 2001; Storey et al., 2002) and for development of targeted selection processes for graduate recruitment.

It is believed the stakeholders in the UK food industry, educators, employers and the graduates themselves would benefit from having a competency framework for the typical roles food sciences graduates are recruited for. This study aims to find commonly used terms for desirable graduate skills used by industry stakeholders and the associated definitions they apply to them. From these data, a language tool could be produced to outline the ideal competencies for food graduate careers. This tool will underpin a future competency framework outlining the types of competencies desirable in typical roles for food science graduates. The scope of this study does not include all the specific scientific and technical aspects of higher education training in food science degrees as outlined in the QAA subject benchmark statement for this category of degree course (QAA, 2009) and in associated degree curricula. It is focused on the associated competencies and attributes an employer may desire in a food sciences graduate to underpin these technical abilities.

Methods and results

The study was conducted between September 2015 and July 2016. The required ethics approval for working with the participants was obtained internally from the School of

Sociology & Social Policy, aligned with University Ethical Committee requirements (The University of Nottingham, 2016a). The appropriate consent was gained from all participants in the study using the approved information sheet and consent form.

As the work was exploratory in nature, a qualitative approach was chosen for the study aiming to establish in detail the perceived 'skills' required of food sciences graduates (Braun & Clarke, 2013; Creswell, 2014; Davies, 2007). In addition, the study sought to find the definitions participants' associated with these skills. The process involved stages of preparation by the researcher to develop the appropriate materials for conducting the research. This was followed by individual stakeholder involvement in the form of semi-structured interviews (Brinkmann & Kvale, 2015; Davies, 2007; Frankfort-Nachmias & Nachmias, 2009; Keats, 1999). Thematic analysis (Braun & Clarke, 2013; Brinkmann & Kvale, 2015) was performed on the resulting data, then a group engagement activity in the style of a modified Delphi technique (Johnston et al., 2014; Sobaih, Ritchie, & Jones, 2012) was employed to consolidate the findings.

Stakeholder selection

A range of stakeholders were identified as representatives for the types of businesses that employ food science-based graduates in the food industry. A purposive stratified method of stakeholder sampling (Braun & Clarke, 2013; Creswell, 2014) was employed to ensure that the diversity of typical career pathways was included in the study.

Types of stakeholders for food industry employment of technical graduates were identified as outlined in Figure 1 and included employers, a recruitment consultant and recent graduates. Participants were convenience sampled (Braun & Clarke, 2013) with an aim of providing a range of viewpoints and thus a wide pool of material.

A total of 12 stakeholders were secured for the study. These were sourced from existing industry contacts known to the researcher or in the wider network of the Division of Food Sciences at the University of Nottingham and aimed to represent the range of perspectives on the subject: seven employers from a range of business types, three recent graduates from typical initial pathways and two representatives from the careers and recruitment sector (Table 1).

Table 1. List of stakeholders.

Employer, Services or Recent Graduate	Areas of industry	Stakeholder reference
Employer	Larger Chilled Own Label Manufacturer	LCO
Employer	Smaller Chilled Own Label Manufacturer	SCO
Employer	Branded Manufacturing Companies / R&D	BRM-1
Employer	Branded Manufacturing Companies / R&D	BRM-2
Employer	Retailer (Technical Area)	RET
Employer	Postgraduate Researcher Supervisor	PGR
Employer	Technical Services and R&D in Food Industry	TEC
Recent Graduate	Larger Chilled Own Label Manufacturer	RG-LCO
Recent Graduate	Retailer (Technical Area)	RG-RET
Recent Graduate	Postgraduate Research	RG-PGR
Services	University Careers & Employability Service	CES
Services	Recruitment Consultant	REC

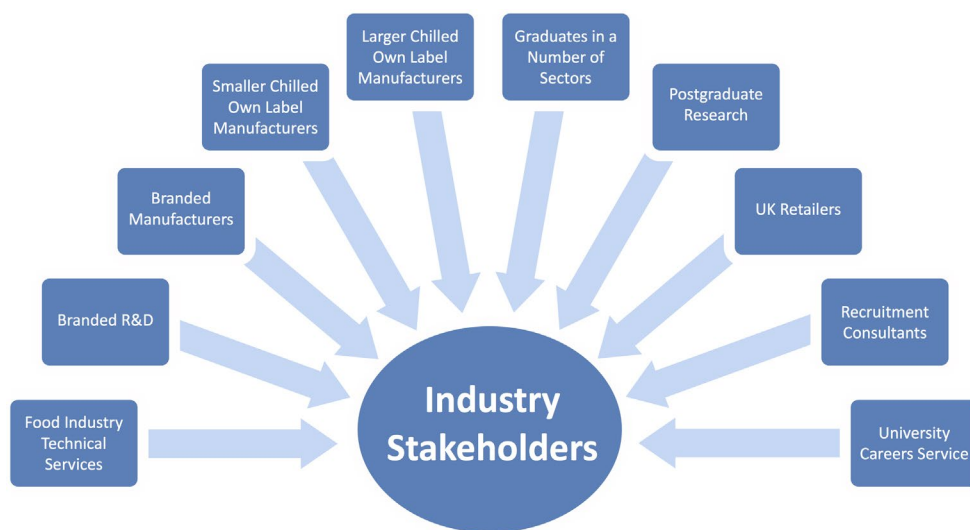


Figure 1. Illustration of the range of stakeholders selected for the study.

Preparation for interviews

An initial literature review of graduate skills was undertaken to assemble a guidance tool for the qualitative interviews. The literature review established a wide range of terms used to describe skills or desirable competencies for a graduate to possess. Information gathered included UK Government bodies and Higher Education material as well as books focused on graduate employability and job seeking. A tool recently developed in the School of Biosciences (The University of Nottingham, 2016b) was included; however, no specific material on skills in relation to the food industry was included, primarily due to the lack of available resources (2016b). Themes and terms were collected from a final selection of 13 literature sources and examples of where themes were sourced can be found in Table 2.

Data was collated in a spreadsheet and then themes of skills or competencies were gathered aiming to construct a list of standardised vocabulary or a 'lexicon' of terms (Lawless & Civile, 2013) for supporting interviews. This lexicon was designed to support and prompt the researcher during these sessions. Different sources used different phrases to highlight similar skills so these were grouped and a nominal term chosen for simplicity. Material was categorised into a nominal list of 16 types of graduate attributes as guidance for conducting the interviews. This categorisation was based on typical sections in reference texts used for the literature review (Confederation of British Industry, 2011; Gallup Organisation, 2010; Sumner, 2012; Trought, 2012).

- Self-Management
- Teamworking
- Positive Attitude
- Business and Commercial Awareness
- Problem-Solving
- Communication and Literacy
- Communication Skills

Table 2. List of resources used to create the lexicon used for interviews.

Resource & Reference	Examples of themes taken
<i>Ambition 2020: UK Commission for Employability and Skills</i> (2009a)	Planning and Organising; Problem-Solving
<i>Being the One with Their Foot in the Door: Price Waterhouse Cooper</i> (2010)	Commercial/Financial; Adaptive
<i>Biosciences Core Graduate Competencies: The University of Nottingham</i> (2016b)	Digital Literacy; Social and Society
<i>Brilliant Employability Skills: Trought</i> (2012)	Positive Attitude; Teamworking
<i>Education and Skills Survey 2011: Confederation of British Industry</i> (2011)	Oral Literacy; Improving Own Performance
<i>The Dearing Report – Higher Education in the Learning Society: The National Committee of Inquiry into Higher Education</i> (1997)	Application of Numeracy; Communication
<i>The Employability Challenge: UK Commission for Employment and Skills</i> (2009b)	IT Skills; Punctuality
<i>Employability Skills Explored: Martin, Villeneuve-Smith, Marshall, and McKenzie</i> (2008)	Self-management; Entrepreneurism
<i>Employers' Perception of Graduate Employability: Analytical report: Gallup Organisation</i> (2010)	Sector-Specific Skills; Clear Written Work
<i>Graduate Employability: What do employers think and want: Archer and Davison</i> (2008)	Decision-Making; Confidence
<i>How to Use Your Degree to Secure a Job : Kaplan's guide to core skills and employability: Sumner</i> (2012)	Cultural Sensitivity, Innovation
<i>Student Employability Profiles: A guide for employers: Kubler and Forbes</i> (2006)	Emotional Intelligence; Work Experience
<i>What Do Graduates Do?: Higher Education Careers Services Unit</i> (2014)	Leadership; Flexibility

- Application of Numeracy
- Application of Information Technology - Computer Literacy
- Entrepreneurialism
- Global Outlook
- Social Awareness
- Academic Skills
- Subject/Job-Specific Skills
- Past Workplace Experience
- Personal Development

This lexicon allowed the interviewer to prompt further discussions within each area, but was not explicitly shared with the participants or used in any particular order, as this may have influenced the data gathered. However, it formed a useful tool for the researcher to check progress during an interview.

Interviews

The aim of the interviews was to ascertain from participants the types of skills or attributes they most desire in food science graduates and how they would describe those terms. As the subject matter considered was fairly structured but the participants were to be given freedom to express their definition of a topic or situation (Frankfort-Nachmias & Nachmias, 2009), a semi-structured or focused interview seemed the most appropriate approach. The interview process and script were developed using the support of a combination of internal documents and externally sourced references (Brinkmann & Kvale, 2015; Davies, 2007) for key aspects such as the introduction, explanation statements and a range of suitable probing question phrases to use. A structured list of questions or an ordered list of terms were not used as this may have restricted the participants' outputs. The aim was to gather the subject's experience of the area under discussion and not to complete a defined task list (Brinkmann

& Kvale, 2015). The lexicon outlined earlier was used to support the script as required. The initial aim of the script was to ask the participant to verbally list the skills they valued in a graduate (to be recorded by hand by the researcher) and then to probe items in this list sequentially with simple feedback loops to allow the participant to talk freely about a specific term or group of terms, then for the interviewer to return to the next theme in participants' 'own list' when appropriate (Keats, 1999). A few weeks before starting the interviews, the script and the lexicon were tested in a full-scale pilot study with a colleague possessing a general understanding of the topic taking the role of participant, adhering to the planned timing of 1-h and with audio recording and transcription. Reflecting on this exercise, the material was refined as deemed appropriate such as adding variety to wording of questions. All final interviews were audio recorded and additional notes made by the interviewer, predominantly to capture and track the participants' initial list during the interview.

A series of 12 interviews were conducted over a period of six months with the stakeholders listed in Table 1. Initial confidence was established by inspection of the raw data during the first few interviews and the quality and richness of material for each theme or area of the lexicon was confirmed (Braun & Clarke, 2013; Brinkmann & Kvale, 2015). The participants were asked to talk about the attributes they believed essential for a graduate to possess to be successful in the type of roles they employed. The interviewer logged a list of these attributes. Then they were asked to define the attributes on the list they had generated. If this was initially difficult, the interviewer provided assistance but did not suggest a solution. Once the participants had discussed all the skills they had listed, additional skills from the lexicon were raised by the interviewer. As appropriate, a participant's choice of terms and definitions for these new items were captured. All audio files from the interviews were fully transcribed (Brinkmann & Kvale, 2015).

Thematic analysis

An inductive approach was taken to data evaluation. Thematic analysis was used to examine the transcripts (Braun & Clarke, 2013) supported by NVivo™ software. Material from the participants linked to the different attributes included in the interviews was pulled out and initial codes or 'nodes' were created in a list to collect the data. The code list was cross-checked by an independent party as a triangulation process (Bell & Opie, 2002) and any necessary amendments made. Thematic analysis continued using the nominal code list to assign material to and new codes were created if any new categories were generated from the raw data. It was permitted for the same material to be copied into a number of nodes at this stage to ensure comprehensive use of the data-set.

To support the aim of gaining the desired breadth and quality of material, the transcription and thematic analysis commenced as soon as the first few interviews were completed. Breadth of the material was assessed considering the quantity of material gathered for types of terms using the lexicon as a guideline for coverage. The quality of material gathered was assessed by inspecting the clarity and level of data retrieved for defining particular terms or skills included in the interviews. In some cases, responses could have been confused or vague; in others confident articulation was found. The interview stage was planned to be iterative in nature and allowed for any necessary changes of approach to be made. It allowed for focus to be made in future interviews on any specific attributes in the lexicon with as yet limited coverage (quantity) or quality of data. A list was also compiled from each of the

transcripts taking the terms initially raised by participants themselves as important for an excellent graduate to possess. These were then used for cross-checking purposes to ensure these terms were captured in resulting material where appropriate.

External data was imported into NVivo™ for the thematic analysis, and finally comprised of the following materials:

- 12 transcripts of the interviews (after careful checking for any missing words)
- 12 sets of notes made by the interviewer supporting the transcription
- Any material specifically shared or referred to by participants during the interviews

For initial analysis, raw data were fully read and inspected to make sense of the data and understand the broader messages in the material (Creswell, 2014). It was then sorted or ‘coded’ using NVivo™ to establish:

- The total material pertaining to a particular term or skill
- Where definitions to skills were universally agreed
- Where differences or gaps are evident or terms are used interchangeably
- Where terms are not used at all and thus not suggested to be included
- Suggested definitions

Material was initially coded into 64 individual elements (nodes) and 13 groups. The groups were predominantly built based on the material gathered from the interviews and how participants categorised areas, for example ‘working with others’ in the transcripts. The definitions provided were analysed in detail and proposed phrases to characterise each element drafted.

At this stage, for quality control purposes, one of the interview transcripts (LCO) was analysed by an independent party experienced in qualitative research using the coding system established for the study. The results were compared and reviewed against the researcher’s original output data to check if there was any variation in understanding of the treatment the material; no concerns were identified.

The individual elements and groupings (and the names of the groups) were then refined further at which point some terms were consolidated and a few highlighted as unclear. Key activities in the refining stage were:

- Individual skills were consolidated or grouped as considered appropriate for the study.
- Types or groups of skills were adjusted against the initial list until clarity was achieved and their names reviewed as appropriate.
- Assessment was made whether definitions provided of any individual names of skills or terms were closely associated to others.
- Judgements made if material gathered on the definition of a particular skill remained inconclusive.

At this stage, the material comprised of 47 items or ‘skills’ assigned to one of 11 groups.

Consolidation processes

This two-part process was included in the research design in order to return the processed and refined data gathered during the interviews to the stakeholders (interview participants) to check it continued to represent the material faithfully.

Table 3. 20 topics raised in consolidation online forum.

Group	Element	Focus raised in discussion
Behaviours	Positive Attitude	Definition
Behaviours	Open-Minded	Definition
Behaviours	Confidence	Definition
Behaviours	Self-motivated 'or' Energy	Choice of Name and Definition
Behaviours	Reliability 'or' Commitment	Choice of Name
Behaviours	Questioning Approach 'or' Enquiring Mind	Choice of Name
Behaviours	Adaptability	Definition
Problem Solving	Decision Making	Definition
Working Effectively	Personal Responsibility	Which group to be in
Working Effectively	Independence? Patience?	Should these be added to the list?
Communication	Verbal Communication	Definition
Communication	Written Communication	Definition
Working with Others	Leadership	Definition
Working with Others	Networking and Relationship Building	Definition
Numbers, Data and IT	Digital Literacy	Definition
Innovations and New Horizons	Entrepreneurship	Definition
Worldwide Perspective	Cultural Sensitivity	Required?
Technical and Workplace	Work Experience	Definition
Social, Political and Environmental	Values and Credibility (and fit?)	Definition and Scope
Appreciation		
The Business World	The Commercial Market and Supply Chain	Choice of Name

Consolidation Process A: A preliminary report on the key findings from the thematic analysis was issued to all stakeholders. The report divided the elements into a number of groups highlighting aspects where there remained lack of agreement or clarity in particular skills. Twenty points were highlighted that were considered in need of further development by the researcher and are listed in Table 3.

Consolidation Process B: An online focus group comparable to a modified Delphi technique (Johnston et al., 2014; Sobaih et al., 2012) was held over a period of five days using a simple forum created for purpose within the University of Nottingham e-learning platform (2016c).

The aim was to:

- Ratify the skills' names and definitions drafted in the report issued
- Discuss the 20 definitions that the researcher suggested required more debate (Table 3) or had been queried by a stakeholder before or during the forum.

The forum allowed the stakeholders to discuss and finalise terms and definitions issued in the preliminary report. Discussion topics were each posted over 24-h sessions to allow stakeholders to respond and discuss together with facilitation from the researcher. The discussions and feedback were monitored over each session and facilitated as required.

On days 1 to 4, five items were posted for each 24-h period. The topic material presented full details gathered and raised a specific question for discussion in the stakeholder group (nine of the participants). Only minimal facilitation was required by the researcher. At the end of each session, the material against each posting (discussion thread) was analysed by the researcher on discrete basis and if a clear action or agreement was generated in the material, a conclusion was posted at the end of the discussion thread and the topic 'closed'. An example of a typical discussion thread recorded for refining the defining of 'confidence' can be found in the Supplemental Section provided. If further work was needed or a new

action generated this was captured and the topic reintroduced on the final fifth day. A tracker was built to manage all material during this stage.

Three of the 20 topics were reposted with an additional question or point of clarification on the fifth day. The name for the framework was discussed as a separate topic. A final tracker of all comments and conclusions was completed at the end of the forum period to collate all results and include in the final output. The overall outcome was a movement in one of the elements to another group, the inclusion of a new element and the completion of a number of definitions.

Finalisation and terminology

The output was issued in report format and presented to a number of the stakeholders in a face-to-face discussion for final agreement. The session helped inform the process of completing the final framework document and associated terminology. Further discussions were also held regarding the future use of the report and subsequent strategy.

To help establish the most appropriate name for the output, an additional topic was posted during the final day of the online forum period asking for suggestions. Data were collected and reviewed alongside relevant literature on competency frameworks (Johnston et al., 2014; Miller, Rankin, & Neathey, 2001; Parry, 1998). This was discussed fully in the stakeholder session and the name finalised. The terms used for the groups and types of elements in the document also needed to be clarified and supported by relevant literature (Evers, Rush, & Berdrow, 1998; Lauby, 2013; London School of Economics & Political Science, 2013; Parry, 1998; Yorke, 2004). Options were evaluated over the course of the study and concluded in the final report for stakeholders to use in the meeting and to aid agreement of the terms.

It was considered important to establish a suitable title which resonated effectively with target readers such as students and employers. In summary it was agreed;

'Competencies for Food Graduate Careers' contains 11 'zones' with a total of 48 elements categorised as either behaviours, skills or knowledge. Terms used to support the framework have been clearly outlined in Table 4.

A suitable diagram for the framework was created and an example is seen below (Figure 2). The details of the elements within a zone are displayed as a 'feather' in the example in Figure 3 and the definitions of each element tabulated as the example in Table 5.

Table 4. Glossary of terms established for use in the competency framework developed during the study.

Term	Study definition
Competencies	A set of knowledge, skills and behaviours that are required to successfully perform in a given role
Behaviours	These are elements of how a person conducts themselves and operates in the workplace
Skills	These tend to be learned proficiencies and indicate the capability to be able to carry out an operation or task. They can be innate but in general can be improved on with development opportunities (such as experience, teaching or training)
Knowledge	A theoretical or practical understanding of a subject. It does not mean a person can actually perform a task but they should be able to describe it or write about it correctly
Abilities	Inherent qualities that can influence the speed or effectiveness in developing or gaining skills, knowledge and behaviours

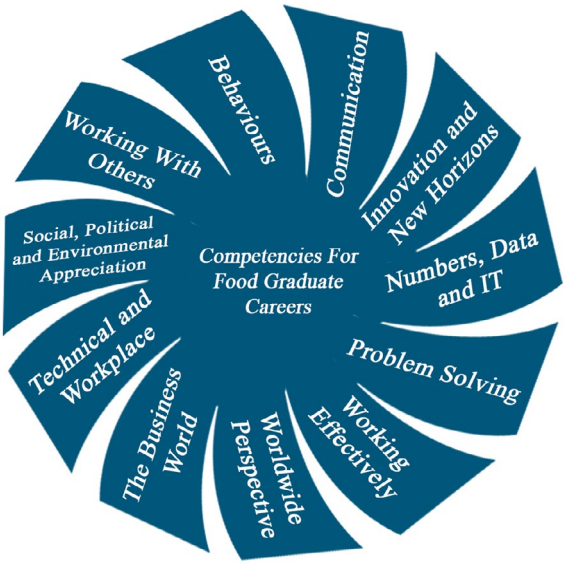


Figure 2. Diagram of the final framework noting the title and the 11 zones.



Figure 3. Feather from a Zone noting all the elements it contains.

Table 5. Definitions for elements in the 'Working Effectively' zone.

Independence	
<i>Definition</i>	Capacity for self-directed operation
Planning and Organising	
<i>Definition</i>	Remaining in control of activities under your responsibility and completing tasks to agreed deadlines
Resourcefulness	
<i>Definition</i>	Finding a way to achieve your goals and overcome problems
Self-Awareness	
<i>Definition</i>	Understanding what you can do well and how you may be perceived by others and then developing your contributions and behaviours positively
Self-Development	
<i>Definition</i>	Owning your own future development in your current role and beyond
Thoroughness and Attention to Detail	
<i>Definition</i>	Meticulous, careful and accurate
Working under Pressure	
<i>Definition</i>	Establishing your personal approach to balancing demands and challenges in working life

Discussion

The resulting output of the Competencies for Food Graduate Careers is believed to have the correct level of context to be of value for educators, employers, students and graduates in understanding the type of competencies that may be desirable in food sciences graduates. This work may help embed a consistent language for student development and graduate recruitment for all food industry stakeholders to embrace.

As a sample of the target population was used for the study, the subject of generalisability (Muijs, 2010) needs to be considered. With regard to the methodology used, the researcher understands that using 12 stakeholders as participants is unlikely to represent all the views from the UK food industry with regard to food science graduate skills. However, the conscious choice of participants from different business types, sizes and roles within the supply chain aimed to provide the most sensible approach and thus a stratified sample. A wider sample size could be used in such a study but would have to be evaluated for the value versus the additional time and resource required to conduct the interviews and analyse the data. The choice of a semi-structured approach to interviewing was used in order to gather data in an exploratory way but with the associated support of prompt material. The pre-designed lexicon as a prompt to encourage participants' ideas and to ensure overall capture of commonly published themes of 'graduate skills' was considered beneficial. A number of the terms in the lexicon were not carried into the final version of Competencies for Food Graduate Careers and completely new ones were gathered from the interview material, so the concern of possibly leading the participant by suggesting themes or terms appears to have been avoided.

Over the study, it was interesting to note that some elements that were captured were similarly defined by most stakeholders, whilst others required further review and examination to agree the names for elements and their associated definitions. Using proprietary software such as NVivo™ for the thematic analysis supported a thorough use of the interview transcript material and was relatively easy to use. It also served as a flexible repository of the

study data. The inclusion of two stages of quality control in the form of the triangulation or cross-check process (Bell & Opie, 2002) of the initial code book and then the independent coding of one of the transcripts aimed to ensure confidence in the thematic analysis process. By the inclusion of a group consolidation process to reflect on the data generated by thematic analysis, objective handling was provided to debate any aspects of dissimilarity and then reach consensus. The online group forum proved to be a simple yet effective method to discuss topics and the provision of a 24-h window to engage in each topic accommodated for participants' other commitments and time pressures. Data was collected and stored automatically from the discussion threads, providing accurate records.

Comparing Competencies for Food Graduate Careers to the literature reviewed in the initial stages of the study, there are similarities to be seen in a number of areas. Unsurprisingly, the inclusion of some of the commonly used skills (elements) to define competency in the workplace mirrors a number of sources (Higher Education Careers Services Unit, 2014; Miller et al., 2001; Sumner, 2012; Trought, 2012). However, there is variability within all sources and no single tool or framework reviewed matches another identically including the Competencies for Food Graduate Careers. This perhaps reflects the focus (such as a specific vocation), intended use of the material (such as a more generic guidance tool for all graduates) or the popularity of certain themes at the time of development. Looking at how some of the elements or terms are grouped, again there are similarities and variations between material, including Competencies for Food Graduate Careers and this includes the names given to these groups (Confederation of British Industry, 2011; Higher Education Careers Services Unit, 2014; Sumner, 2012).

However, this study was aimed to develop a tool or framework for use in the UK food industry and the Competencies for Food Graduate Careers is believed to be tailored for this. Firstly, the choice of elements that are included has been informed by the stakeholder interview process. In addition, the whole of the study has allowed for a definition to be developed for each element which is aimed to resonate effectively with all stakeholders of a graduate's early career in the food industry.

Conclusions

The study in establishing the language used to define desirable food sciences graduates entering the food industry has been aimed to deliver an objective and useful reference for educators, students, graduates and employers. The use of stakeholders throughout the process has proven to be a prudent choice in gaining the breadth of sample material required. The selection of a range of stakeholders was important to the success of the study. The thematic analysis of 1:1 interviews followed by an online forum for consolidation gave rise to a methodical and appropriate way for a group to evaluate refined data and ensure balanced results. In particular, the ability of an online forum process was valued and the production of discussion threads for each topic provided an effective data source. It may be feasible for others to follow a similar process to develop competency frameworks pertinent to their graduate's typical career pathways.

Degree providers can use this language book as a tool to cultivate undergraduates' skills in recognising key competencies desirable in a graduate entering the food industry. The perceived importance of these competencies by type of employer or nature of graduate role was not explored in this study. The next phase of the overall project is to determine by an

industry survey what the most desirable elements may be for typical graduate entry roles. The Competencies for Food Graduate Careers serves to provide a language tool for use in this survey and thus increase confidence in the quality and consistency of material gathered. From a higher education perspective at Nottingham, the Competencies for Food Graduate Careers will be utilised to provide an informed review of degree course curriculum. This will further develop the competency-based approach to teaching for the degree courses. As the final aim is for the output to signpost key competencies for particular graduate roles entering the food industry, students can then also determine for themselves what ideal skills, knowledge and behaviours they possess and then focus on how to articulate them.

It is also hoped to be of value for employers in the development of job specifications and role profiles with appropriate and consistent terms and definitions for attracting new graduates to their companies. Feedback from stakeholders has been such that the demand for such a competency framework for the food industry has been corroborated throughout the process. There is also an opportunity to improve the consistency of terminology used in the food industry and thus clarity for all stakeholders in articulating what is desirable in a food sciences graduate. The prospect of using consistent terminology for articulating desirable competencies and then developing curricula to support associated development of undergraduates could serve to increase the employability of graduates entering the food industry.

Disclosure statement

No financial interest of benefit has arisen from the direct applications of this work.

ORCID

Emma Weston  <http://orcid.org/0000-0002-2161-4103>

Jim Crilly  <http://orcid.org/0000-0002-8035-4620>

Liz Mossop  <http://orcid.org/0000-0003-1317-1856>

Tim Foster  <http://orcid.org/0000-0002-9757-9615>

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