Developing sensors and sensibilities for an absurdist theatre piece at Malthouse Theatre: *Homunculus* and the functioning of a complex educational and theatre project.
Towards an evaluation using narrative research methods

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During Semester 2, 2005, Hybrid (formerly Music and Multimedia Hub) at Victoria University supported a special project that implemented simple sensor technology for a theatre production "*Homunculus*". The project represented an innovative pedagogical direction, in that an educational context (a unit of study for the TAFE diploma, involving the full cohort of enrolled students) was combined with the production of a dramatic work, as well as exercising the sponsorship relationship that Victoria University enjoys with the Malthouse Theatre. Within this context of institutional encounter, a creative exploration took place on a number of levels, involving staff, students, actors, musicians, production and theatre staff. This exploration involved the construction and utilisation of sensors that were embedded in the theatre set and in the costume of the actors. In addition, a concurrent research project was initiated that collected and analysed the experiences of the participants in this complex multi-layered project.

This paper details the areas of analysis of recorded comment and related experiences from the actors and writers, Grant Mouldey and Jacob Lehrer, Hybrid co-ordinator Stefan Schutt, programmer Greg Giannis, and many of the students from the TAFE Diploma of Music Technology course. The report is also a reflexive exercise for the authors who were intimately involved in the project in all its stages.

The focus of the research was to evaluate some of the outcomes in the areas of:

1. the relative success of the engagement of a community within Victoria University with a community of professional theatre practitioners in Melbourne,
2. multi-level interactivity on the human/machine and human/human level, and
3. innovative pedagogical exploration.

Introduction

This paper offers a descriptive and contextual analysis of the Homunculus project as a multi-layered and multi-modal narrative system. This system consists of several interacting and sometimes conflicting strands of experience, posited as separate narratives, even though the narrative data are not the interviews or discussions typically seen in this kind of qualitative method. Instead, some evaluative comment from students was gathered as a matter of course in the delivery of a TAFE Unit of Study. In addition, some responses were gathered from other participants in the project. Despite this relatively paucity of data, enough may be interpreted from the comments and responses to indicate contrasting agendas and experiences of the project, which can contribute to the construction of an evaluation of the project outcomes. Different narratives can be discerned by evidence such as interpretations of specifications, even the devising of contrasting specifications for this technical project. This presentation follows a rough chronology, although causal events are presented with their results, and given a narrative reading based on participant experiences throughout the text of the paper.

The *Homunculus* project was conceived as one that could engage a significant number of students from the Diploma of Music Industry (Technical Production) CUS50201 at Sunbury with an existing professional context,

in this case a range of widely-experienced theatre professionals, including, in the final stage, an engagement with a leading theatre, Malthouse, which has a sponsorship arrangement with Victoria University.

The following list of possible outcomes may be evaluated in the light of the experiences of participants:

- Developing a specialised sensor application for a theatre production.

- The utilisation of some existing expertise and equipment in a new setting directed partially towards a community engagement, and partially towards a novel teaching process.

- Serving as a prototype for future community engagements that may be specifically linked with TAFE programs.

- It served as a vehicle for enquiry into the use of interactive technology into a specific theatre setting, thus making a research outcome in this area possible.

The research approach of narrative analysis makes it possible to evaluate two distinct areas of enquiry in this project. The first area was concerned to investigate theoretical and practical issues associated with the implementation of sensor technologies in the context of live theatre performance. The other area of enquiry piloted the involvement of a cohort from a TAFE Diploma Unit of Study (Implement Sound Design, Unit Code CUSSOU22A) in the design and implementation of a specialised music/multimedia application in a small industry setting. These two enquiries may be evaluated using the (written and transcribed) contributions from staff and students of Victoria University as well as the actors/writers and musician.

Each stakeholder, individual or group, contributes a particular viewpoint as to what constitutes the success or failure of the project. For this paper two short examples of "intertextual" comment are used to investigate the two areas of enquiry. The first is a divergence of script, revealed through both an equipment list, and also revealed through experiential comment. The second example is a convergence of scripts: participants with different roles in the project talk about their experience of the workings of the sensor implementation in the performances. The approach followed is similar to an anthropological approach (Cortazzi, 1993, p108), that assumes different groups will "speak" with particular voices. Two specific "micro-cultural" contexts emphasised in this paper are the student/educational world and the professional/theatrical worlds.

Example one –script sensibilities

In a dramatic work, the script is the central locus for constructing the world of the production. It is the starting point for the central players – the actors. In the *Homunculus* project the script followed this pattern for the actors, for the students, and for the main teacher, Adam.

In the *Homunculus* project, not only are there collections of narrative scripts, but also a literal dramatic script, that is also an artistic/dramatic metaphor for the experiences of individuals within organisations. The content of this dramatic script could be both confounding and irrelevant to narrative analysis, but in this case provides a kind of map for the pathways of stakeholder narrative. Another script is the actual chronology of events, which was experienced by differently by all players. There is some revelation in the recounting of particular events, and in

the concurrence of dramatic script, with chronological events that were either planned or emerged as significant in the course of the project.

Data collection for the project was limited: students as a matter of course complete an evaluation of any subject that they are enrolled in as part of the TAFE Diploma of Music Technology. These are sketchy data for narratives but certainly reveal whether expectations have been met and are a measure of the students' experiences in the project. Additionally, some of the actors/writers involved purely working towards the production outcome contributed reflective comment. Missing narratives are those from the production and administrative areas of the theatre itself, with only minimal comment from the programmer of the software interface.

What emerged is a complex system of insider/outsider dichotomy, given a metaphoric articulation in the piece itself. The students occupy both the insider "emic" category as the core players in the educational outcome, but they are also in the "etic" category, experiencing the professional theatre process as outsiders. Conversely, the "professionals" are insiders to their own theatre process, while definitely "etic" to the culture and associated processes of the educational institution. Mediating somewhat are the teachers who have negotiated the cultural interface: they carry information and interpretations between the two sites.

"*Homunculus*" is a small, independent production that premiered at La Mama Theatre, Carlton in December 2004. Written, produced and performed by Grant Mouldey and Jacob Lehrer, *Homunculus* played with the idea of a closed and absurd environment that dominates two "co-workers". The piece can be read as a metaphor for the position and experiences of individuals (including relationships) within an external governing structure. This is a kind of *genre*, with many previous literary and dramatic examples, for example, nineteenth century Russian literature, or the film *Brazil. Homunculus* gave the genre another absurdist reading with a strong physical-theatrical interpretation of the text. The actors are thus employed to carry out physical tasks of a non-specified nature on abstracted and absurd equipment. This then, is the first (and literal) script that provides in this project both an "internal" narrative world, and an "external" frame of reference for all the players in the project. For a narrative analysis of this project, the script was the Script.

Another script that emerged was the story of the special project itself – a project that took the *Homunculus* script and formulated another production, this time involving students and staff from Victoria University. In April 2005, several teachers at the School of Music, Sunbury, figured on this production, and the potential for an implementation of sensor technology, was an ideal vehicle to explore the opportunities for a new teaching direction, and also a vehicle for a significant community engagement.

This vehicle was oriented towards the production of the music and sound for the event. In the original production, music is provided by two onstage musicians who apparently "control" the sound environment, thus helping to establish the world of the text.

The new project specification called for a number of sensors to be embedded in the set, to be operated by the actors. These sensors would create a level of interactivity in that the actors would contribute to the sound composition of the piece through the operation of different elements of the set. The sound composition in the previous production had been interactively mediated by the two musicians who closely followed the execution of

the script and provided different sounds that supported and interpreted the script's rhythm and created-world as articulated by the actors.

For the *Homunculus* set, the following sensory controllers were developed as new components of the set to aid in the overall atmosphere. These sensor specifications were based on a list of sound requirements provided by the actors, who had envisaged a "cartoon-like" association of sound effect with physical action. An appropriate mechanical switch was then proposed to trigger the associated sound.

The following was the list of proposed sensors as initially proposed by the actors, then filtered through one of the authors and presented as the initial project brief::

- A couple of floor pressure sensors linked to a creaky floorboard or stepped in something squishy sound. (2 x pressure-mat sensors)
- The "Two-flux cupboard" needs a gurgling sound that ranges from gentle gurgling to the sound of the bath emptying, this sensor will be linked to a door activated when opening and deactivated when closing. (1 x standard button switch)
- Two sensors that are activated by the weight of an egg with odd whistle sounds as the egg is placed on them. (2 x simple pressure switches)
- Four headphone jacks or equivalent that makes a "plop" sound when jacked into. (hard wired circuit closed by headphone jack)
- A sensor that is activated only when a door shut and produces the sound of something being taken away very fast.
- Some surprise, seemingly random sensors that the actors are unaware or unsure when they are likely to trigger a sound (2 x proximity sensors 2 x light beam switches)
- A means of signal alteration/effect that is continuously controlled by the live musicians (microphones at four different locations on set)

A further, more expansive list of sensor switch circuits, and associated sounds, was compiled after the one of the actors visited the students at Sunbury, and following an extensive viewing of a DVD recording of the first production. Students catalogued the occurrences of sounds throughout as potential sound cues that they themselves would provide new alternatives to. This development represents a first divergence from the project brief as first specified (see below), and was followed by a number of changes in specification that occurred as the project progressed.

According to the specification, students were to be involved in the project in three main ways:

1. By discussion with the performance artists to become acquainted with the brief

2. By creating a sound sample, which would then be stored in a suitable computer software – based sample player, triggered by the sensor circuits.

3. Creating a physical circuit to trigger the sound that they created, according to the creative brief.

In the event, the students spent a larger proportion of time creating their sound samples, and a lesser proportion of time making the switching circuits, reflecting a emphasis on sound that is understandable coming from a Music Department. This resulted from the first diversion of interpretation of the project Script (P) – the actors, with an intimate knowledge of the script, but without an exhaustive plotting of the course of the *Homunculus* script (*H)* referred to the set itself and their physical interaction with it in devising a set of sensors.

The students, following an established method that is regularly employed, for example, in developing music for film, the students viewed a recording of the production and were allocated their sample tasks according the

sound that they heard on the DVD recording. Even though it was made very clear to the students by the teacher that their sounds were not necessarily going to appear in the final production, some students expressed their disappointment when this actually occurred. These were two early divergent narratives that led many students into assuming that they were in fact creating "automated" sound for the whole production, an assumption shared by the programmer, but which had never been envisaged by the production team itself. Below are four examples of evaluative comment, two from students, one from the teacher, and one from a theatre professional, revealing explicitly different experiences of the project:

> Apparently in the play my sound effect wasn't even used. I was unable to go as I have done soft tissue damage to my right ankle and I would not have been able to have sat there during the whole play and get up the stairs. I was very disappointed that I was unable to go though as I was looking forward to seeing the play live. I think that this play was a good experience in theatre, however it was a little disappointing that not all work contributed by students was used.

and

> In the future I think we should get more feed back from the people who are choosing the sounds that are going to be used. Some people in our class were a bit disappointed that they went to so much effort and only one sound was used if at all.

> This way I think that Tim and Maddy etc could get the sounds that they really wanted, because obviously they were not happy with a lot of our sounds.

It is problematic to a creative artist, even a student one, for their work to be rejected, even if this was previously discussed by the teacher of the Unit of Study as a possibility, even a likelihood:

> Some of you mentioned that you were disappointed that your sounds were changed or not used at all. Fair enough. This did not affect your assessments. As was discussed at the commencement of the unit, we are not in control of which sounds are used. This is the decision of the artists and we must respect this. These kinds of issues will come up regularly when working as an engineer or technical consultant for someone else's creative project.

This response to student evaluations indicates that the engagement was indeed a professional one – with a world that regularly rejects the work of musical/sound consultants. The arena is kept in the area of educational assessment and the rejection of sounds in the final show part of an educational experience that has been an encounter with the realities of However, comment by one of the musicians furthers this argument, and propels the discourse back towards a pedagogical arena:

> There was an important interaction between the layers of triggers, which were created by the students, and the samples, found objects and instruments which I (and Tim) played. I felt as if the students did not understand that the sounds they created were only one layer of the sonic landscape that was created for the show: certainly due to the instability of the triggering systems that were created (as with any live electroacoustic endeavour) I felt the need to be prepared to "play" for the live trigger, as well as creating the continuous scape and particular cues which the actors needed. This sense of "standby" is a familiar one when working with equipment: a readiness to leap into the space that may happen if the machine or indeed the human does not perform an expected event. In a collaboration with actors who are concerned about the availability and reliablility of cues, this is a skill which is fundamental to theatre performance.

These comments from one of the composer/musicians who had created the entire score for the first production, and continued to provide live mediated sound and music for the later production, is revealing of the responsibility felt by her as a live performer, with a concurrent understanding of the specifics of the relationships in live theatre performance.

As evidence of a further divergence of narrative scripts, Madeleine's comments about the overall nature of the project as being concerned fundamentally with students becoming acquainted with the

theatrical world, rather than the project being fundamentally about the production of *Homunculus* with a sensor implementation may be compared with student Dan's comment :

> This project was about the relationship between students and established practitioners, working to create a further development on an established theatre piece.

And

> The fact it was a real performance with the performers investing a lot into it and hoping to make it a success gave it an extra edge.

Although the performance aspired to professional production status, the involvement of students skewed its orientation towards something more like a creative development, as this concluding comment from Jacob, one of the actors/writers reinforces:

> I personally don't mind seeing H. as a "research piece", because it's that sort of research and development that I like to push off from and it's a small and contained little show. If Grant and I were to make another one, we'd flesh out a whole lot of different ideas in a different way. But for the moment it's – it's a still-developing piece. I don't think *Homunculus* has been fully realised.

This is perhaps something like Boje's "breakdown of the emic/etic duality" (2001, p127). The student/theatrical outsiders are drawn into the world of the professional/insiders and *vice versa*. This research or this paper is, as Boje would attest, also part of the "latticing" across of a creative/educational, and organisational project.

A major lack of mutual understanding, or "divergence of narrative" is indicated by the comment from Madeleine about the multi-layering of sounds: students being disappointed that their sounds didn't make the show would follow from an assumption that they (the students) were providing for the entire sound score, and that perhaps they weren't aware that there were any other sound or music performers involved in the Malthouse production.

The disappointment felt by some of the students about their sound contributions not making it to the project, make their evaluative narratives become like Boje's "little acts of resistance" to the "dominant narrative" (Boje, 12), this latter narrative being the one that we can establish as the "justification" narrative for what was eventually constructed as necessary for the professional success of the production, and reflecting an inherent power relationship, or necessary retained control of professional artists engaged in "real production". It also demonstrates clearly a case of the limitations of community engagement, and one which begs careful examination of the boundaries of each context. There may be two types of community engagement: Community engagement and professional community engagement, where the expected outcomes or student product will differ significantly. A process of community engagement needs to develop a strong sensibility of how the variously identifiable agendas are expressed in different narratives and how they are governed through interaction.

Example Two—sensor experience

As scripts diverged, so sensor implementations became more ambitious, creating a new script, and a new complication for those divergent scripts in that more time was going to be necessary to test the sensor implementation. This "testing" period was a potential site for testing the physical actions of the performers, the nature of the live mediation by the musicians, and also a site for testing the interacting agendas of the participants. Here, potential issues such as "why isn't my sound in the show" would be addressed specifically and

perhaps resolved satisfactorily for everybody. Unfortunately, the project ran out of time, due to a number of factors, and this "narrative testing ground" didn't occur. However, the actors' response, coupled with the students' and other players response to the operation of the sensors in the show give some indication of the operation of interactivity in a theatrical setting.

There is an interesting convergence of narrative comment from different players in relation to the actual implementation, especially in the agreement on "what worked what didn't". While this appears to be an obvious technical issue, the implementation in the specialised context of constructed meaning in a theatre piece makes "what works" a more loaded issue.

After discussions between staff, the original plan to use a "keyboard hack" system to trigger one sample at a time was augmented by the decision to use a more sophisticated interface device. At this stage Greg Giannis was brought into the project, as he had wide experience using configurable hardware interface devices, in particular the EZIO board, which would allow for a number of samples to be triggered simultaneously. The keyboard hack version remained in a new incarnation, through the use of a "hacked" remote keyboard and mouse system that was implanted in the costumes of the actors, thus allowing them to create sound through "plugging themselves" in, or moving parts of their costumes. This part of the interactive set (or costume) proved the most problematic, but also the most impressive when it worked (finally) for the final two performances.
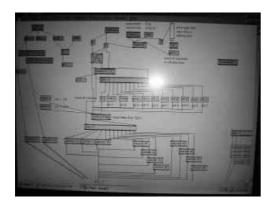
It is significant to note that the programming completed by Greg Giannis was beyond the level that could be expected from a cohort of Diploma of Music (Technology) students, and allowed Greg himself to develop his skills in the Max/MSP environment. The on/off signals (no "continuous control" devices were used), were routed to a PC computer via the EZIO board interface, and a "hacked" keyboard/mouse remote interface device which sent an average of sixteen analogue and digital signals to the serial input of the PC (average due to the inconsistent reliability of some of the circuits).

Laptop with MAX/MSP software connected via serial cable to the EZIO board (in black box). Switch wires (which were integral to the visual design of the set) plugged into the sockets labelled in white.

This input was then polled and used to trigger pre-stored samples via a MAX/MSP patch. Selected student samples were loaded into the laptop computer and triggered through the sensor circuit. This simple system was the most that could be accomplished given the resources of time and expenditure for the project, but it enabled the actors to trigger samples for many of the specified actions listed above.

"Max/Msp patch showing serial input from EZIO board, routed to sample playing sub-patches.

The system as described was only completed on the week of bump-in at Malthouse Theatre. This late completion of the physical circuit meant that the actors had only very limited time to rehearse with the live set, in fact, due to the complications of bump-in, and the very limited access time to the theatre, the actors did not properly rehearse with the sensor switches interactively until the opening performance. As we have discussed above, two on-stage musicians returned to this production to provide live interactive sound and music for the production, the new sensor circuits providing another specific layer of interactivity from the actors themselves. The specific sensor interactivity was of a limited nature, due to the simple "on-off" switching or triggering, and the fact that the samples played back in the same manner each time (although the dynamic level was varied by the on-stage musicians). The interactivity proved to be one of timing, and really could have been done manually by the actors, on an acoustic device. However, the nature of the reality created through the script and its execution, meant that the obverse and contorted nature of the sound production suited the absurd "hi-tech/no-tech" world of the play itself.

This is the setting for the final production, the play with the script, and the testing of the project before an audience (who are another obvious collection of players for the whole event). Unfortunately no data was collected from audiences: it was a differently constituted group some of whom were watching for the differences in the show provided by the sensor implementation.

The experiences as related by the actors are logical starting points for evaluating the project outcomes in the area of sensor implementation:

> Working with the wired set posed many challenges for me as a performer. Timing became even more precise and I wished that we had more time to really work with the sounds with more finesse, and actively incorporate them into the rhythm of the work. That said, the random nature of the sounds were exciting and positively added to the themes of control and interruption that the play is about. I hope that the personal wiring system could be improved, it was disappointing not to have the tie and helmet working properly.

Here, the incomplete and "random" implementation of the sensors contributes to the reality of the world of the production. Grant actually experienced a "technical meltdown" off the kind predicted by the script. For the students these random sounds were indications of technical failure; the irony being somewhat lost on them as they surveyed the results of many weeks work in creating sounds and circuits without the opportunity for testing:

> There was a lot of trouble with the some of the triggers during the show. Particular things weren't being triggered correctly and others would continue to sound when they were not supposed to. I'm not sure if the performers had a run through the show with all the sounds, but not all things ran as they were planned. Despite this I do believe the sounds added depth to the show. I feel everyone did what was required of them and the errors that did happen during the show are to be expected. If we were do this task again I feel a lot more emphasis should have been put on testing and setting up the equipment to best ensure a hassle free run come show time.

Paul's comment continues this theme (in common with nearly all of the student experiences), but offers a similar understanding of the added layering that the sensor implementation brought to the production to that of the actors and musicians.

Grant's next comment is a vindication of the theatrical benefit of the sensor implementation, and its relationship to the realisation the *Homunculus* script and follows his expression of frustration at some elements "not working":

> As an actor, responding to this new level was at first difficult, the practical incorporation was time consuming and hard to imagine, but once we were up and running I found that I needed to take more time, to let the space breath more and to confront the space in a more tender fashion. This really helped with the realisation of the piece, made it all more exact. The fact that so much of the feedback this time was about the words and what they meant was facilitated by this increased awareness the new sounds had given us.

The comment regarding feedback is attests to the success of the sensor implementation, and cuts to the heart of an implementation of interactive sensor technology in theatre. A significant challenge for interactivity in the scripted theatre is to approach the agenda championed by Grotowski (2002). In a famous manifesto "Towards a poor theatre", he called for the removal of all extraneous "media" and for the institution of a theatre that consisted solely of the actor. To the extent that new media can support and highlight the world that is centrally created by the actor, interactive theatre may yet have a meaningful place within scripted theatre, and thus make a more secure and meaningful place within cultural production in general. The special and imperfect implementation of sensor technology has managed to support and highlight the actors' world, albeit in a construction that is self-referential in its imperfection and unpredictability.

Narratives of sensor implementation and experiencing interactivity

> It makes the space more localised and alive in so far as, for this stage of the development, the sensors are sound sensors, and it means that as we're performing, we know when, the rhythm, not just of speaking, but of putting the sound within the rhythm of the play. For example, there's a part where I walk towards Grant, and I'm not very happy with him at that point, and I say "You'll find out the hard way that U.P. One will not be so ready to accept the virtues, or even the existence of an ethical/metaphysical harmonic. You're not the first person to have thought of this, you're a fool". And the other night, Grant stepped on the "squelch mat"

> at the perfect time "You're not the first ersonto have thought of this [squelch] – you're a fool". It was just beautiful, a beautiful moment which almost made us laugh.

Jacob's comment celebrates the placement and timing of a particular sensor circuit and sound event. He recounts an experience of interaction, human-to-human and machine-to-human that creates a successful script enactment. What we don't know is whether the audience saw it! However, the comment by Janelle, gives a context to its implement that is complementary to Jacob's:

> My sound trigger combination was the floor mat. The sound is triggered by applying pressure (standing on) the mat. I created the sounds in the M Box studio in building 15. In my outline I decided I would produce several sounds one being the squelching sound of a shoe standing on chewing gum, one being the regular thud of standing on a floor board, and another one of a squeaking floor board. To create the sounds I recorded myself chewing gum, shoes squeaking on a vinyl chair, and recorded thuds of

hitting the table and walls with a fist. I also created some extra ambient sounds that sounded like wind chimes.

With these sounds I used a lot of EQ to manipulate them. I used plug ins like Amp Farm and D Verb to vary and alter the sounds.

After bouncing down at least 9 sounds to be used for the Homunculus show, only one of my sounds were used. This was a quite dry sound of chewing gum reversed. So it was more of a sucking sound. I thought they would trigger at least 3 sounds so that every time the mat was stood on one of 3 sounds would play.

I got to solder the wire to the 1/4 inch jack and then tested the signal and it worked. I also soldered a 1/4 inch jack on to the helmet and soldered some other cables.

On the day of the bump in I tested the sound trigger combination by plugging in the mats jack to the desk and standing on the mat to make sure it worked.

On opening night my sound worked well. I unfortunately did not get to see it in action. The mat was in front of the Two Flux cupboard so it apparently got stepped on a lot.

Janelle's deadpan account of the successful creation of the floor-mat sensor contrasts with its celebration by Jacob in performance. Below we comment on the variable success that students accepted the non-literal requirement of the sound cues in relationship to the letter of the text. Here though, Janelle's literal original conception has been transformed successively, both physically in her manipulation, then contextually in the Jacob's and Grant's experience of the sound. The literal trace (it is in fact chewing gum) becomes obliterated in the course of the thematic narrative.

Across different disciplines, for example multimedia, music, computer interface design and performance the term "interactive" has different meanings. Especially in performance, interactivity may take many different forms, each however, having the assumption of "liveness", and dynamic alteration of media as a consequence of action on the part of somebody – be they actor, audience, on- or off-stage artist. The usual meaning given for interactive theatre refers to the style of audience interactive/improvisational style of theatre that was made famous by Moreno (Phillips, 1996).

As an "interface" the *Homunculus* set has some similarities with the designs of Human-Computer interaction in that an "avatar" or manifestation of a representation of an (imaginary) reality is created. However, unlike a computer user interface, the theatrical set is also real spatially and materially, and is a far more tangible visceral entity than the two- or even three- dimensional representations on a screen. Another similarity emerges if the set is considered as an actual "tool" as with a musical instrument or camera perhaps, that is operated by the actors to *create* the imaginary reality in conjunction with the other devices of the theatre.

The project raises a number of interesting questions that arise when interactivity is combined with conventional theatre production. These questions have been explored by David S Saltz in his work with the Interactive Performance Laboratory (Saltz, 2002). Saltz distinguishes this type of interactivity (as in *Homunculus*) from the more widespread employment of interactivity that is utilised by audiences as they "interact" with media (typically screen- or sound- based), and also from the widespread "live" interface devices that are regularly catalogued through such gatherings as NIME (see, for example N.I.M.E 2005).

Saltz has noted the less obvious relevance of interactive technology to scripted theatre, noting in particular the inherent spontaneity in live theatrical performance, that any pre-figured interactive device could inhibit (2002, p109). Hence, in two of the productions he has developed and discussed in his article, live offstage performers

worked the interactive component, separately, though in close scrutiny of, the action, and the actors, onstage. This model of interactivity, as mentioned above, was employed in the original production of *Homunculus*. Saltz has less to say about a scripted performance that combines separately mediated interactivity with un-mediated devices that the actors themselves operate within the context of the piece, although his production of *Kaspar*, featured a combination of onstage and off-stage mediated interactivity, as well as a design feature common to *Homunculus* – the deliberate visual fetish of wires strewn across the stage, making the sensor circuits an obvious design symbol.

Even conventional theatre is a highly interactive environment, often consisting of many different modes or "layers" of interactivity. Arguably, the most important interaction takes place between the actor(s) and the audience. Other layers of interactivity serve this primary interaction in the sense of underlying the theatrical reality as established primarily by the actors. So the scripted theatre has interactivity on the part of its actors as a fundamental assumption. Though the actors interact chiefly with the audience, they also interact critically with their co-actors and possibly less-critically, the set, to establish the reality of the world of their performance. The set will potentially include a multitude of parameters, including lighting, sound/music, and whatever "interaction" is built into the set.

There are similar inherent problems with any on-stage property, such as an acoustic musical instrument. It is a "real" object absolutely no different from a musical instrument outside of the imaginary world of the theatre production. But it is also a device with a meaning within the imaginary world. Such diegetic instruments are of the kind created for *Homunculus*, and they can be an unwieldy implement in the course of the theatre's narrative or world-creation. Fortunately, *Homunculus* was a world where the distinction between the two "real" and "unreal" functions was necessarily and meaningfully merged, or confused, thus could be wielded in a perfectly consistent rhythm with the propulsion of the piece. The character of the *Homunculus* interactivity swayed between the "diegetic" and "affective" types of interactive media that Saltz describes in his taxonomy of performer/media relationships (2002, p123).

To create meaningful sensor devices, students had to understand both the scripted world as articulated by the actors, and the visceral world of stage action, also articulated by the actors, and perhaps also have a sense of the "rhythm" of this "interaction" taking place on the stage in the creation of a world. The student responses show some awareness of this, and in some cases succeeded through guidance in creating effective devices.

While the script was known, and a prior production analysed, the innovation of sensor implants in the set created a research context – specific to *Homunculus*, but with broader theatrical implications, as discussed above. In this way, the project was performance research and the students were carried along in a dynamic and fluid educational process that was also a pedagogical research process.

Conclusion

The processes of multiple interactions through the course of a project and in a performance piece create a multitude of narrative courses that may be foregrounded at different times.

This paper has foregrounded a few of these narrative courses relevant to the two general themes of the enquiry:

1. issues associated with the involvement of TAFE students in the design and implementation of a specialised music/multimedia application in a small industry setting.
2. issues associated with the implementation of sensor technologies in the context of live theatre performance.

The students' involvement, although diverging from the conception of the project instigators, did end up producing a positive and fruitful experience for most students, with the apparent divergence of understanding creating some disappointment (though this can be interpreted as a positive outcome).

The patchy, or slightly random implementation of the sensor technologies in the set of *Homunculus* was certainly appreciated by the actors/writers as a significant creative development of their work, underlaid with scrutiny by the students' accounts and the mediating narratives provided by the TAFE teachers and musician.

A particular and entertaining aspect of the narratives inherent in the *Homunculus* project is its self-referential nature. As we examine the nature of the project organisation and process, we discover similarities with the metaphors that are part of the original dramatic script. So a narrative *homunculus* of a kind is achieved.

Student (Sam) completing some ready repair/installation on the set

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