



University of HUDDERSFIELD

University of Huddersfield Repository

Hean, Sarah, Craddock, Deborah and O'Halloran, Cath

Learning theories and interprofessional education: a user's guide

Original Citation

Hean, Sarah, Craddock, Deborah and O'Halloran, Cath (2009) Learning theories and interprofessional education: a user's guide. *Learning in Health and Social Care*, 8 (4). pp. 250-262. ISSN 1473-6853

This version is available at <http://eprints.hud.ac.uk/id/eprint/7230/>

The University Repository is a digital collection of the research output of the University, available on Open Access. Copyright and Moral Rights for the items on this site are retained by the individual author and/or other copyright owners. Users may access full items free of charge; copies of full text items generally can be reproduced, displayed or performed and given to third parties in any format or medium for personal research or study, educational or not-for-profit purposes without prior permission or charge, provided:

- The authors, title and full bibliographic details is credited in any copy;
- A hyperlink and/or URL is included for the original metadata page; and
- The content is not changed in any way.

For more information, including our policy and submission procedure, please contact the Repository Team at: E.mailbox@hud.ac.uk.

<http://eprints.hud.ac.uk/>

Learning theories and interprofessional education: a user's guide

Sarah Hean PhD,^{1*} Deborah Craddock MA BSc (Hons) DPodM² & Cath O'Halloran PhD³

¹ Senior Lecturer (Research Methods), School of Health & Social Care (HSC), Bournemouth University, RI 14, Royal London House, Christchurch Road, Bournemouth, Dorset BH1 3LT, UK

² MSc Programme Leader, School of Health Sciences, University of Southampton

³ Head of Department of Clinical and Health Sciences, School of Human and Health Sciences, University of Huddersfield

2

Keywords

curriculum development, evaluation, interprofessional education, learning theory

Abstract

There is increasing interest in the theoretical underpinning of interprofessional education (IPE) and writers in this field are drawing on a wide range of disciplines for theories that have utility in IPE. While this has undoubtedly enriched the research literature, for the educational practitioner, whose aim is to develop and deliver an IPE curriculum that has sound theoretical underpinnings, this plethora of theories has become a confusing, and un-navigable quagmire. This article aims to provide a compass for those educational practitioners by presenting a framework that summarizes key learning theories used in IPE and the relationship between them. The study reviews key contemporary learning theories from the wider field of education used in IPE and the explicit applications of these theories in the IPE literature to either curriculum design or programme evaluation. Through presenting a broad overview and summary framework, the study clarifies the way in which learning theories can aid IPE curriculum development and evaluation. It also highlights areas where future theoretical development in the IPE field is required.

Introduction

Historically, curriculum design and evaluation of initiatives in interprofessional education (IPE) have been accused of being theory less (Freeth *et al.* 2002; Barr *et al.* 2005; Clarke 2006). However, the scene has changed over the past 5 years with an increasing number of published works in the field that do consider theoretical underpinnings. Within these articles, writers turn to more established disciplines, mainly sociology, psychology and education, for theories with utility for IPE, e.g. contact theory,

social identity theory, activity theory and adult educational theories (Colyer, Helme & Jones 2006). This however has resulted in an abundance of theories of potential use in IPE research, each author using a favoured approach to articulate his/her own understanding. For the educational practitioner, whose aim is to develop and deliver an IPE curriculum that has sound theoretical underpinnings, this plethora of theories has become a confusing, and un-navigable quagmire. This article aims to provide a compass for those educational practitioners by presenting a framework that summarizes key learning theories

*Corresponding author.
Tel: +44 0 1202 9 62201;
fax: +44 0 1202 9 62194;
e-mail: shean@bournemouth.ac.uk

utilized in IPE and the relationship between them. The framework also represents a step towards moving IPE theory from a list of theories and their individual application towards a heuristic, critical comparison and prioritization of key theoretical tools (O'Toole 2004).

A learning theory focus

To achieve such a comparison, it is tempting to try to review all theories applied to IPE; however, such an exercise is overambitious and unwieldy, so this study focuses specifically on learning theories by which we mean those theories that describe how IPE interventions are run or organized (e.g. complexity theory – Cooper 2004). Sociological theories dealing with issues of professionalism and socialization or psycho-sociological theories dealing with issues of group identity or group dynamics (e.g. social identity theory, the contact hypothesis (Hean & Dickinson 2005; Carpenter *et al.* 2006) have been put aside. Discussion here is confined to theories that seek to explore learning as defined as:

a relatively permanent change in behaviour with behaviour incorporating both observable activities along with internal processes such as thinking, attitudes and emotions. (Burns 1995)

Hence, the specific objectives of the study are to:

- 1 present an overview of learning theories applied in IPE and their relationships with one another.
- 2 note the relative contribution of these theories to the development of the field, identifying areas for future theoretical development in IPE.

In so doing, we briefly review:

- 1 key contemporary learning theories from the wider field of education and used in IPE.
- 2 explicit applications of these in IPE literature in either curriculum design or programme evaluation. Readers are directed to Craddock *et al.* (2006) for a more comprehensive review.

Method

To achieve the above aims, the authors reviewed key educational texts to identify key learning theories in the wider educational field.

Search strategy in IPE

Relevant literature was collected through a systematic search of relevant databases: In order to capture literature pertaining to IPE and related terms (e.g. inter-professional; multi professional education), the first part of a published literature search strategy described in a critical review of the IPE literature described by Freeth *et al.* (2002) was undertaken. Hereby, literature was identified in which the concept of 'interprofessional' and related terms was identified. To identify IPE literature in which explicit reference to learning theories was made, the latter search was run in conjunction with searches for key words covering:

- 1 broader terms related to learning theory in general and broader families of learning theories (e.g. Learning theor*; behaviour*; constructiv*).
- 2 specific theories that fall within these families (e.g. interprofessional competen*, activity theory; adult learning theory; communities of practice).

The bibliographic databases searched were:

- 1 Medline 1966–2008;
- 2 Cumulative Index to Nursing and Allied Health Literature (CINAHL) 1982 to June 2001;
- 3 British Education Index (BEI), 1964 to June 2001.

Key journals in IPE (*Journal of Interprofessional Care*, *Learning in Health and Social Care*) were searched by hand for any explicit use of a learning theory in discussion.

Review strategy

Abstracts were reviewed and selected on the following criteria:

- the article related particularly to IPE, using the definition:

Members (or students) of two or more professions associated with health or social care, to be engaged in learning with, from and about each other. (Freeth *et al.* 2002)

- The article's content made explicit use of a key learning theory to articulate formalized learning that might take place in an interprofessional context.

This meant that articles where the learning of the patient was central to the article were discarded. This narrowed the focus down to those studies in which

the learning of a group of two or more health and social care professionals was central.

- Articles involved learning in higher education institution (HEI) and practice contexts and at an individual and organizational level were included.

For each study, the reviewer extracted and synthesized information from each article based on the following outcomes:

- 1 the learning theory that was applied;
- 2 the family of learning theory under which the individual learning theory could be subsumed (i.e. if the theory had behaviourist or constructivist origins);
- 3 whether the application of the theory had been made to underpin an IPE curriculum design or evaluation;
- 4 whether the unit of analysis was at the micro or macro level of learning. The micro level refers to learning at the level of the individual student; macro level learning has a wider remit and encompasses learning that may occur within communities, systems or organizations as a whole.

The dearth in application of learning theory in some areas (e.g. use of activity theory) made assessment of the quality of articles reviewed a difficult exercise. Because of this, the only criterion for the assessment of article quality was that the theory, and its application, was discussed in some detail in the article. Articles that only mentioned theory tangentially and without further discussion were excluded. In future, as and when theory becomes more widely applied in the IPE literature, strategies to assess and distinguish between articles based upon the quality with which theory has been applied, and the context in which it has been applied, would be recommended. Establishing the criteria for such an assessment will not prove an easy task, however, not least because of the familiarity required by the assessor of each individual theory under scrutiny.

The framework that resulted from the above synthesis which summarizes key learning theories that have found application in IPE can be viewed in Fig. 1. To test the validity of the framework, it was presented to an audience of IPE educators, practitioners and researchers attending an Economics and Research Council-funded Seminar Series (Hean *et al.* 2008) in January 2008. The objective of this series was to develop IPE theory for the future. Participants were asked to discuss and feedback on the framework through group work as well as in evaluation sheets completed at the end of the seminar. Members of the convening group completed written reflections on the progress of the seminar. These data were synthesized to provide some preliminary pointers as to how this framework might move learning theories forward in their application to IPE in future. Some of the conclusions that pertain to learning theories in particular will be reported here.

Learning theories and their utility in IPE

When attempting to use learning theories to underpin the design or evaluation of an IPE initiative it is useful to recognize two wide families of learning theory, namely behaviourist and constructivist approaches (Bigge & Shermis 1999; Armitage *et al.* 2003) (Fig. 1A,B) and to first consider the initiative in relation to them.

Behaviourism

Behaviourists believe that:

- 1 Learning occurs through experiencing the consequences of one's own behaviour.
- 2 Trial and error may be part of such learning.
- 3 All behaviour is learned and all learning involves an observable change in behaviour.

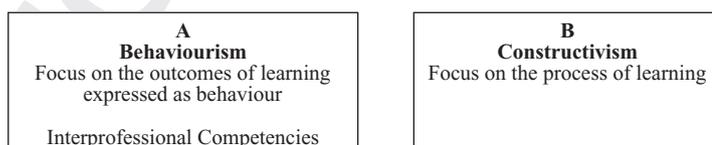


Fig. 1 Two key families of learning theory with application to interprofessional learning.

4 Extreme behaviourists take a positivist approach through the belief that only what can be measured can be regarded as learning.

5 Students' own activity in obtaining these outcomes is often central to learning (Bigge & Shermis 1999; Armitage *et al.* 2003).

Behaviourists are less interested in thought processes and how learning has occurred, but focus on learning outcomes (Bigge & Shermis 1999; Armitage *et al.* 2003).

A key question for the IPE practitioner is to consider the part behaviourist approaches have taken in the understanding the nature of interprofessional learning, IPE curriculum development and evaluation. Taking the above description of behaviourism, this approach is one in which an IPE curriculum developer creates an outcome-based curricula. This is in line with current trends in most curriculum development in Higher Education in the UK where establishing key learning outcomes is central (Biggs & Tang 2007). Curriculum developers should question whether their designs of IPE curricula should follow this same trend, i.e. borrow from the same

behaviourist tradition as that of the uniprofessional curriculum. The key question remains: is this a natural and appropriate progression or one that is taken pragmatically when IPE curriculum development is often conducted in circumstances in which time and human resources are limited?

Although the search of the literature showed no reference to behaviourist models of learning explicitly, some evidence was found of reference to the *learning outcomes* of IPE although these were rephrased as *interprofessional competencies*. Using the latter as a keyword in the search strategy, identified only three key references (Barr 1998; Arredondo *et al.* 2004; Norris *et al.* 2005) that specifically mentioned interprofessional competencies. Some of these competencies identified in these articles are summarized in Table 1.

A search of the published literature however showed no explicit reference to the use of these IPE competencies in curriculum design. Although it is hard to believe that at least some of these learning outcomes are not included in the learning objectives of current IPE curriculum, it is likely that the

Table 1 Interprofessional competencies identified by interprofessional education (IPE) authors taking a behaviourist approach to learning

<i>Author</i>	<i>Interprofessional competency</i>
Norris <i>et al.</i> (2005)	After completion of an IPE unit(s) students should have the ability to: Work in challenging situations Managing change Resolve conflict Negotiate
Arredondo <i>et al.</i> (2004)	After completion of an IPE unit(s) students should have: Foundational knowledge, e.g. theories of interprofessional collaboration, theories of organizational behaviour An awareness of their own beliefs and values The ability to distinguish between what they know and do not know in different contexts in terms of their abilities to collaborate The ability to appreciate and act on different, conflicting world views
Barr (1998)	After completion of an IPE unit(s) students should have the ability to: Work with other professions to assess, plan and provide care Describe their roles and responsibilities to other professions Recognize and respect the roles, responsibilities and competence of other professions Cope with uncertainty and ambiguity Facilitate interprofessional case conferences and meetings Handle conflict with other professions

1 theoretical underpinnings of these designs are not
2 being articulated and/or published more widely
3 other than in the HEI's own course approval docu-
4 mentation.

5 Behaviourist approaches were apparent in publi-
6 cations linked to IPE evaluations, particularly those
7 that focused on measurement of learning outcomes
8 alone and in which any process measures were
9 excluded. One clear example is the adaptation of the
10 Kirkpatrick model of evaluation by Freeth *et al.*
11 (2002). This framework has been utilized in IPE
12 evaluations by authors such as McNair *et al.* (2001)
13 and Carpenter, Barnes & Dickinson (2003). In this
14 model, levels of educational learning outcomes are
15 proposed, the measurement of which should be
16 included in an effective evaluation of an educational
17 programme. These levels include the reaction of the
18 student to the learning experience, the modification
19 of students' attitudes/perceptions, the acquisition
20 of knowledge/skills, student behavioural change,
21 changes in organizational practice and benefits to
22 clients.

23 The measurement of changes in student behaviour
24 in interprofessional working would be an example of
25 a behaviourist approach to evaluation. However,
26 there is little evidence of IPE evaluations explicitly
27 measuring student behavioural change, a fact previ-
28 ously noted in the IPE literature (Barr *et al.* 2005).
29 Some few exceptions include the work of McNair
30 *et al.* (2001) where students are asked to make self-
31 reports of their own developing interprofessional
32 competencies and interprofessional confidence and
33 involvement. These authors suggest facilitator obser-
34 vation of student working be included in future mea-
35 surement of behavioural change. Similarly, Pollard
36 *et al.* (2006) collected students' self-reports of their
37 own communication skills. Generally however, there
38 is a dearth of behavioural measures beyond the level
39 of self-report. This is largely because measurements
40 of behavioural change in IPE programmes (e.g.
41 teamwork behaviours) are hard to identify and mea-
42 sure effectively. If a broader definition of competen-
43 cies is taken that includes student attitudes and
44 knowledge, then several other instances in which
45 competences have been incorporated into evalua-
46 tions were found. For example, changes in students'
47 attitudes or stereotypes were measured as an IPE

learning outcome in several IPE evaluations (Hind
et al. 2003; Mandy, Milton & Mandy 2004; Hean
et al. 2006).

A behaviourist approach to understanding IPE
learning, designing IPE curriculum and evaluating
its outcomes is likely to appeal to those more com-
fortable with a positivist approach to research and
curriculum development in which clear outcomes
are expected, assessed and evaluated. Such a clear-
cut, structured approach has its appeal. However, if
chosen to underpin an IPE evaluation or curriculum
design, it must be acknowledged that, in focusing
exclusively on the outcomes or products of IPE, the
developer ignores the processes that have under-
pinned this learning. Furthermore, if a behaviourist
curriculum approach emphasizes learning by doing,
learning by trial and error, and the consequences of
one's own behaviour, then there is the danger that
students become involved in practicalities of experi-
ence, and fail to reflect on their actions during this
process. Students may also become overly focused
on the assessment and achieving the stated behavio-
urial objectives (Bigge & Shermis 1999; Armitage
et al. 2003). These problems however are not limited
to interprofessional learning.

Constructivism

In contrast to behaviourist theory constructivism
takes account of the process of learning. The con-
structivist family encompasses both cognitive con-
structivist and socio-constructivist approaches to
learning (Fig. 2).

Cognitive constructivism

Cognitive constructivism is concerned with the pro-
cesses experienced by learners. The creation of cog-
nitive structures and higher order skills such as
problem solving and the development of insights are
key (Dewey 1966; Piaget 1973; Burns 1995; Atherton
2005) as too are student activity in learning and self-
direction in his/her own development. A typical
cognitive constructivist approach applied to the IPE
field would be to use the stage or developmental the-
ories created by Piaget to explore learning and the
acquisition of knowledge in children. Piaget (1973)

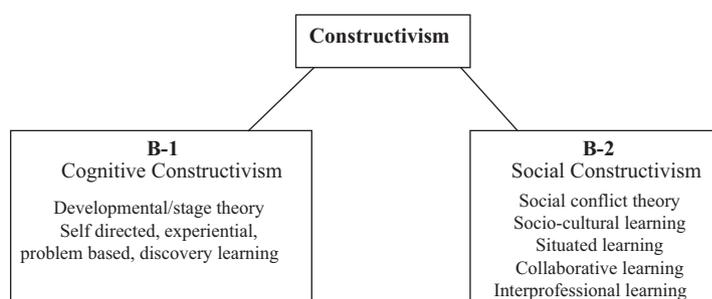


Fig. 2 Branches of constructivism that have been utilized with interprofessional education.

proposed that children's cognitive development progressed with age (maturation) beginning with basic sensory-motor functioning and progressing to formal operational stages of development (Bigge & Shermis 1999; Jarvis, Holford & Griffin 2003); however, his basic premise of developmental learning has now been widely adapted from its original form to not only account for the development of knowledge and skills in the individual but also for the development or learning of more affective traits (Jarvis *et al.* 2003). Dahlgren (2006) and Clarke (2006) appear to be the only authors who have considered these theories in their application to IPE. Dahlgren (2006) considered the possible stages of interprofessional development and the processes of decentering in students, whilst Clark (2006) has explored the application of Perry's (1970) four stages of student development in terms of students' development of interprofessional knowledge and values. A commitment to relativism represents the ultimate goal on an interprofessional scale of development and when reached, students are comfortable and prepared to take a stand on their own particular professional perspective but show an awareness that their perspective is governed by a system of values and beliefs and recognize that others may have committed to a different, but equally valid, perspective based on their own value and belief systems (Clark 2006). Despite these discussions of stage theory by Dahlgren and Clark, no explicit reference was found to these concepts in published literature in either IPE curriculum design or indeed the evaluation of IPE initiatives. Greater application of the ideas of 'stages of IPE development' beyond the theoretical and into the underpinnings of curriculum development and evaluation would progress the field.

Based in the tradition of stage development, Piaget (1973) also proposed two processes involved in knowledge acquisition, namely *assimilation* and *accommodation*. The former is the process whereby a student will take in and filter information from their environment. This information interacts or comes into conflict with existing knowledge held by the individual. This interaction between existing and new knowledge is important in learning and has led to the recognition that teaching must take account of students' existing knowledge (Bigge & Shermis 1999). These processes appear largely to be excluded from writing within the IPE literature, Hughes, Ventura & Dando (2004) being one exception. These authors described a third-year undergraduate online IPE module. In the IPE curriculum described here, students are given the opportunity to revisit and rework initial submissions of group work in an iterative process. Hereby successive layers of knowledge are added to existing knowledge through each cycle of the process in keeping with a constructivist approach to learning. The search strategy was also less successful in uncovering the application of a cognitive constructivist approach to the *evaluation* of IPE. The use of a Realistic method of evaluation (Pawson & Tilley 1997) in which mechanisms and processes are addressed in the evaluations of some IPE modules (Clarke, Laphorn & Miers 2005) was one of the few examples of such an approach.

Although the above cognitive constructivist theories are not commonly utilized in the IPE literature, the search strategy showed adult learning theories, in contrast, to be widely utilized in the field (Fig. 2B-1) (Craddock *et al.* 2006). Adult learning theory in this context appears as a collection of pedagogical approaches and is described variously as

e.g. self-directed (Kaufman 2003), experiential (Puliyel, Piliyel & Puliyel 1999; Moon 2004), problem-based learning (Newble 2002; Wood 2003) and discovery-based learning (Spencer & Jordan 1999). Some of these theories have a particular emphasis on the process of reflection in learning, e.g. transformative learning (Mezirow 1997, 2004), the reflective practitioner (Schon 2004), experiential learning (Kolb 1983; Moon 2004; Fig. 2B-1). In order to make meaning of the wide number of adult learning theory applied to IPE, it is important to recognize that many adult learning theories – experiential learning (Kolb 1983), inquiry-based learning (Cleverly 2003) – are constructivist in their origins. This is reflected in some of the key assumptions of adult learning theory that holds that adults:

- 1 are independent and self directing;
- 2 have accumulated vast experiences, which are rich resources for learning;
- 3 value learning that integrates with the demands of their daily lives;
- 4 are more interested in immediate problem-centred approaches than in subject-centred ones;
- 5 are more motivated to learn by internal as opposed to external drivers (Knowles *et al.* 1984; Knowles 1990; Kaufman 2003).

However, a failure in the IPE literature to recognize the constructivist origins of adult learning theory, means these ‘theories’ are often used simply to describe *how* the IPE curriculum was delivered (e.g. as a form of group work) and fail to recognize or articulate the constructivist theories that underpin *why* the curriculum is being delivered in this way. This study takes the stance (as illustrated in Fig. 1) that adult learning applied to IPE should not be seen as a theory on its own but is instead a context in which constructivist learning theories are applied.

Social constructivism

Learning is not a purely individually constructed process and social constructivists view individual learning as being mediated by the environment. Curriculum developers and evaluators in IPE who discuss collaborative, interprofessional and situated learning take this perspective (Fig. 2B-2).

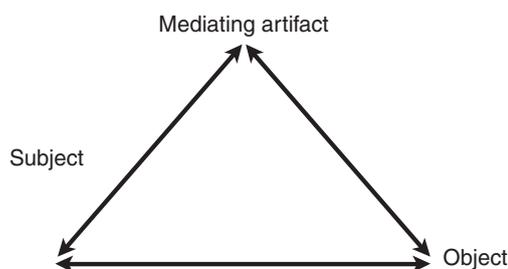


Fig. 3 Triangle depicting a subject's (or learner's) mastery or learning about an object as through an external and mediating artefact such as a peer or tool such as language (Engeström 2001).

Social constructivism, in contrast to cognitive constructivism, emphasizes how social encounters influence learners' meanings and understanding (Atherton 2005). The learner is more actively involved in constructing new meaning in a collaborative enterprise, particularly with the facilitator (Atherton 2005). This approach is best characterized by the theory of socio-cultural learning theory developed mainly through the work of Vygotsky (1978). Here student learning is perceived to be mediated through socio-cultural tools such as language (see Fig. 3). In the discussion of this mediated learning, Vygotsky talks of a zone of proximal development (ZPD). This is the level of development that students can achieve via facilitated problem solving or in collaboration with more able peers. In other words, the ZPD is the difference between what a student can learn alone and what they can learn with the assistance of an external other. This external other may be their IPE facilitator or fellow student, albeit of another profession.

Vygotsky's belief was that individuals have varying potentials for ZPD in specific contexts which can be developed via teaching (Jarvis *et al.* 2003). To undertake tasks within the ZPD, and allow learners to transcend this zone, scaffolding systems can be employed. Scaffolds may take the form of more knowledgeable people or cultural resources external to the student and which support their learning. This enables them to build on their own existing knowledge and internalize new information. Scaffolds, by their nature, are temporary support structures and will be slowly removed as

1 students master the concepts in question and
 2 become independent learners (Vygotsky 1978; Jarvis
 3 *et al.* 2003).

4 If one remembers the 'with, from and about' defini-
 5 tion of IPE (Freeth *et al.* 2002), socio-cultural
 6 learning is key to an understanding of interprofes-
 7 sional learning. For those in the field who wish to
 8 pinpoint how interprofessional learning is in fact
 9 different from learning that could occur uniprofes-
 10 sionally, an emphasis on the socio-cultural approach,
 11 in preference to more cognitive constructivist
 12 approaches, will have an appeal.

13 As with cognitive constructivist and behaviourist
 14 approaches, the search strategy sought out articles
 15 in the IPE literature in which a reference to socio-
 16 cultural learning, scaffolding, Vygotsky and/or the
 17 ZPD had been made. It found that explicit use of
 18 the theory was limited but with some notable
 19 exceptions: Although not situated within the con-
 20 fines of IPE delivery in a HEI, Zorga (2002) pub-
 21 lished a developmental-educational model of
 22 professional supervision in practice. In this model,
 23 the supervisor mediates the learner's reflection on a
 24 relevant work issue from which they wish to
 25 learn/develop. The process of supervision is seen as
 26 a mediating artefact that can accelerate learning
 27 across the ZPD, a form of scaffolding for the
 28 learner under supervision. Interdependence was
 29 actively discouraged and the supervision sessions
 30 are finite in order that scaffolding can be removed
 31 once the subject has developed sufficiently. Hughes
 32 *et al.* (2004) also referred briefly to the concept
 33 of the ZPD in a description of the interactions
 34 between peers and a peer review activity within a
 35 virtual IPE programme, using these interactions as
 36 a means by which Vygotsky's ZPD can be tran-
 37 scended.

38 However, D'eon (2005) provided, by far, the most
 39 comprehensive utilization of socio-cultural learning
 40 and specifically the concept of scaffolding. This arti-
 41 cle provided clear and practical guidance on how
 42 the concepts of scaffolding could be applied to IPE
 43 via a range of student tasks of ever increasing com-
 44 plexity. These become progressively more complex
 45 in two ways:

46 **1** From working on paper-based scenarios to those
 47 set in real life practice settings.

48 **2** From simple interaction between two profession-
 49 als, to a case in which a range of professionals are
 50 involved.

They maintain that when the scaffolding of these
 guided tasks is removed (i.e. the tasks are com-
 pleted), students should be able to apply or transfer
 their interprofessional learning independently 'to
 novel cases and situations'.

There was no evidence in the search of concepts
 of scaffolding and ZPD being used as a means of
 evaluation. Future work in IPE development would
 therefore benefit from an increase in the applica-
 tion of ideas of ZPD and scaffolding and explora-
 tion of this can be applied to peer-led or tutor-led
 discussions.

Macro level thinking

Constructivist and behaviourist approaches may be
 criticized as focusing overly on learning within an
 individual, or a micro level analysis. Some IPE edu-
 cationalists, especially those developing curricula in
 practice, may find a macro level understanding of
 IPE better suited to framing their understanding
 and curricula. They may wish to see learning as a
 collective exercise that takes place within or by a
 practice organization (Fig. 4B3). At this level, social
 constructivism grows into theories such as activity
 theory, communities of practice and expansive
 learning.

At the simplest level, the social environment in
 which the IPE student learns can be described in
 terms of communities of practice. These are
 groups of individuals engaged in a joint, mutually
 recognized activity that binds them together where
 common cultural resources are shared (Wenger
 1998). A search of the IPE literature for the key
 word of communities of practice led to the con-
 clusion that although communities of practice is
 becoming a popular concept to describe *working*
 in practice in health and social care, it is less fre-
 quently used to explore how learning takes place
 (and it is student learning that we focus on
 in this study) or how learning occurs inter-
 professionally. The concept has greater utility if
 subsumed in the greater complexity described by
 activity systems.

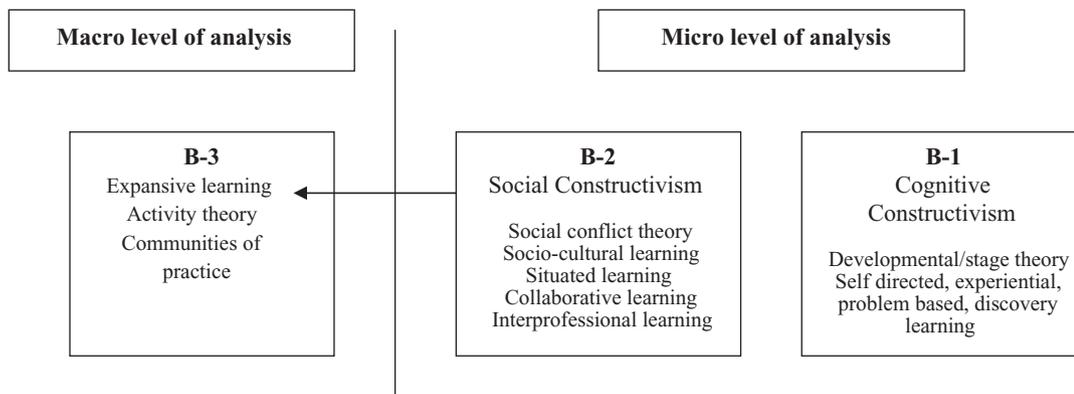


Fig. 4 Learning theories used in interprofessional education at a macro and micro level of analysis.

To consider learning at the macro level, the concepts of socio-cultural learning have been expanded to explain learning beyond that which occurs at the level of the individual and whereby learning is viewed as being mediated by a single cultural artefact. This evolution is seen in Fig. 3 (Engeström 2001) where Vygotsky's triangle of individual activity develops into a macro level description of collective human activity and the learning that takes place within these. Community is a key factor within the activity system. In the arena of interprofessional working, Engeström (2001) uses the concept of activity systems to frame the learning that takes place when parents and practitioners from different professions and organizations work collaboratively to plan and monitor the care of sick children admitted to their care. In this system, knowledge is often generated in these interactions in parallel and simultaneously to people and organizations learning within the system. Knowledge is therefore not stable or even understood ahead of time. Engeström describes learning of this knowledge, in this context, as expansive learning. Expansive learning takes place within these collective activity frameworks, most often when contradictions in the system occur and are resolved (Engeström 2001).

A search of the literature for the use of activity theory in curriculum development was not successful. However, this was not unexpected as current HEI curriculum development, especially if based outside practice, focuses on the micro, individual level learning with predictable and definable outcomes. The systems activity theory, in

which expansive learning takes place, is less predictable and hence does not lend itself to use in curriculum development as readily. It was therefore not unexpected that activity theory has not been used to underpin any known IPE curriculum models.

The search for use of activity theory in the evaluation of IPE was more successful: Two examples of the use of activity theory to underpin evaluations of interprofessional learning (rather than IPE) were identified. Robinson & Cottrell (2005) in an evaluation of decision-making and knowledge sharing in multi-agency teams, explored the ways in which professional knowledge was generated in these teams, how learning took place, as well as the ways of working created as a result of being part of this activity system. Similarly, Payler, Meyer & Humphris (2007) applied the second generation of activity theory to inform the development of a conceptual framework to guide an evaluation of the impact of pedagogy employed in continuing professional development for professionals in education, health and social care.

Despite the lack of macro level theories in the literature, there is an increasing interest in their application. In the seminar used to validate this framework, it was clear from evaluations (Hean *et al.* 2008) that the theories in which the social context of learning and working were included were seen as key. In fact, theories such as activity theory and socio-cultural learning took precedence over the other learning theories presented in the framework. It is the social component of these theories that

differentiates interprofessional from uniprofessional learning. This echoes Bleakley (2006) who also criticizes the abundance of adult learning theory, stating that

androgogy provides limited understanding of how learning occurs in complex, dynamic systems such as teams, where socio-cultural learning provide a more powerful alternative. Bias towards individualistic learning theory may be ideological rather than evidence based. (p. 151)

However, as with all theory, activity theory is not without it critics. Jarvis *et al.* (2003) for example, points out that although Engeström's (1990) theory emphasizes social reality within which learning and expansion occurs, there is a risk that insufficient emphasis is placed on the psychological processes and the individual. Furthermore, Tennant (1997) is concerned that communities of practice are romanticized and that

in their eagerness to debunk testing, formal education and formal accreditation, they do not analyse how...(this)...affects power relations, access, public knowledge and public accountability. (Tennant 1997, p. 79)

The push to move IPE into practice and the increased interest in activity theory and communities of practice need to bear this in mind.

Potential use of the framework

The overview of learning theories used in IPE and presented as Fig. 5 attempts to explain the relationship between the range of available theories and how ideas have evolved one from another. An understanding of these relationships can help researchers and practitioners form a mind map of the learning theories and their uses and compile a theoretical toolbox for use in IPE curriculum design and evaluation. For example, the relationship between micro level thinking of socio cultural learning and its application leads into the more complex macro level thinking of activity theory and expansive learning in which ideas of community practice may be linked is one example of how the range of theories can provide clarity where a single theory cannot.

An understanding of the evolution and connect-edness of theories also helps us position ourselves as both educational practitioners and researchers. For example, evaluators who may have focused on IPE evaluation on measurement of stereotype change through quantitative surveys (Carpenter *et al.* 2003; Hean *et al.* 2006) would recognize from Fig. 5 that their theoretical underpinnings are from more positivist, behaviourist traditions in which comfort is

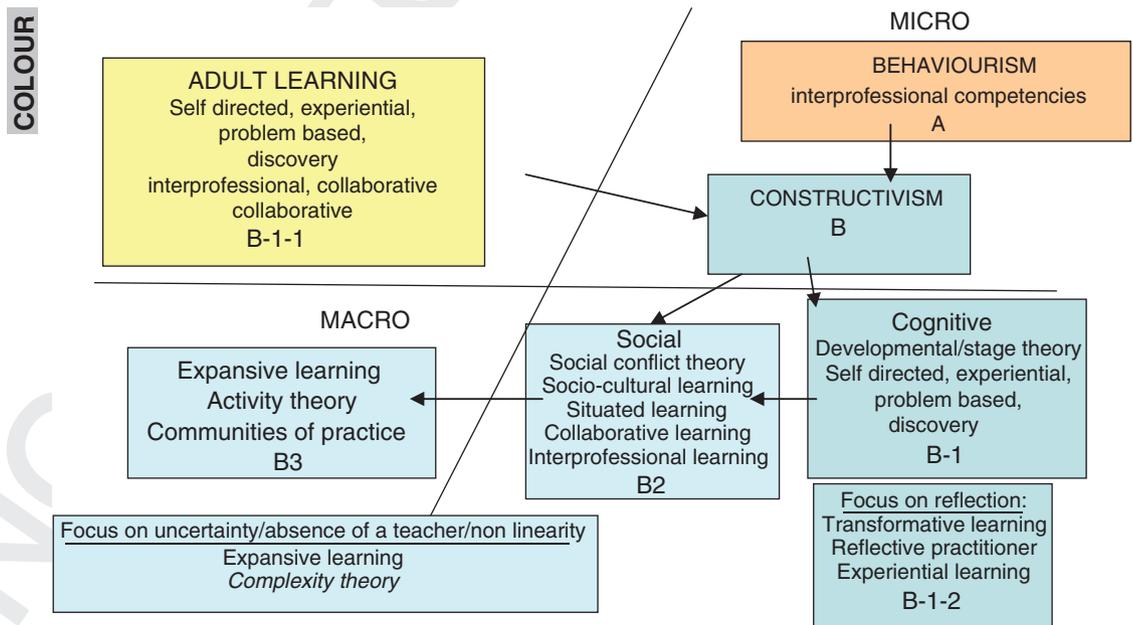


Fig. 5 Overview of key learning theories in the interprofessional education literature and the relationships between one another.

1 taken in assessment of measurable outcomes in an
2 evaluation. The approach is also in line with a socio-
3 psychological research approach in which the indi-
4 vidual is the common unit of analysis. In contrast,
5 those who have applied activity theory to underpin
6 evaluations (Payler *et al.* 2007) would recognize
7 more constructivist and sociological slants to their
8 evaluations. Both are equally valid and potentially
9 complementary.

10 The overview (Fig. 5) also shows that the learning
11 theories used to underpin the understanding of IPE
12 are not mutually exclusive. They only have a differ-
13 ent emphasis. For example, taking a behaviourist
14 approach to curriculum design in which interprofes-
15 sional competencies are key does not preclude con-
16 structivist ideas in which the processes behind
17 learning these competencies are considered in paral-
18 lel. Furthermore, both behaviourist and constructiv-
19 ist theorists would agree that interprofessional
20 learning 'by doing' and student centredness are key.

24 Conclusions

25 Theory for theory sake is futile but practice that is
26 not underpinned by a sound theoretical underpin-
27 ning is tantamount to incompetence (Eraut 2003).
28 It is essential that educationalists and researchers
29 underpin their practice with sound theoretical
30 frameworks, first to improve the quality of their cur-
31 riculum development and evaluative practice but
32 also as a means of explaining the curriculum and
33 evaluation to sceptics.

34 We hope that this study, through presenting a
35 broad overview and summary framework, has helped
36 clarify the way in which learning theories can aid IPE
37 curriculum development and evaluation. In some
38 instances we raise unanswered questions and make
39 recommendations that may appear tentative. How-
40 ever, this is with intent as in many instances there is
41 no right or wrong answer, no definitive recommen-
42 dation that an educator or evaluator should follow.
43 What they decide to do will largely be determined by
44 the educational context in which they find them-
45 selves. We ask at most, and at the very least, that edu-
46 cators and evaluators consider these questions,
47 evaluate their actions and then make an informed
48 decision that is suitable for their own context.
49
50

The framework has also highlighted areas where
future theoretical development is required: For the
behaviourists among us, interprofessional compe-
tencies are infrequently translated into published
curriculum designs and evaluation strategies and
moves need to be made to redress this alongside
efforts to increase and improve the measurement
of interprofessional behaviours. For proponents of
adult learning theory in IPE, the constructivist ori-
gins of adult learning theories need to be recog-
nized and the application of these theories should
progress from a 'how we did it' to a 'why we did
it' approach. Those in the IPE field publishing their
curricula and evaluation strategies also need to go
beyond the current absence or tokenistic few sen-
tences describing their theoretical standpoint to a
careful consideration of how the theory has
informed their practice.

Ideas around interprofessional stage development
have potential but now need to move from the
purely theoretical to an application in curriculum
and evaluation design. Questions such as 'how do
we measure students' stages of interprofessional
development' and 'how do we enable them to pro-
gress to the final stages of commitment to relativism'
need to be asked.

Finally, after some neglect, the IPE field is moving
towards inclusion of socio-cultural and more macro
level theories to underpin practice. Ideas of scaffold-
ing and ZPD have potential and should be employed
further to understand and improve our educational
practice utilizing scaffolds such as e-learning and
mediated learning through peer and tutor facilitated
e-learning. There is also much scope for the applica-
tion of issues of expansive learning and activity sys-
tems, especially to the more complicated levels
described in so-called third generational develop-
ments.

Despite the potential for future development, the
theoretical underpinnings of IPE practice has pro-
gressed well over the past 5 years and is no longer
the atheoretical discipline it has been in the past.
The evidence of contemporary learning theories in
education being reflected in IPE is particularly heart-
ening and bodes well for the future development of
IPE educational theory, IPE practice and research in
general.

Acknowledgements

This work originated from a seminar series 'Evolving theory in Interprofessional Education 2007-2009' funded by the Economics and Social Research Council in the United Kingdom.

References

- Armitage A., Bryant R., Dunhill R., Hayes D., Hudson A., Kent J. & Et Al. (2003) *Teaching and Training in Post-Compulsory Education*. Open University Press, Buckingham.
- Arredondo P., Shealy C., Neale M. & Lapearle L.W. (2004) Consultation and interprofessional collaboration: modelling for the future. *Journal of Clinical Psychology* **60**, 787–800.
- Atherton J.S. (2005) Learning and teaching: constructivism in learning. ????
- Barr H. (1998) Competent to collaborate: towards a competency-based model for interprofessional education. *Journal of Interprofessional Care* **12**, 181–187.
- Barr H., Koppel I., Reeves S., Hammick M. & Freeth D. (2005) *Promoting Partnership for Health*. Blackwell Publishing and CAIPE, London.
- Bigge M.L. & Shermis S.S. (1999) *Learning Theories for Teachers*, 6th edn. Longman, New York.
- Biggs J. & Tang C. (2007) *Teaching for Quality Learning at University*, 3rd edn. Open University Press, Maidenhead.
- Bleakley A. (2006) Broadening conceptions of learning in medical education: the message from team working. *Medical Education* **40**, 150–157.
- Burns R. (1995) *The Adult Learner at Work*. Sydney Business and Professional Publishing, Sydney.
- Carpenter J., Barnes D. & Dickinson C. (2003) *Making a Modern Mental Health Care Force: Evaluation of the Birmingham University Interprofessional Training Programme in Community Mental Health 1998–2002*. Centre for Applied Social Studies, University of Durham, Durham.
- Carpenter J., Barnes D., Dickinson C. & Wooff D. (2006) Outcomes of interprofessional education for community mental health services in England: the longitudinal evaluation of a postgraduate programme. *Journal of Interprofessional Care* **20**, 145–161.
- Clark P. (2006) What would a theory of interprofessional education look like? Some suggestions for developing a theoretical framework for teamwork training 1. *Journal of Interprofessional Care* **20**, 577–589.
- Clarke B., Laphorn C. & Miers M. (2005) *Study 2: Student Learning in Interprofessional Modules: Evidence from Student Interviews and Assignments*. University of West of England, Bristol.
- Cleverly D. (2003) *Implementing Inquiry-Based Learning in Nursing*. Routledge, London.
- Colyer H., Helme M. & Jones I. (2006) *The Theory–Practice Relationship in Interprofessional Education*. Higher Education Academy Health Sciences and Practice, London.
- Cooper H. (2004) Complexity and interprofessional education. *Learning in Health and Social Care* **3**, 179–189.
- Craddock D., O'Halloran C., Borthwick A. & McPherson K. (2006) Interprofessional education in health and social care: fashion or informed practice. *Learning in Health and Social Care* **5**, 220–242.
- D'eon M. (2005) A blueprint for interprofessional learning. *Journal of Interprofessional Care* **19**(S1), 49–59.
- Dahlgren L.O. (2006) *Developing Flexibility Through Experiencing Variety: A Potential Function of Interprofessional Learning for Improving Competence*. Paper Presented at The Altogether Better Health III, London.
- Dewey J. (1966) *Democracy and Education*. Collier Macmillan, London.
- Engeström Y. (1990) *Learning Working and Imaging*. Orienta_Konsultit Oy, Helsinki.
- Engeström Y. (2001) Expansive learning at work; towards an activity theoretical reconceptualisation. *Journal of Education and Work* **14**, 133–156.
- Eraut M. (2003) The many meanings of theory and practice. *Learning in Health and Social Care* **2**, 61–65.
- Freeth D., Hammick M., Koppel I., Reeves S. & Barr H. (2002) *A Critical Review of Evaluations of Interprofessional Education*. LTSN-Centre for Health Sciences and Practices, London.
- Hean S. & Dickinson C. (2005) The contact hypothesis: an exploration of its further potential in interprofessional education. *Journal of Interprofessional Care* **19**, 480–491.
- Hean S., Macleod Clark J., Adams K., Humphris D. & Lathlean J. (2006) Being seen by others as we see ourselves: the congruence between the ingroup and outgroup perceptions of health and social care students. *Learning in Health and Social Care* **5**, 10–22.
- Hean S., Barr H., Borthwick A., Craddock D., Hammick M., Miers M. et al. (2008) Evolving IPE theory for practice: the outcomes of discussion from a seminar series. ????
- Hind M., Norman I., Cooper S., Gill E., Hilton R. & Judd P. (2003) Interprofessional perceptions of health care students. *Journal of Interprofessional Care* **17**, 21–34.

- Hughes M., Ventura S. & Dando M. (2004) On-line interprofessional learning: introducing constructivism through enquiry-based learning and peer review. *Journal of Interprofessional Care* **18**, 263–268.
- Jarvis P., Holford J. & Griffin C. (2003) *The Theory and Practice of Learning*. Kogan Page, London.
- Kaufman D.M. (2003) Applying educational theory in practice. *British Medical Journal* **326**, 213–216.
- Knowles M.S. (1990) *The Adult Learner: A Neglected Species*. Gulf Publishing, Houston, TX.
- Knowles M.S. et al. (1984) *Andragogy in Action: Applying Modern Principles of Adult Learning*. Jossey-Bass, San Francisco, CA.
- Kolb D.A. (1983) *Experiential Learning: Experience as the Source of Learning and Development*. Prentice-Hall, Hillside, New Jersey.
- Mandy A., Milton C. & Mandy P. (2004) Professional stereotyping and interprofessional education. *Learning in Health and Social Care* **3**, 154–170.
- McNair R., Brown R., Stone N. & Sims J. (2001) Rural interprofessional education: promoting teamwork in primary health care education and practice. *The Australian Journal of Rural Health* **9** (Suppl. 1), S19–S26.
- Mezirow J. (1997) Transformative learning: theory to practice. *New Directory for Adults and Continuing Education* **74**, 5–12.
- Mezirow J. (2004) Forum comment on Sharan Merriam's "The role of cognitive development in Mezirow's transformational learning theory". *Adult Education Quarterly* **55**, 69–70.
- Moon J. (2004) *A Handbook of Reflection and Experiential Learning: Theory and Practice*. Routledge Falmer, London.
- Newble D.I. (2002) Don't presume about experienced adult learners in medicine. *British Medical Journal* **325**, 779.
- Norris E., Alexander H., Livingston M., Woods K., Fischbacher M. & MacDonald E. (2005) Multidisciplinary perspectives on core networking skills. A study of skills and associated training needs, for professionals working in managed clinical networks. *Journal of Interprofessional Care*, **19**, 156–163.
- O'Toole L.J. (2004) The theory-practice issue in policy implementation research. *Public Administration*, **82**, 309–329.
- Pawson R. & Tilley N. (1997) *Realistic Evaluation*. Sage, London.
- Payler J., Meyer E. & Humphris D. (2007) Theorizing interprofessional pedagogic evaluation; framework for evaluating the impact of interprofessional continuing professional development on practice change. *Learning in Health and Social Care* **6**, 156–169.
- Perry W.G. (1970) *Forms of Intellectual and Ethical Development in the College Years: A Scheme*. Holt, Rinehart and Winston, New York.
- Piaget J. (1973) *To Understand Is To Invent*. Grossman, New York.
- Pollard K., Miers M., Dando M., Evans D., Hughes M., Johnson R. et al. (2006) *Evaluation of the Pre-Qualifying Interprofessional Curriculum*. University of West of England, Bristol.
- Puliyel M.M., Piliyel J.M. & Puliyel U. (1999) Drawing on adult learning theory to teach personal and professional values. *Medical Teacher* **21**, 513–515.
- Robinson M. & Cottrell D. (2005) Health professionals in multi-disciplinary and multi-agency teams: changing professional practice. *Journal of Interprofessional Care*, **19**, 547–560.
- Schon D.A. (2004) *The Reflective Practitioner: How Professionals Think in Action*. Basic Books, New York.
- Spencer J.A. & Jordan R.K. (1999) Learner centred approaches in medical education. *British Medical Journal* **318**, 1280–1283.
- Tennant M. (1997) *Psychology and Adult Learning*. Routledge, London.
- Vygotsky L.M.I.S.C. (1978) *Mind in Society*. Harvard University Press, Cambridge.
- Wenger E. (1998) *Communities of Practice: Learning, Meaning and Identity*. Cambridge University Press, Cambridge.
- Wood D.F. (2003) Problem based learning. *British Medical Journal* **326**, 328–330.
- Zorga S. (2002) Supervision: the process of life-long learning in social and educational professions. *Journal of Interprofessional Care* **16**, 265–276.

Author Query Form

Journal: LHS

Article: 227

Dear Author,

During the copy-editing of your paper, the following queries arose. Please respond to these by marking up your proofs with the necessary changes/additions. Please write your answers on the query sheet if there is insufficient space on the page proofs. Please write clearly and follow the conventions shown on the attached corrections sheet. If returning the proof by fax do not write too close to the paper's edge. Please remember that illegible mark-ups may delay publication.

Many thanks for your assistance.

Query reference	Query	Remarks
Q1	AUTHOR: A running head short title was not supplied; please check if this one is suitable and, if not, please supply a short title of up to 40 characters that can be used instead. ^λ	
Q2	AUTHOR: Please provide full address for the second and third affiliations. ^λ	
Q3	AUTHOR: Clarke (2006) has not been included in the Reference List, please supply full publication details. ^λ	
Q4	AUTHOR: Daghlen (2006) has been changed to Dahlgren (2006) so that this citation matches the Reference List. Please confirm that this is correct. ^λ	
Q5	AUTHOR: Knowles (1984) has been changed to Knowles <i>et al.</i> (1984) so that this citation matches the Reference List. Please confirm that this is correct. ^λ	
Q6	AUTHOR: Engeström <i>et al.</i> (2001) has been changed to Engeström (2001) so that this citation matches the Reference List. Please confirm that this is correct. ^λ	
Q7	AUTHOR: Please provide all author names in Armitage <i>et al.</i> (2003). ^λ	
Q8	AUTHOR: Please provide journal name, volume and page span in Atherton (2005). ^λ	
Q9	AUTHOR: If there are fewer than 3 author names for Reference X, XXXX, please supply all of their names. If there are 11 or more author names, please supply the first 3 author names then <i>et al.</i> Also, provide journal name, volume and page span. ^λ	
Q10	AUTHOR: Arrendo <i>et al.</i> (2004) has been changed to Arredondo <i>et al.</i> (2004) so that this citation matches the Reference List. Please confirm that this is correct. ^λ	

MARKED PROOF

Please correct and return this set

Please use the proof correction marks shown below for all alterations and corrections. If you wish to return your proof by fax you should ensure that all amendments are written clearly in dark ink and are made well within the page margins.

<i>Instruction to printer</i>	<i>Textual mark</i>	<i>Marginal mark</i>
Leave unchanged	... under matter to remain	Ⓟ
Insert in text the matter indicated in the margin	∧	New matter followed by ∧ or ∧ [Ⓢ]
Delete	/ through single character, rule or underline or ┌───┐ through all characters to be deleted	Ⓞ or Ⓞ [Ⓢ]
Substitute character or substitute part of one or more word(s)	/ through letter or ┌───┐ through characters	new character / or new characters /
Change to italics	— under matter to be changed	↙
Change to capitals	≡ under matter to be changed	≡
Change to small capitals	≡ under matter to be changed	≡
Change to bold type	~ under matter to be changed	~
Change to bold italic	≈ under matter to be changed	≈
Change to lower case	Encircle matter to be changed	≡
Change italic to upright type	(As above)	⊕
Change bold to non-bold type	(As above)	⊖
Insert 'superior' character	/ through character or ∧ where required	Υ or Υ under character e.g. Υ or Υ
Insert 'inferior' character	(As above)	∧ over character e.g. ∧
Insert full stop	(As above)	⊙
Insert comma	(As above)	,
Insert single quotation marks	(As above)	ʹ or ʸ and/or ʹ or ʸ
Insert double quotation marks	(As above)	“ or ” and/or ” or ”
Insert hyphen	(As above)	⊖
Start new paragraph	┌	┌
No new paragraph	┐	┐
Transpose	┌┐	┌┐
Close up	linking ○ characters	○
Insert or substitute space between characters or words	/ through character or ∧ where required	Υ
Reduce space between characters or words		↑