

Annex I to Contract
Project Programme

Project EP29335 -PUPPET
“The Educational Puppet Theatre of Virtual Worlds”

By
Aalborg Universitet, DK
University of Sussex, UK
Århus Universitet, DK
DFKI, Saarbrücken, D

Aalborg
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Esprit, Long Term Research, Task 4.4
Intelligent Information Interfaces (i3)
Experimental School Environments (i3 -ese)

Annex I to Contract
Project Programme, Part 1
Financial and Administrative Data

Project EP29335 -PUPPET
“The Educational Puppet Theatre of Virtual Worlds”

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1. Project Summary

The objective of the PUPPET project in the field of early learning is to develop and investigate the value of a new virtual reality environment, the Virtual Puppet Theatre (VPT) based on a theoretical framework of "learning through externalisation". Hence PUPPET aims at extending the current forms of early learning through play by developing a range of novel individual as well as collaborative interactive environments - using a theatre metaphor.

The results of the project will be to: i) promote new forms of creativity made possible by new IT tools; ii) enable new forms of self-expression not possible with conventional plays; iii) encourage learning to learn and iv) allow for a new form of computer literacy.

The consortium has developed a 3 year project plan, which has yearly milestones to deliver and experiment with VPT's for (1) a single young puppeteer (age 4 to 5) in realistic settings, (2) for a single older puppeteer (age 6 to 8) in settings that encourage symbolic activities, and (3) for multiple puppeteers in settings encouraging collaborative interactions. The work programme is designed with a clear annual development cycle through 3 phases of Informing and Specifying Design, Tool Development and Implementation, and Experimental Evaluation, respectively.

In the first phase of each year, we will study drama and play writing for children and carry out a series of exploratory and empirical studies to determine current play practices - especially when using imaginary and physical puppets and props - in order to establish reference and support for the design of the VPTs. We will involve children, teachers and others in co-designing the prototypes of our interactive worlds (VPTs) and their appropriate interfaces, by using a range of innovative low-fi and hi-fi prototyping methods called "informant design".

In the second phase, overlapping the first phase in time, we will develop and implement the VPTs as full Virtual Reality Environments with the use of avatars, autonomous agents/puppets and "magical" animations. The third phase evaluates the Early Learning benefits of the developed "Virtual Puppet Theatres" through school tests.

The impact of the project will be: (a) the development of a new concept for interactive computer environments, the "Virtual Puppet Theatre", and (b) the demonstration of four fundamental hypotheses that socio-cognitive skills can be fostered by the VPT in developing a new form of computer literacy: the ability to construct, edit, and run interactive plays. This is a form of learning how to learn, since only by developing strategies for making the process explicit can the children decompose, master and integrate the sequence of play construction. The VPT is age-appropriate - since children naturally like to perform drama - and innovative because physical (everyday) plays do not allow the possibilities for manipulating characters, roles and plots in the ways that technology can allow. In this regard the VPT can play a vital role in developing both individual self-belief, through the ability to make personal creations, and collaborative communication skills through group work on plays.

The publicity of PUPPET and its results will be promoted in terms of a number of linked levels of involvement. At the community level, children, teachers, parents and others will be involved in the development and tests of the VPTs, to encourage the development of IT strategies at our partner schools with communication via the Internet, video conferencing, and children publishing their plays and stories on the Internet. This organised local setting around the project will form the basis for contact to relevant national and international organisations and authorities, for which we also will develop a PUPPET Website with updated descriptions and results of our work.

We will write theoretical and applied papers for international journals and conferences of the various related fields, and develop and exploit supplementary ways of dissemination with colleagues and other projects of the i3 e-community. Direct contact to interested commercial companies has been established and will be further developed.

2 Administrative Overview

2.1 Project Administrative Overview

Form1: Project Administrative Overview

Esprit Proposal N°: EP29335		Action Type ^(a) :			Acronym (max.10char.) : PUPPET			
Proposal Title (max.160char.) :								
The Educational Puppet Theatre of Virtual Worlds								
Work Programme Task ^(b) : 4.4					Duration (in months) : 36			
List of Participants								
N°	Organisation Name ¹	Country	Admin. Role (c) C/P/A	Funct. Role (d) S/U	Assoc. ton° ²	Global costs in Ecu ³	Funding in ECU	Effort in Person Years
1	LIA, Aalborg Universitet	DK	C	S	-	372.6	372.6	4.83
2	COGS, University of Sussex	GB	P	S	-	482.6	482.6	6.75
3	IDAU, Århus Universitet	DK	P	S		105.6	105.6	1.33
4	DFKI, Saarbrücken	D	P	S		289.2	289.2	2.33
TOTALS							1250	15.24

Please copy this form if more space is needed to list the participants.

(a) A list of codes is supplied in Appendix to Form 2.1.

(b) See Work Programme

(c) C=Coordinator, P=Partner, A=Associated Partner

(d) S=Supplier, U=User

¹ Short name for participants that uses such a name in form 2.1, and legal name if such a short name does not exist

² This column must only be completed for an Associated Partner (A). It should indicate to which partner N° a particular Associated Partner is linked

³ The global costs as indicated in form 3.1

2.2 Individual Participant Data**Form 2.1: Registration Form for organisations registered as contractors within Esprit**

ProjectNoEP29335

Partner: LIA**Legal Identification of the Organisation**

FullName ¹	Aalborg Universitet		
LegalStatus(SA, Ltd, GmbH)	EDU		
Name(s) of Legal Signatory(ies)	Richard Gajhede, Chief Accountant		
VAT number	32858910	Registration number	

Organisation Classification for Statistical Purposes

Organisation type ²	U	Industry sector ³	ED
Number of employees	2,000	Is the organisation an SME (Y/N)? ⁴	N

Legal Address of the Organisation

Address	Tel country+area code:	+45
Aalborg Universitet	Tel number:	96359505
Fr. Bajersvej 7F	Fax:	98158578
DK-9220 AALBORG Ø	Email:	rag@aua.auc.dk
DENMARK		
Address	Tel country+area code:	
Same as above	Tel number:	
	Fax:	
	Email:	

Mailing Address of the Organisation (if different from the Legal Address)Do you have a Parent Organisation Y/N? **N**

If yes, please complete the following section of this form.

Form2.2: Technicalcontactpoint

Partner:LIA

ProjectNoEP29335

1.4TECHNICALCONTACT(=T)

TITLE	Professor		
FIRSTNAME	Erik		
LASTNAME	Granum		
ORGANISATIONNAME	AalborgUniversitet		
DEPARTMENTNAME	LaboratoryofImageAna lysis		
STREETNAME	Fr.Bajersvej	No.	7D -1
POBOX		REGIONCODE	
COUNTY/LOCALITY (eg.Province,Nomos,Region,Bundesland)	NordjyllandsAmt		
POSTCODE	DK-9220	CITY	Aalborg
COUNTRY	Denmark		
TELEPHONENO. (directline)	+4596358789	TELEFAXNo.	+4598154008
TELEXNo.		EUROKOMNAME	
E-MAIL	eg@vision.auc.dk		

Form2.3: Administrativecontactpoint

Partner:LIA

ProjectNoEP29335

1.5ADMINISTRATIVECONTACTPERSON(=A)

Pleasetickifthisisthesamepersonasmentionedinform1.2				Y
TITLE	ChiefAccountant			
FIRSTNAME	Richard			
LASTNAME	Gajhede			
ORGANISATIONNAME	AalborgUniversitet			
DEPARTMENTNAME	AccountingDivision			
STREETNAME	Fr.Bajersvej	No.	7F	
POBOX	159	REGIONCODE		
COUNTY/LOCALITY (eg.Province,Nomos,Region,Bundesland)	NordjyllandsAmt			
POSTCODE	DK-9100	CITY	Aalborg	
COUNTRY	Denmark			
TELEPHONENO. (directline)	+4596359505	TELEFAXNo.	+4598158578	
TELEXNo.		EUROKOMNAME		
E-MAIL	rag@aua.auc.dk			

Form2.1: RegistrationFormfororganisationsregisteredascontractors withinEsprit

Partner:COGS

Proj.NoEP29335

LegalIdentificationoftheOrganisation

FullName 1	UniversityofSussex	
LegalStatus(SA,Ltd,GmbH)	Charity	
Name(s)ofLegalSignatory(ies)	M.D.Clark	
VATnumber	GB6927123120	Registrationnumber

OrganisationClassificationforStatisticalPurposes

Organisationtype 2	U	Industrysector 3	ED
Numberofemployees	1911	IstheorganisationanSME(Y/N)?	N

LegalAddressoftheOrganisation

Address	Telcountry+area code: +441273	
UniversityofSussex		
Falmer	Telnumber:	606755
BrightonBN19RH	Fax:	678335
UK	Email:	

MailingAddressoftheOrganisation(ifdifferentfromtheLegalAddress)

Address	Telcountry+areacode:	
	Telnumber:	
	Fax:	
	Email:	

DoyouhaveaParentOrganisationY/N?N

Ifyes,pleasecompletethefollowingsectionsofthisform.

LegalIdentificationoftheParentOrganisation

FullName 1		
LegalStatus(SA,Ltd,GmbH)		
VATnumber	Registrationnumber	

ParentOrganisationClassificationforStatisticalPurposes

Organisationtype 2	Industrialsector 3
Numberofemployees	IstheorganisationanSME(Y/N)? 4

LegalAddressoftheParentOrganisation

Address	Telcountry+areacode:	
	Telnumber:	
	Fax:	
	Email:	

Form2.2: Technicalcontactpoint

Partner:COGS

ProjectNoEP29335

1.4 TECHNICAL CONTACT (=T)			
TITLE	Associate Professor, Dr.		
FIRSTNAME	Michael		
LASTNAME	Scaife		
ORGANISATIONNAME	University of Sussex		
DEPARTMENTNAME	School of Cognitive & Computing Sciences		
STREETNAME	Falmer	No.	
POBOX		REGIONCODE	
COUNTY/LOCALITY (eg. Province, Nomos, Region, Bundesland)	EASTSUSSEX		
POSTCODE	BN19QH	CITY	BRIGHTON
COUNTRY	UK		
TELEPHONE No. (directline)	+441273678317	TELEFAX No.	+441273671320
TELEX No.	-	EUROKOMNAME	-
E-MAIL	mikesc@cogs.susx.ac.uk		

Form2.3: Administrativecontactpoint

Partner:COGS

ProjectNoEP29335

1.5 ADMINISTRATIVE CONTACT PERSON (=A)			
Please tick if this is the same person as mentioned in form 1.2		YES	-same person
			Y
TITLE	Mr.		
FIRSTNAME	Mark		
LASTNAME	Clark		
ORGANISATIONNAME	University of Sussex		
DEPARTMENTNAME	Research Grants and Contracts		
STREETNAME	Sussex House, Falmer	No.	
POBOX		REGIONCODE	
COUNTY/LOCALITY (eg. Province, Nomos, Region, Bundesland)	East Sussex		
POSTCODE	BN19RH	CITY	Brighton
COUNTRY	UK		
TELEPHONE No. (directline)	+441273678238	TELEFAX No.	+441273678335
TELEX No.		EUROKOMNAME	
E-MAIL	M.D.Clark@sussex.ac.uk		

Form2.1: RegistrationFormfororganisationsregisteredascontractorswithinEsprit

Partner:IDAU

ProjectNo
EP29335

LegalIdentificationoftheOrganisation

FullName 1	ÅrhusUniversitet		
LegalStatus(SA,Ltd,GmbH)	EDU		
Name(s)ofLegalSignatory(ies)	Ms.KirstenSkjoedt		
VATnumber	DK16562777	Registrationnumber	

OrganisationClassificationforStatisticalPurposes

Organisationtype 2	U	Industrysector 3	ED
Numberofemployees	3000	IstheorganisationanSME(Y/N)	? 4 N

LegalAddressoftheOrganisation

Address	Telcountry+areacode:	+45
ÅrhusUniversitet	Telnumber:	89421166
NordreRinggade1	Fax:	89421110
DK8000AarhusC	Email:	ks@adm.au.dk
Denmark		

MailingAddressoftheOrganisation(ifdifferentfromtheLegalAddress)

Address	Telcountry+areacode:	
	Telnumber:	
	Fax:	
	Email:	

DoyouhaveaParentOrganisationY/N? N

Ifyes,pleasecompletethefollowingsectionsofthisform.

LegalIdentificationof theParentOrganisation

FullName 1			
LegalStatus(SA,Ltd,GmbH)			
VATnumber	Registrationnumber		

ParentOrganisationClassificationforStatisticalPurposes

Organisationtype 2	Industrialsector 3	
Numberofemployees	IstheorganisationanSME(Y/N)?	4

LegalAddressoftheParentOrganisation

Address	Telcountry+areacode:	
	Telnumber:	
	Fax:	
	Email:	

Form2.2: Technicalcontactpoint

Partner:IDAU

ProjectNoEP29335

1.4TECHNICALCONTACT(=T)

TITLE	AssociateProfessor,Dr.		
FIRSTNAME	Janek		
LASTNAME	Szatkowski		
ORGANISATIONNAME	ÅrhusUniversitet		
DEPARTMENTNAME	DepartmentforDramaturgy		
STREETNAME	Langelandsgade	No.	139
POBOX		REGIONCODE	
COUNTY/LOCALITY (eg.Province,Nomos,Region,Bundesland)	ÅrhusAmt		
POSTCODE	DK8000C	CITY	Århus
COUNTRY	Denmark		
TELEPHONENO. (directline)	+4598421825	TELEFAXNo.	+4598421828
TELEXNo.		EUROKOMNAME	
E-MAIL	drajs@hum.au.dk		

Form2.3: Administrativecontactpoint

Partner:IDAU

ProjectNoEP29335

1.5ADMINISTRATIVECONTACTPERSON(=A)

Pleasetickifthisisthesamepersonasmentionedinform1.2				V
TITLE	FinancialDirector			
FIRSTNAME	Kirsten			
LASTNAME	Skjoedt			
ORGANISATIONNAME	ÅrhusUniversitet			
DEPARTMENTNAME	FinancialPlanningOffice			
STREETNAME	NordreRinggade	No.	1	
POBOX		REGIONCODE		
COUNTY/LOCALITY (eg.Province,Nomos,Region,Bundesland)	ÅrhusAmt			
POSTCODE	DK8000C	CITY	Århus	
COUNTRY	Denmark			
TELEPHONENO. (directline)	+4589421166	TELEFAXNo.	+458942 1110	
TELEXNo.		EUROKOMNAME		
E-MAIL	ks@adm.au.dk			

Form2.1: RegistrationFormfororganisationsregisteredascontractorswithinEsprit

FullName	DeutschesForschungszentrumfürKünstlicheIntelligenz		
LegalStatus(SA,Ltd,GmbH)	non-profitGmbH		
Name(s)ofLegalSignatory(ies)	Prof.Dr.WolfgangWahlster,Dr.WalterOlthoff		
VATnumber	DE148646973	Registrationnumber:	HR2313 (AmtsgerichtKaiserslautern)

Partner:DFKI**LegalIdentificationoftheOrganisation** ProjectNoEP **29335****OrganisationClassificationforStatisticalPurposes**

Organisationtype	R	Industrysector	IM,IS
Numberofemployees	110	IstheorganisationanSME(Y/N)?	Y

LegalAddressoftheOrganisation

Address	Telcountry+areacode:	+49
631 DeutschesForschungszentrumfürkünstlicheIntelligenz Postfach2080 67608Kaiserslautern, Germany	Telnumber: 2053211 Fax: 2053210 Email:	

MailingAddressoftheOrganisation(ifdifferentfromtheLegalAddress)

Address	Telcountry+areacode:	+49681
Dr.ElisabethAndre DeutschesForschungszentrumfürkünstlicheIntelligenz Stuhlsatzenhausweg3 66123Saarbrücken, Germany	Telnumber: 3025267 Fax: 3025341 Email: andre@dfki.de	

DoyouhaveaParentOrganisationY/N?**NO****Ifyes,pleasecompletethefollowingsectionsofthisform.****LegalIdentificationoftheParentOrganisation**

FullName ¹	Registrationnumber
LegalStatus(SA,Ltd,GmbH)	
VATnumber	

ParentOrganisationClassificationforStatisticalPurpose **s**

Organisationtype ²	Industrialsector ³
Numberofemployees	IstheorganisationanSME(Y/N)? ⁴

LegalAddressoftheParentOrganisation

Address	Email:
	Telcountry+areacode:
	Telnumber:
	Fax:

Form2.2: Technicalcontactpoint
Partner:DFKI

ProjectNoEP 29335

1.4TECHNICALCONTACT(=T)			
TITLE	Dr.		
FIRSTNAME	Elisabeth		
LASTNAME	Andre		
ORGANISATIONNAME	DFKIGmbH		
DEPARTMENTNAME	IntelligentUserInterfaces		
STREETNAME	Stuhlsatzenhausweg	No.	3
POBOX		REGIONCODE	
COUNTY/LOCALITY (eg. Province, Nomos, Region, Bundesland)	Saarland		
POSTCODE	66123	CITY	Saarbrücken
COUNTRY	Germany		
TELEPHONENO. (directline)	+496813025267	TELEFAXNo.	+496813025341
TELEXNo.		EUROKOMNAME	
E-MAIL	andre@dfki.uni-sb.de		

Form2.3: Administrativecontactpoint
Partner:DFKI

ProjectNo.EP29335

1.5ADMINISTRATIVECONTACTPERSON(=A)			
Pleasetickifthisisthesamepersonasmentionedinform1.2			
TITLE	Dr.		
FIRSTNAME	Walter		
LASTNAME	Olthoff		
ORGANISATIONNAME	DFKIGmbH		
DEPARTMENTNAME			
STREETNAME	Erwin-Schroedinger-Str.	No.	57
POBOX	2080	REGIONCODE	
COUNTY/LOCALITY (eg. Province, Nomos, Region, Bundesland)	RheinlandPfalz		
POSTCODE	67680	CITY	Kaiserslautern
COUNTRY	Germany		
TELEPHONENO. (directline)	+496312053478	TELEFAXNo.	+496312053210
TELEXNo.		EUROKOMNAME	
E-MAIL	olthoff@dfki.uni-kl.de		

2.3 Financial BreakdownForm 3.1 Partner costs/cost types per period ⁽¹⁾ (KECU)

Project N°: 29335 Acronym: PU PPET

Participant: LIA

Period Cost category	Period1 KECU	Period2 KECU	Period3 KECU	Period4 KECU	Period5 KECU	Total KECU
1. Personnel	88.3	65.2	69			222.5
2. Equipment (2)	30	0	0			30
3. Third party assistance	3	3	4			10
4. Travel and subsistence (3)	12	10	10			32
5. Consumables and computing (4)	3.5	3,5	3,7			10,7
6. Other significant specific Project costs (5)	3	2	2			7
7. Overheads (6)	27.4	16.1	16.9			60,4
Total KECU (7)	167.2	99.8	105.6			372.6

Total costs :372.6 KECU

Requested Project Funding from CEC372.6 KECU

in % of Costs100.... %

National Currency for this Participant:DKK....

Length of periods and conversion rate used in budget (value of 1 ECU in National Currency)

	Period1	Period2	Period3	Period4	Period5
Number of Months	12	12	12		
National Currency	7.5	7.5	7.5		

- (1) a period in this table is normally 12 months. In special cases it may be necessary to use shorter periods
- (2) Equipment must be depreciated (Art. 19.2 of Annex II of the contract)
- (3) See Article 19.4 of Annex II of the contract
- (4) See Article 19.5 of Annex II of the contract
- (5) To be used strictly in accordance with Art. 19.6 of Annex II of the contract
- (6) See Article 20 of Annex II of the contract
- (7) To be carried forward to Form 3.2

Form3.1 Partnercosts/costtypesperperiod (1)(KECU)

ProjectN°: 29335 Acronym:PUPPET

Participant: COGS

Period Costcategory	Period1 KECU	Period2 KECU	Period3 KECU	Period4 KECU	Period5 KECU	Total KECU
1.Personnel	92.5	92.5	80			265
2.Equipment(2)	77.2	0	0			77.2
3.Thirdpartyassistance	3	2	2			7
4.Travelandsubsistence (3)	12	11	10			33
5.Consumablesand computing(4)	3.5	2.8	2.8			9.1
6.Othersignificant specificProjectcosts(5)	4	4	4			12
7.Overheads(6)	37.8	22.1	19.4			79.3
TotalKECU (7)	230.0	134.4	118.2			482.6

Totalcosts:482.6 KECU

RequestedProjectFundi ngfromCEC482.6 KECU

in%ofCosts100.... %

NationalCurrencyforthisParticipant:GBP....

Lengthofperiodsandconversionrateusedinbudget(valueof1ECUinNationalCurrency)

	Period1	Period2	Period3	Period4	Period5
NumberofMonths	12	12	12		
NationalCurrency	0.676	0.676	0.676		

(1) aperiodinthisstableisnormally12months.Inspecialcasesitmaybenecessary
touseshorterperiods

(2) Equipmentmustbedepreci ated(Art.19.2ofAnnexIIofthecontract)

(3) SeeArticle19.4ofAnnexIIofthecontract

(4) SeeArticle19.5ofAnnexIIofthecontract

(5) TobeusedstrictlyinaccordancewithArt.19.6ofAnnexIIofthecontract

(6) SeeArticle20ofAnnexIIofthecontract

(7) TobecarrriedforwardtoForm3.2

Form3.1 Partnercosts/costtypesperperiod (1)(KECU)

ProjectN°: 29335 Acronym:PUPPET

Participant: IDAU

Period Costcategory	Period1 KECU	Period2 KECU	Period3 KECU	Period4 KECU	Period5 KECU	Total KECU
1.Personnel	24	20	20			64
2.Equipment(2)	0	0	0			0
3.Thirdpartyassistance	0	0	0			0
4.Travelandsubsistence (3)	5	4	3			12
5.Consumablesand computing(4)	3	3	3			9
6.Othersignificant specificProjectcosts(5)	1	1	1			3
7.Overheads(6)	6.6	5.6	5.4			17.6
TotalKECU (7)	39.6	33.6	32.4			105.6

Totalcosts: 105.6 KECU

RequestedProjectFundingfromCEC 105.6 KECU

in%ofCosts100.... %

NationalCurrencyforthisParticipant: ...DKK....

Lengthofperiodsandconversionrateusedinbudget(valueof1ECUinNationalCurrency)

	Period1	Period2	Period3	Period4	Period5
NumberofMonths	12	12	12		
NationalCurrency	7.5	7.5	7.5		

(1) aperiodinthisstableisnormally12months.Inspecialcasesitmaybenecessary
touseshorterperiods

(2) Equipmentmustbedepreciated(Art.19.2ofAnnexIIofthecontract)

(3) SeeArticle19.4ofAnnexIIoftheco ntract

(4) SeeArticle19.5ofAnnexIIofthecontract

(5) TobeusedstrictlyinaccordancewithArt.19.6ofAnnexIIofthecontract

(6) SeeArticle20ofAnnexIIofthecontract

(7) TobecarriedforwardtoForm3.2

Form3.1 Partnercosts/costtypesperperiod (1)(KECU)

ProjectN°: 29335 Acronym:PUPPET

Participant: DFKI

Period Costcategory	Period1 KECU	Period2 KECU	Period3 KECU	Period4 KECU	Period5 KECU	Total KECU
1.Personnel	73	73	58			204
2.Equipm ent(2)	17	0	0			17
3.Thirdpartyassistance	0	0	0			0
4.Travelandsubsistence (3)	8	6	6			20
5.Consumablesand computing(4)	0	0	0			0
6.Othersignificant specificProjectcosts(5)	0	0	0			0
7.Overheads(6)	19.6	15.8	12.8			48.2
TotalKECU (7)	117.6	94.8	76.8			289.2

Totalcosts:289.2 KECU

RequestedProjectFundingfromCEC289.2 KECU

in%ofCosts100.... %

NationalCurrencyforthisParticipant:DM.....

Lengthofperiodsandconversionrateused inbudget(valueof1ECUinNationalCurrency)

	Period1	Period2	Period3	Period4	Period5
NumberofMonths	12	12	12		
NationalCurrency	1.97	1.97	1.97		

(1) aperiodinthisstableisnormally12months.Inspecialcasesitmaybenecessary
touseshorterperiods

(2) Equipmentmustbedepreciated(Art.19.2ofAnnexIIofthecontract)

(3) SeeArticle19.4ofAnnexIIofthecontract

(4) SeeArticle19.5ofAnnexIIofthecontract

(5) Tobeusedstrictl yinaccordancewithArt.19.6ofAnnexIIofthecontract

(6) SeeArticle20ofAnnexIIofthecontract

(7) TobecarriedforwardtoForm3.2

Form3.2 Partnercosts/costtypesperperiod (1)(KECU)

Project: EP29335 Acronym: PUPPET

Participants	Period1 KECU(2)	Period2 KECU(2)	Period3 KECU(2)	Period4 KECU(2)	Period5 KECU(2)	Total KECU(2)	Funding toProject
LIA	167.2	99.8	105.6			372.6	372.6
COGS	230.0	134.4	118.2			482.6	482.6
IDAU	39.6	33.6	32.4			105.6	105.6
DFKI	117.6	94.8	76.8			289.2	289.2
TotalKECU(3)	554.4	362.6	333.0			1250	1250

Totalcosts: 1250 KECU

RequestedProjectFundingfromCEC: 1250 KECU

-
- (1) Aperiodinthistableisdefinedatform3.1.Itisnormally6or12months.Inspecialcasesit mayberequiredtouseshorterperiods(3or6months)
- (2) ValuescarriedoverfromForm3.1
- (3) ThesetotalsmustcomplywithArt.3oftheContract

2.4 Form4: **BankInformation** -to be completed by **Co-ordinator** only

ProjectNoEP29335

1.7.1COUNTRYOFLAW	Denmark		
1.7.2DESIREDSTARTDATE	October15,1998		
1.7.3FINANCIALMANAGER(=F)			
TITLE	ChiefAccountant		
FIRSTNAME	Richard		
LASTNAME	Gajhede		
ORGANISATIONNAME	AalborgUniversitet		
DEPARTMENTNAME	AccountingDivision		
STREETNAME	Fr.Bajersvej	No.	7F
POBOX	159	REGIONCODE	
COUNTY/LOCALITY (eg.Province,Nomos,Region,Bundesland)	NordjyllansAmt		
POSTCODE	DK -9100	CITY	Aalborg
COUNTRY	Denmark		
TELEPHONENO. (directline)	+4596359505	TELEFAXNo.	+4598158578
TELEXNo.		EUROKOMNAME	
E-MAIL	rag@aua.auc.dk		
1.7.4BANKDETAILS (seeAnnex3forbankaccountformats)			
BANKNAME	SparNord,VejgaardAfdeling		
BANK/SORT/SWIFTCODE	spnodk22		
STREETNAME	Hadsundvej	No.	20
POBOX		REGIONCODE	
COUNTY/LOCALITY (eg.Province,Nomos,Region,Bundesland)	NordjyllandsAmt		
POSTCODE	DK9000	CITY	Aalborg
COUNTRY	Denmark		
BANKACCOUNTNo.	9380	3828856579	
PAYMENTREFERENCE	RF179		

Esprit, Long Term Research, Task 4.4

Intelligent Information Interfaces (i3)
Experimental School Environments (i3 -ese)

Annex to Contract
Project Programme, Part 2
Description of the RTD Project

Project EP29335 -PUPPET
“The Educational Puppet Theatre of Virtual Worlds”

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Brief Summary

The objective of the PUPPET project in the field of early learning is to develop and investigate the value of a new virtual reality environment, the "Virtual Puppet Theatre", based on a theoretical framework of "learning through externalisation". Hence PUPPET aims at extending the current forms of early learning through play by developing a range of novel individual as well as collaborative interactive environments - using the theatre metaphor.

We will carry out a series of exploratory and empirical studies to determine current and new play practices and to analyse the kinds of behaviour that children show and the socio-cognitive skills they develop through these forms of play, in order to support design and evaluation of the new tools.

The benefits of this project for the Experimental School Environments will be: i) it will promote new forms of creativity made possible by new IT tools; ii) it will enable new forms of self-expression not possible with conventional plays; iii) it will encourage learning to learn and iv) it will allow for a new form of computer literacy.

The consortium brings together an interdisciplinary team with the Aalborg University (LIA) as coordinator of the project and of the technological development of new tools. The Århus University (IDAU) brings expertise in dramaturgy. The German Research Centre for Artificial Intelligence in Saarbrücken (DFKI) brings expertise in building intelligent user interfaces and autonomous agents. The University of Sussex (COGS) brings expertise in several areas including innovative methods of design methodology and early learning. They will be coordinating the Workpackages on informing design and the evaluation of the VPT series.

Deliverable and Report Identification

Ti.Wp.[t] e.g. D1.W3, D2.W1.2

T Type:

D External Deliverable Report

P Prototype System

M Milestone

I Internal Reporting

"i" iteration=[1,2,3] i.e. work related to VPT1, VPT2 or VPT3, respectively.

Wp Workpackage=[W1, W2, W3]

"t" task number (applicable for Internal Reporting only), and possibly a discriminating letter.

1. Objectives and Results

1.1 Specific Objectives and Early Learning Paradigms

The specific objectives of the PUPPET project are:

- to design and develop the VPTs as individual and collaborative virtual environments, based on our fieldwork, with a special focus on providing constructive and expressive tools (e.g. the use of avatars, autonomous agents and 'magical' animations) that fosters symbolic activity in the use of objects, roles and collaboration.
- to investigate the value of such environments for early learning based on our theoretical framework of learning through externalisation ('external cognition').

To achieve this we also pursue the following objectives:

- to carry out a series of exploratory and empirical studies to determine current play practices and to analyse the kinds of behaviours and skills that children show in order to establish reference and support for the design of the VPT.
- to involve children, drama teachers and others in the community in co-designing the prototypes of our interactive worlds (i.e. the VPTs), by using a range of innovative low-tech and high-tech prototyping methods called "informant design".

Early Learning Paradigms

Our starting point for using a theatre setting to promote early learning, EL, is that dramatic symbolic play is an attractive and educationally appropriate activity for 4-8 year old children. It is a ubiquitous phenomenon in childhood and has a well-documented value in promoting cognitive and social skill development for children. It takes various forms during childhood but we are particularly interested in fantasy or make-believe play (hereafter MBP), characterised by the child taking on a series of roles that involve extensive use of props and assigning roles to the toys and perhaps other children. MBP has two main forms, one where children can pretend on their own, acting out a situation in exclusion from others, and a more sophisticated form that requires interaction, communication and co-operation with others.

We see the value of the VPT in terms of two learning models at different levels of granularity.

The first is our theory of external cognition (Scaife & Rogers, 1996). Here we focus on the role of externalisation in cognitive development: the process of articulating (making explicit) and acting out concepts. Externalisation decreases cognitive load during processing, enabling the child to focus less on the detail and more on the structure of the space whilst learning. The example that we shall be exploring in the project is MBP in the puppet world, with its emphasis on the child having to script and act out roles, use objects symbolically and integrate the whole process. The externalisation learning model means that we need to consider the specific cognitive benefits to the individual child of both individual and collaborative activities and the roles of objects in supporting them.

The second learning model that we will employ is the socio-historical one advanced by Vygotsky and Leontiev. This emphasises processes at the social, rather than the individual, level. Thus an important function of children's play is to gain experiences with features of the adult world, acting out adult roles and activity structures in order to gain understanding and mastery of them. In this learning model, there are important distinctions between the roles of other children and of adults in the developmental process. This learning model means that we need to consider (i) precisely what the roles are of other children and of adults in the plays situation and (ii) the cultural context for particular play activities.

1.2 New Tools

The new tool we plan to develop for early learning, is a special -capability full Virtual Reality Environment, the virtual puppet theatre or VPT, which has its own and designable ontology. This means that within it anything imaginable may exist, and anything may happen. These "anythings" can be made to operate under full control of the user, or they may operate on the basis of fully autonomous processes (possibly stochastic) within the VPT software system. Further, any intermediate level between these extremes of "who is in control", can be made dynamically achievable on a continuous scale.

The VPT comprises a dynamic virtual 3-D world, that can be seen, heard, and controlled by the user, a stage with objects of all sorts. Objects may be static like props, i.e. trees, chairs, houses, castles etc., or dynamic (moving) like cars, trains and living creatures in particular acting puppets. The stage may be changed using various scenographic effects, magical things may happen like "dead" and static objects being turned into living things as in a fairy tale, puppets may behave according to some instructions from a user provided script, or they may be autonomous so that they may react to their own observations and events in the virtual world, and in accord with some intentions of their own.

The puppets may function as avatars, i.e. representatives of the children (puppeteers) playing with the VPT. The behaviour of an avatar may in part or in full be controlled by a child through special interfaces which record the child's gestures and/or body motion.

All content and activity in the VPT in a given play is described in a "script" as in theatre or film productions. The balance of control between script, puppeteer, and actors/puppets may be adaptable over a continuous scale: the script may specify actions down to the least detail, but it may also just define a framework within which a set of autonomous puppets/processes can operate. In either case, the puppeteer may interfere, and she may change the script dynamically during the course of a play.

The script, as actually executed, may be recorded together with all relevant control parameters. This allows for a repeat of the play as it was, or possibly with specific changes so that the cause-effect relation of these changes can be studied (by the child, and/or by the investigator).

The VPT described above is technically feasible. Hence, in principle, any child fantasy and any experimental scenario cleverly thought out by an adult, such as a specialist in learning, should be realisable and controllable in the VPT.

To facilitate 'learning by externalisation' we plan to develop three instances of the VPT, that are targeted at the different age groups and will support different kinds of learning activities. These are:

VPT1: "The Realistic VPT" - for individual 4-5 year olds

VPT2: "The Magic VPT" - for individual 6-8 year olds

VPT3: "The Collaborative Magic VPT" - for 6-8 year olds.

At an operational level these VPTs will vary in:

- degree of realism* - how objects in the virtual world behave with respect to our every day expectations.
- complexity of scripting* - what children have to do to create a story when interacting with the VPT
- level of interactivity and control* - the way the child interacts with the interface (e.g. via direct manipulation) and who controls the puppets (i.e. the system or the child).

The dimensions and their manifestation in the various VPT's give insight into what degrees of freedom the VPT design will be subjected to. Concrete specifications will be derived in close interdisciplinary collaboration between experts in learning, psychology, dramaturgy, and teachers, and in the context of field studies. Especially specifications concerning the degree of realism in puppet behaviour (semantic consistency of actions and interactions) need to be determined, in order to create intriguing puppetsto interact with. To this end the consortium has planned an iterative process of prototyping -fi and hi -fi

mock-ups and subject them to field studies to continuously get input from children on interface design and how effectively the VPT supports MBP. This is investigated in WP -1 and WP -3.

Relative to other Virtual Reality Environment applications the VPT concept involves a major technological challenge in making the Virtual World come alive and support the child in acting out plays. Our learning model emphasises the importance of role play and acting out of situations/scenarios. In the theatre metaphor this translates into scripting. In the VPT the child will be able to specify a scenario in terms of settings, characters present and props available. Additionally narrative building blocks can be combined in multiple ways to lay out a story line. The VPTs will include:

- *Support for script generation.* We will develop tools to support the child in expressing their ideas for a play into a script.
- *Support for script execution.* We will develop tools for interpretation and execution of the script, including control of scenographic effects and puppet behaviours.
- *Support for online interaction.* We will develop tools enabling the child to actively participate in the running of a script, e.g., by controlling a puppet via an interface.

Also, a "Tutor Interface" will allow an adult to observe, and potentially interact with the "Puppeteer's" control and use of the VPT. Associated with this interface, an event -logging as well as a monitoring facility will be provided.

1.3 Methods

We shall use a combination of interdisciplinary conceptual analyses, informant design, empirical and ethnographic studies and technological research to develop a new learning paradigm and an IT -based tool.

- At a conceptual level we shall review existing theories and empirical research from a diversity of fields, including cognitive science, developmental psychology, educational science and learning, media science, dramaturgy and engineering science. Results will be analysed in terms of (i) symbolic play and its importance for cognitive and social development, (ii) the construction of plays and drama, for and by children, and (iii) the design of computer -supported systems for children's play and learning.
- Exploratory and ethnographic studies in conjunction with our theoretical analyses of early learning. We shall carry out a series of exploratory and ethnographic studies to understand better early learners in terms of current play practices - from different perspectives, including children from different age groups, drama teachers and parents. For the 4 -5 year age group we will investigate the kinds of Make -Believe Play children by themselves engage in when interacting with imaginary, physical and virtual puppets. For the 7 -8 year age group, we will conduct observational studies on children's use of 'pretend' play, using imaginary and physical puppets as a baseline for comparison and as a source of design ideas. The data collected will be analysed in terms of the kinds of behaviours that children show and the socio -cognitive skills they develop through these forms of play. They will also be used to inform the design of the various forms of the VPT.
- Informant design & Technological Research . Informant design is a method developed by Scaife et al (1997) which advocates efficiency of input from different people: maximising the value of contributions from various informants and design team members at different stages of the design process. A particular emphasis is shown to use to best effect the contribution children can offer when designing educational software. Drama teachers will also serve as informants, providing us with insight into the various drama techniques available. To carry out informant design we shall use both low -tech techniques, using 'lightweight' communicative and creative tools (e.g. paper cut -outs) to mock -up aspects of the interface for the VPT and high -tech techniques involving both rapid prototyping of first generation software and also designers working with children commenting on their software. These results feed directly into the technology design process.

- Empirical Evaluation. We shall carry out a series of empirical studies that will allow us to assess the pedagogical value of providing constructive and expressive tools (e.g. the use of avatars, autonomous agents and 'magical' animations) and how they can effectively support symbolic activity in the use of objects, roles and collaboration. We shall assess what new forms of learning have evolved by using socio-cognitive developmental indices such as:
 - reflective verbal skills
 - story comprehension in terms of recall and divergent thinking
 - emergent scripting skills
 - collaborative and social skills
 - ability to decentre

This will be done in studies of children, alone and together using the different forms of the VPT. Data will be collected in pre- and post-tests and during play sessions with the VPT.

1.4 Expected Results

The project will generate 3 prototype versions of the new EL-tool, the VPT, which can serve as models for commercial products in the area of education. Through the development and test of these VPTs we expect that the project will produce the following results in the area of Early Learning:

- (i) the VPT will promote new forms of creativity, through the use of authoring, editing and scripting tools that allow 'magical' actions to happen, i.e. the transformations of virtual objects and artefacts, that is not possible with physical artefacts.
- (ii) the VPT will enable new forms of self-expression, by allowing the children to construct, assign and act out different roles using virtual characters in the form of avatars and intelligent agents.
- (iii) the VPT will encourage learning to learn in two principled ways: firstly by allowing children to externalise their actions and cognition through animating puppets in the VPT environment, and secondly, at a meta-level, supporting them in decomposing their own actions and cognition, by externalising the process of play construction - something they don't normally reflect upon in the physical world.
- (iv) the VPT will allow for a new form of literacy, i.e. the ability to construct, edit and run interactive narratives which are normally ephemeral in physical play.
- (v) that an analysis of the behaviour of the children using the VPT will show that they are motivated to use it and can do so easily across children with the range of social and cognitive skills normally found in classrooms.
- (vi) that the VPT will meet the needs and aims of the teaching and parental communities in terms of its value for child development.
- (vii) that the learning theories and insights achieved in PUPPET will inspire other creative versions of educational computer environments.

2. Work Programme and Deliverables

The challenge of the project is to evaluate and hopefully validate 3 hypotheses on how aspects of Early Learning can benefit from new tools in terms of “Virtual Puppet Theatres”, VPTs.

This implies, that for each of these hypotheses, the project must carry out:

- Theoretical and empirical studies in various fields in order to best design the new tools (VPTs),
- Development and implementation of these new tools.
- Field test and evaluation of how well these tools support the hypotheses.

The Workplan has been so designed that each of these 3 tasks is covered by a Workpackage, WP, as follows:

- WP-1. Informing and Specifying Design
- WP-2. Tool Development & Implementation
- WP-3. Experimental Evaluation

A fourth WP has been added to describe the activities of project coordination and management:

- WP-4. Project Coordination

The workplan is in principle an iterative activity, which in each iteration produces a VPT and uses it experimentally to investigate and validate the paradigm and hypothesis of the current iteration.

This structure of the workplan is illustrated in Figure 2.1

The series of iterations provides:

- a gradual improvement in new tools, taking previous experience into account, as well as
- a scan across the age range of the children, and the complexity of the tools.

Each iteration comprises a number of critical design investigations and decisions, which are dependent on expertise from many diverse fields. This necessitates a close coordination between interdependent tasks and partners, particularly in the design phase, in order to achieve timely input to the development and implementation efforts.

Figure 2.2 illustrates the primary interdependencies of the tasks through the production of one VPT, and it indicates a necessary sequential ordering of the efforts. However, for several practical reasons, most activities must go on concurrently, such that e.g. the transfer of design specifications from one task to another will be provided incrementally. I.e. first some initial design framework is defined to allow other tasks to start up, and then the specification is gradually refined. This allows for feedback to the design task, which then as far as possible adapts its work to provide specifications and details to keep the dependent tasks in efficient activity. This calls for a very close collaboration between partners and tasks, respectively.

In practice the iterative cycle shown in Figure 2.1 may/will overlap in time, i.e., some activities of cycle N may have started before cycle N-1 is completed. Although we use “year” as iteration counter, it actually means VPT number, i.e. indicating activities related to VPT1, VPT2, and/or VPT3, respectively.

Milestones and Deliverables

For each iteration we define 3 milestones:

- the first when all major specifications are in place,
- the second when the tool (VPT) is ready and submitted for the test phase, and
- the third when test results are derived and analysed, and ready for review.

For technical deliverables we define “External Deliverables” for each Workpackage, which are prepared to allow Commission services to assess progress and results of the project as follows:

WP-1, One comprehensive report per year/VPT:

“Design basis and specifications for VPT -Y and for its use“.

WP-2, Demonstration of a new VPT prototype per year

WP-3, One comprehensive report per year/VPT on

„Evaluation of VPT -Y for Early Learning“.

WP-4, Managerial reports as required by the contract.

For internal use and support of project coordination, the workplan includes a range of „Internal Reports“ listed for the individual tasks and subtasks.

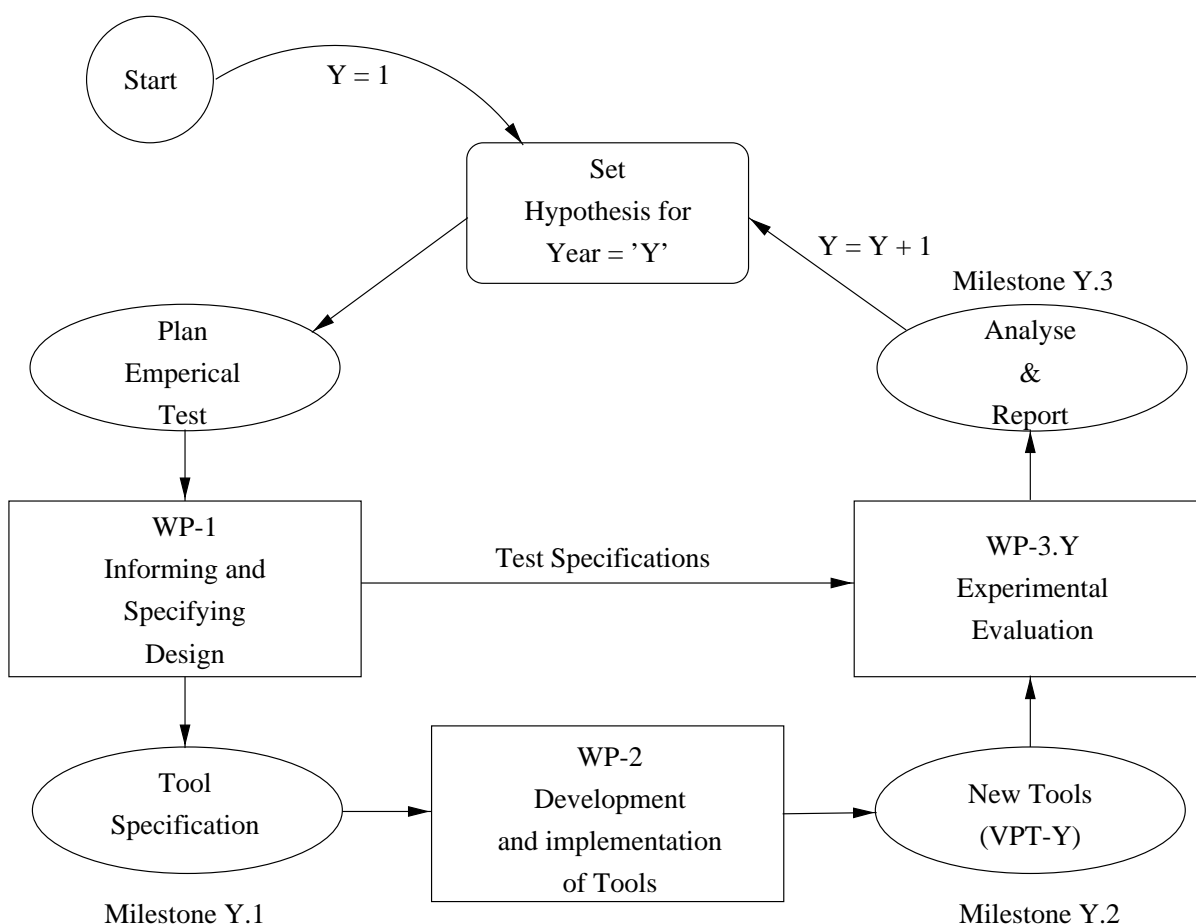


Figure 2.1: The iterative cyclic structure of the workplan. For each iteration no. “Y” (of about one year of duration) a hypothesis on IT -Tool (VPT) supported EL is suggested and tested. To do this a tool is designed (WP -1) and implemented (WP -2) for field tests in schools (WP-3). The workplan covers 3 iterations, each producing and testing a new and extended version of the Tool (VPT).

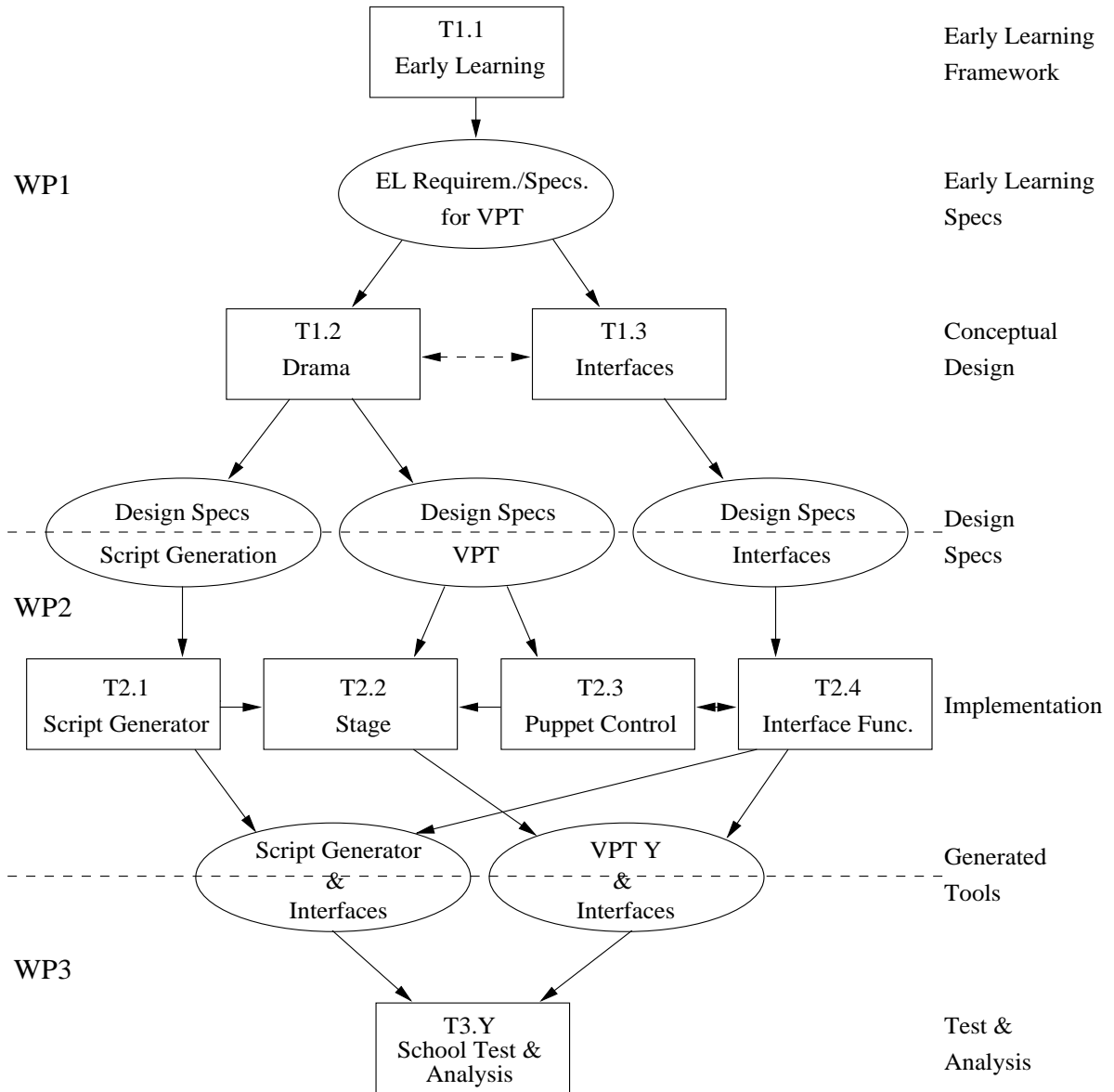


Figure 2.2: Simplified sketch of primary task dependencies and task input/output relations for the generation and use of one VPT. Dashed lines indicate Milestones Y.1 and Y.2, respectively. The intensive feedback interactions between tasks are not indicated.

The four WPs are described on the following pages, and supplemented with tabulated information at the end of this section:

Table 2.1 Schedule of External Deliverables.

Tables 2.2a, b, c Schedule of Internal Reports and Prototypes. (One per VPT/year)

Table 2.3 Manpower Resources allocated to participants per Work package and per Task.

Tables 2.4a,b Project Time Schedules, which provide the same information, but are sorted by VPT -number/Task-number/Partner and Partner/VPT -number/Task-number, respectively.

WP-1. Informing and Specifying Design

WP-Leader COGS, Mike Scaife & Yvonne Rogers

OBJECTIVES

- (i) To establish and update foundations for the design and use of each of the three VPTs and their interfaces through the evaluation of existing theories and ongoing empirical research in the areas of:
 - symbolic play and its importance for cognitive and social development
 - construction of plays and drama, for and by children
 - interface design concepts for young children
- (ii) To develop the conceptual design for the computer-supported VPT systems for children's play and learning (input for WP -2) and for their empirical evaluation (input for WP -3).

SUMMARY

This Workpackage will repeatedly review existing research, both completed and in-progress, both within the 3-ese community worldwide, to establish and update the foundations for the technical development activities of WP -2 and the empirical evaluation activities of WP -3 for each of the three VPTs of year 1 through 3, respectively.

The WP comprises the following Tasks to be repeated every project year:

- 1.1 Early Learning Perspectives
- 1.2 Conceptual VPT design from Dramaturgy and Children's Play
- 1.3 Conceptual Design of User Interfaces

The findings from Tasks 1.1 and 1.2 will unite concepts from the dramaturgical and early learning fields to derive 'play models' which will be both iteratively refined during the project and used as a basis for common development efforts between the dramaturgical, early learning and technical aims of the project.

EXTERNAL DELIVERABLES

For each of the major milestones (reviews) of the project, the internal communication documents with design considerations and specifications for the related VPT and its interfaces, will be compiled and edited into a comprehensive deliverable report.

- D1.W1 Month 12 Design basis and specifications for VPT1 and for its use.
- D2.W1 Month 24 Design basis and specifications for VPT2 and for its use
- D3.W1 Month 36 Design basis and specifications for VPT3 and for its use

Task 1.1**Early Learning Perspectives**

Task-Leader COGS, Mike Scaife & Yvonne Rogers

Participants: COGS

Output to: Tasks 1.2 and 1.3

OBJECTIVES

To review on-going research into symbolic play and its importance for cognitive and social development. Repeated every project year for each VPT.

To use these results to (i) guide design of the individual VPTs via tasks 1.2 and 1.3 and (ii) to derive a methodology for empirical work in the Puppet context.

BREAKDOWN

SUBTASK 1.1.1 Theoretical Studies of Early Learning

SUBTASK 1.1.2 Early Learning Indices

SUBTASK 1.1.1 Theoretical Studies of Early Learning

Subtask-Leader COGS, Mike Scaife & Yvonne Rogers

DESCRIPTION

The EL hypothesis and framework for each individual VPT (i.e. year 1, 2 and 3) is specified for use in all other tasks, and especially in task 1.2.

In addition to web and library resources we shall use our contacts in industry, with relevant institutions (e.g. MIT, Stanford), and relevant conferences and workshops to obtain background information from key researchers with experience of related work. Particular attention will be paid to existing measures of development and learning and on-going research in the area of play. The results from the reviews will be available on-line and at meetings as a resource for use by the system and interface developers and serve as a basis for queries and ideas for evaluation.

INTERNAL REPORTS

I1.W1.1.1a Month 2 Summary of EL goals for VPT1 design and development

I1.W1.1.1b Month 12 A detailed, updated review in both textual form and on-line at the VPT website for the consortium over the whole project period.

I2.W1.1.1a Month 10 Summary of EL goals for VPT2 design and development

I2.W1.1.1b Month 24 Updated review

I3.W1.1.1a Month 20 Summary of EL goals for VPT3 design and development

I3.W1.1.1b Month 36 Updated review

SUBTASK 1.1.2 Early Learning Indices

Subtask-Leader COGS, Mike Scaife & Yvonne Rogers

DESCRIPTION

Develop an interactivity framework for analysing children's dialogue and behaviour with respect to learning indices, which will form the basis for subsequent empirical studies of VPT1.

Further specify the interactivity framework for analysing children's dialogue and behaviour with respect to learning indices, extending it from VPT1, to form the basis for empirical studies of VPT2.

Finalise the interactivity framework for analysing dialogue and behaviour with respect to learning indices, extending it from VPT1 & VPT2, to form the basis for empirical studies of VPT3.

INTERNAL REPORTS

- I1.W1.1.2 Month9 A set of learning measures for VPT1.
 I2.W1.1.2 Month20 An extended set of learning measures for VPT2.
 I3.W1.1.2 Month32 An extended set of learning measures for VPT3.

Task 1.2

Conceptual VPT design from Dramaturgy and Children's Play

Task-Leader IDAU, Janek Szatkowski

Participants: IDAU, COGS, DFKI

Input from: Task 1.1

Output to: Tasks 2.1, 2.2, and 2.3

OBJECTIVES

To develop the dramaturgical, the pedagogical, and the functional requirements for the three VPTs, i.e., conceptual design specification for WP -2.

BREAKDOWN

- SUBTASK 1.2.1 The Dramaturgy of the VPT
 SUBTASK 1.2.2 Field Studies on Children's Puppet Plays
 SUBTASK 1.2.3 Puppet Behaviour Specification

SUBTASK 1.2.1 The Dramaturgy of the VPT

Subtask-Leader IDAU, Janek Szatkowski

DESCRIPTION

Based on concepts from dramaturgical analysis and including experiences from drama education, the task will support the design of the three VPT instances. Scenarios will have to be developed in an interdependence between considerations to early learning requirements, technological possibilities/interfaces and dramaturgical structures, respectively. Elements of the VPT scenarios will be explored in low-tech versions with children, thus giving new input to the concrete scripting process.

A script will consist of:

- 1) a description of the contract the VPT makes with its user(s)
- 2) suggestions for staged design
- 3) development of possible characters to appear as autonomous agents, avatars, or pre-planned fictional characters
- 4) a plot structure of episodes
- 5) possible lines to be spoken by characters

In the development of this we may include artistic expertise in some of the visual design and the development of stories. This is done since we assume that the more attractive and fascinating we can make the VPT the more we can rely on it to get the children to benefit from the playful interaction with 3-D multimedia.

INTERNALREPORTS

I1.W1.2.1	Month5	Scripts,concepts,andscenarioforVPT1.
I2.W1.2.1	Month14	Scripts,concepts,andscenarioforVPT2
I3.W1.2.1	Month26	Scripts,concepts,andscenarioforVPT3
I3.W1.2	Month34	Concludingreport

SUBTASK 1.2.2 Field Studies on Children's Puppet Plays

Subtask-Leader COGS, Mike Scaife & Yvonne Rogers

DESCRIPTION

Conduct field studies on children's use of puppet plays, using physical hand puppets as a baseline for comparison and as a source of design ideas. Use these data to develop specifications for the VPT1 prototype.

Conduct field studies on children's use of 'pretend' play, using puppets and other props as a baseline for comparison and as a source of design ideas. Use these data to develop specifications for the VPT2 prototype.

Conduct field studies on children's use of collaborative play, using puppets and other props as a baseline for comparison and as a source of design ideas then use these results to specify the VPT3 prototype.

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INTERNAL REPORTS

- I1.W1.2.2 Month 5 Specification of the pedagogical and functional requirements for VPT1.
- I2.W1.2.2 Month 14 Specification of the pedagogical and functional requirements for VPT2.
- I3.W1.2.2 Month 26 Specification of the pedagogical and functional requirements for VPT3.

SUBTASK 1.2.3 Puppet Behaviour Specification

Subtask-Leader DFKI, Elisabeth Andre

DESCRIPTION

In order to provide autonomous puppets with believable personalities we need to identify the behaviour repertoire and affective states of the puppets as well as their perceptual capabilities and interaction capabilities in each of the VPTs. In addition, the control functions for the puppets and other animated/interactive objects of the VPTs have to be specified.

o

The outcome of this task will define the semantic dimension of the script language (e.g., temporal concepts) which will be used in Task 2.1.

INTERNAL REPORTS

- I1.W1.2.3 Month 2 Specification of the behaviour space for the puppets of VPT1
- I2.W1.2.3 Month 14 Specification of the behaviour space for the puppets of VPT2
- I3.W1.2.3 Month 26 Specification of the behaviour space for the puppets of VPT3

Task1.3**ConceptualDesignofUserInterfaces**

Task-Leader DFKI,ThomasRist

Participants: DFKI,COGS

Inputfrom: Task1.1

Outputto: Task2.4

OBJECTIVES

-TodevelopinterfacedesignconceptsforthethreeVPTs

-TospecifythefunctionalityfortheVPTinterfaceimplementationofTask2.4

BREAKDOWN

SUBTASK1.3.1InterfaceDesignConcepts

SUBTASK1.3.2InformantDesignFieldStudies

SUBTASK1.3.1InterfaceDesignConcepts

Subtask-Leader DFKI,ThomasRist

DESCRIPTION

EachofthethreeVPTinstancesrequiresuitableuserinterfacesfor:

(a)scriptgeneration/authoring,

(b)scriptplay/execution,

(c)avatarcontrolduringexecution,and

(d)anobserver(tutor)tomonitorasessionandaccesslogsofVPTsessions.

Specialemphasiswillbegiventotheinterfacesasdescribedunder(a),(b)and(c).

FortheVPT1theywillbebuiltaroundideasinspiredbyboardgamesandnatural playenvironmentswithmaterialobjects.Severalalternativeconceptswillbe developed,forexample,thekidmaybeallowedtomoveaphysicalpuppet,sayin formofajigsawpiece,onatouchscreeninordertospecifyacertaintrajectory forthethevirtualcounterpartofthepuppetintheVPT1.Bychoosingdifferentjigsaw pieces,thekidmayintroducedifferentcharactersandroles.“Puppetongdata glove”isanotherinterfaceconcepttobeinvestigated,whichinparticularmay supportinstructionsforPuppetbehaviour.Sinceaselectionhastobemadefor theVPT1implementationeachdesignconceptwillbeevaluatedinviewof expressiveness,usability,technicalfeasibilityandrequiredefforts.Thepartners LIAandCOGSwillprovideinformationconcerningtheirpracticalexperience withdataglovesandvisionsystemstodetectandinterpretthechild’sgesturesand -ifneeded -thejigsawpieces.

ForVPT2andVPT 3weplantorelyonsymbolicrepresentationsforscriptwriting andexecutioncontrol.Forexample,iconsmaybeusedasrepresentationsfor puppetsandsceneobjectsbutalsotorepresentabstractconcepts,suchtrajectories andactions.

Theconceptdevelopmentwilldrawontheresultofaninitialsurvey.Aninitial reportwillsurveyuserinterfacesforchildren,inparticularintheareaofauthoring toolsandvirtualtheatreenvironments.

INTERNALREPORTS

I1.W1.3.1a	Month3	Report providing an overview of user interfaces for children, in particular authoring tools and virtual theatre environments.
I1.W1.3.1b	Month5	Result of the evaluation of interface design concepts for VPT1
I1.W1.3.1c	Month6	Specification of interface functions for VPT1
I2.W1.3.1a	Month13	Result of the evaluation of interface design concepts for VPT2
I2.W1.3.1b	Month15	Specification of interface functions for VPT2
I3.W1.3.1a	Month25	Result of the evaluation of interface design concepts for VPT3
I3.W1.3.1b	Month26	Specification of interface functions for VPT3

SUBTASK 1.3.2 Informant Design Field Studies

Subtask-Leader COGS, Mike Scaife & Yvonne Rogers

DESCRIPTION

Using low-tech techniques to investigate children's design ideas for interfaces for VPT1. Where appropriate, to use these to make rapid prototypes with a computer for immediate testing.

Using low-tech techniques to investigate children's design ideas for interfaces for VPT2 which emphasises the magical (i.e. transformational) aspects of play and, where appropriate, to make rapid prototypes for immediate testing.

Using low-tech techniques to investigate children's design ideas for interfaces for VPT3 which emphasises the collaborative aspects of play. Where appropriate, to use these to make rapid prototypes with a computer for immediate testing.

INTERNAL REPORTS

I1.W1.3.2	Month5	Findings on pedagogical and functional interface requirements for VPT1.
I2.W1.3.2	Month14	Findings on pedagogical and functional interface requirements for VPT2.
I3.W1.3.2	Month26	Findings on pedagogical and functional interface requirements for VPT3.

WP-2.ToolDevelopment&Implementation

WP-Leader LIA,ErikGranum

OBJECTIVES

To develop and implement the HW and SW required to realise the VPT with interfaces in its various versions as specified by WP -1.

SUMMARY

This WP comprises the following 4 Tasks:

- 2.1 ScriptGenerator
- 2.2 TheVirtualStageandPuppets
- 2.3 BehaviourControlforPuppets
- 2.4 UserInterfaceFunctions

The Workpackage will produce SW systems for script generation (authoring tools used to prepare VPT -plays), and the VPT SW -platforms themselves, in which the puppet plays are executed/acted out. The systems will be capable of handling real time (two -way) multimedia interaction at puppeteer (child) level.

EXTERNAL DELIVERABLES (Demonstration of prototypes at reviews)

P1.W2	Month10	Prototype interfaces and VPT1 Tools for Early Learning
P2.W2	Month22	Prototype interfaces and VPT2 Tools for Early Learning
P3.W2	Month34	Prototype interfaces and VPT3 Tools for Early Learning

Task2.1

ScriptGenerator

Task-Leader LIA,ClausB.Madsen

Participants: LIA

Input from: Tasks 1.2, 1.3, and 2.4

Output to: Task 2.2, WP -3

OBJECTIVES

Investigate, design and implement script generators for the VPTs, and integrate them with the appropriate interfaces.

DESCRIPTION

We will devise techniques for generating scripts that allow the user to stage plays to be acted out in the VPT. In this context, a script is the VPT system's internal representation of a story line, i.e., a temporal sequence of events. The script is used by the VPT system to perform high level control of the autonomous agents (puppets) and the scenography.

The script generator, SG, will via a novel, intuitive interface create the link between the inexperienced user and the script language being executed in the VPT. This task involves 3 subtasks

- 1) Design of a computational framework for representing these sequences of events and actions needed to support the required dramaturgical scenarios. Effort related to Task 1.2

- 2) Design and implementation of mechanisms for mapping the user's interaction with the developed interface to an operational internal representation of a script. Effort related to Tasks 1.3 and 2.4.
- 3) Design and implementation of the interaction between script generator and the internal VPT script executor, including due consideration to how scripts map to a super-ordinate control of autonomous agents. Effort related to Tasks 2.2 and 2.3.

INTERNAL REPORTS AND PROTOTYPES

I1.W2.1	Month 4	Vocabulary and grammar of the script languages for VPT1
P1.W2.1	Month 8	Prototype for Script Generator for VPT1
I2.W2.1	Month 16	Vocabulary and grammar of the script languages for VPT2
P2.W2.1	Month 20	Script Generator with on-line editing facilities for VPT2
I3.W2.1	Month 28	Vocabulary and grammar of the script languages for VPT3
P3.W2.1	Month 32	Script Generator with on-line editing for multiple users, VPT3

Task 2.2.

The Virtual Stage and Puppets

Task-Leader LIA, Claus S. Andersen

Participants LIA, COGS

Input from: Tasks 1.2, 2.1, 2.3

Output to: WP-3

OBJECTIVES

To create a SW environment which:

- 1) Manage the dynamic scene model of the stage of the Virtual Puppet Theatre including interacting, controllable, and autonomous agents, 3D geometric properties of "physical" objects, and scenographic effects.
- 2) Enables multimodal communication between puppets at all levels of autonomy, and provides puppets with sensory information.
- 3) Provides mechanisms for stage control and execution of temporal sequences of events as prepared by the Script Generator.

DESCRIPTION

In addition to the static 3D geometrical and visual properties of objects this task will provide facilities for describing possible degrees of freedom of objects, e.g., a ball can roll. This includes internal degrees of freedom, e.g., a puppet can wave. Importantly, the object description framework will enable modeling of cause-effect aspects of any physical interaction between objects, and how they relate to the object degrees of freedom. The virtual tag material level description framework will be designed to support the real-time multimodal presentation (task 2.4) of the world status.

The puppets' perceptual capabilities will be facilitated in this task using the Spatial Model of Interaction (Benford et al. 1993). The fundamental concepts of this model will be implemented to provide a puppet (and other objects within the VPT) access to information simulating both human and non-human senses. Examples of sensory information include audio (sounds and puppet speech), proximity (closeness to objects), perception of movements, presence of objects, etc. Further this model and a recent extension to it (see Benford et al. 1997) will support the

modelling of puppet attention to and awareness of elements of the environment and properties thereof.

The user's interaction with the stage and puppets will be beside the direct control produced in Task 2.4, be handled through a Script Executor, binding the Script Generator to the actual stage. The Script Executor facilitates execution of temporal events, as well as control of scenographic effects and autonomous agent specifications, in the form delivered by the Script Generator.

INTERNAL PROTOTYPES

- P1.W2.2 Month10 SW for Stage prototype VPT1, "The Realistic VPT"
- P2.W2.2 Month22 SW for Stage prototype VPT2, "The Magic VPT"
- P3.W2.2 Month34 SW for Stage prototype VPT3, "The Collaborative Magic VPT"

Task2.3

BehaviourControlforPuppets

Task-Leader DFKI, ElisabethAndre

Participants: DFKI, LIA

Inputfrom: Task1.2

Outputto: Task2.2

OBJECTIVES

Designandrealisationofamechanismsforcontrolofthebehaviourofthe puppets.

DESCRIPTION

We will combineworkonbehaviour -basedcontrol, computationalmodelsof personalityandemotions, multimediaauthoring, andcontrolarchitecturesto facilitatethecontrolofautonomouspuppetswithbelievablepersonalities. Essentially, this task involves threesubtasks:

- 1) thespecificationofasystem -internformalismforrepresentingpuppetbehaviours consideringth erepertoirespecifiedinsubtask1.2.3.
- 2) thedesignandimplementationofanaffectivereasonertomodeltheaffective statesofthepuppets.
- 3) thedevelopmentofasystemarchitectureforcharactercontrolthatintegrates goal-directedbehaviours,script -basedbehaviours, reactionsandbelievability - enhancingbehaviours, suchasemotions. Thecontrolarchitecturewillinparticular realiseactionselectionmechanismsthatenabletheco -ordinationoftheactivities ofthepuppetinconformancewith itsbehavioursandemotionalstatespossibly underscriptdirectives.

INTERNALREPORTSANDDELIVERABLES

I1.W2.3	Month6	Reviews of existing models of personality and emotion, and of action selection mechanisms for behaviour -based control.
P1.W2.3	Month10	A software package including a library of basic puppet behaviours for control of autonomous puppets with believable personalities for VPT1
P2.W2.3	Month20	Updated SW and Library for VPT2
P3.W2.3	Month32	Updated SW and Library for VPT3

Task2.4**User Interface Functions**

Task-Leader COGS,HilaryBuxton

Participants: COGS,LIA,DFKI

Inputfrom: Task1.3

Outputto: Tasks2.1and2.2/WP -3

OBJECTIVES

ToimplementtheuserinterfacefunctionsforthethreeVPTsasspecifiedinTask 1.3

DESCRIPTION

Real-timetwo-waycommunicationmustbemaintainedwiththepuppeteer(s).The VPTmustprocessinputfromthepuppeteerandtransformitintoactions/effects. Conversely,thestagemustprovidetheuserwithamultimodalpresentation,i.e., visualisationandsound.Implementationworkunderthistaskcomprisesuser interfacesfor:

- (a) scriptgeneration/authoring,
- (b) scriptplay/execution,
- (c) avatarcontrolduringexecution,and
- (d) anobserver(tutor)tomonitorasessionandaccesslogsofVPTsessions.

This task will exploit existing software tools as far as possible to support real-time visualisation, audio and VR interfaces.

Visually Mediated Interfaces will be developed and implemented as needed to allow the puppeteer to control the VPT, in terms of scripting and online control of avatars.

As an interface for recognising gestures, data gloves may also be used.

INTERNAL DELIVERABLES

P1.W2.4 Month10 HWandSWforVPT1UserInterfaces

P2.W2.4 Month20 HWandSWforVPT2UserInterfaces

P3.W2.4 Month32 HWandSWforVPT3UserInterfaces

WP-3.ExperimentalEvaluation

WP-Leader COGS, Mike Scaife & Yvonne Rogers

OBJECTIVES

The aims of this Workpackage are: i) To carry out a range of empirical and observational studies to investigate the value of the VPT in supporting new forms of learning. ii) To analyse children's interaction with constructive and expressive tools and to assess their contribution to the development of symbolic activity in the use of objects, roles and collaboration.

SUMMARY

This Workpackage will carry out a series of exploratory and evaluative studies to examine our theoretical ideas about learning through externalisation using VPT1, VPT2 and VPT3.

The WP comprises the following tasks:

- 3.1 EL and VPT1 – The Realistic Virtual Puppet Theatre (for 4 – 5 year olds)
- 3.2 EL and VPT2 – The Magic Virtual Puppet Theatre (for 6 – 8 year olds)
- 3.3 EL and VPT3 – The Collaborative Magic Virtual Puppet Theatre

EXTERNAL DELIVERABLES

Report on evaluation and benefits for Early Learning of VPT1, VPT2, and VPT3, respectively, and comparisons with physical analogues, as specified for the individual tasks.

Task 3.1

VPT1 – The Realistic Virtual Puppet Theatre (for 4 – 5 year olds)

Task-Leader COGS, Mike Scaife & Yvonne Rogers

Participants: COGS

Input from: Task 1.1, WP -2

Output to: Milestone 1.3

OBJECTIVES

To test the ability of the first VPT to support puppets that mimic their use in real world settings but still extend the capabilities of analogous forms of play in the real world.

DESCRIPTION

Perform field tests in schools on the prototype VPT1 and Interfaces, using the learning indices, to look for evidence of externalisation and to compare the use of the VPT with the 'natural' analogues described in the field studies of WP -1.

EXTERNAL DELIVERABLES

D1.W3-P Month 12 Preliminary observations related to deliverable D1.W3

D1.W3 Month18 Anevaluationoftheprototypeintermsoflearning,engagementand supportforcreativeplayrelativetothebenefitsofpuppetplayin physicalenvironments.

PERIOD Months10 -18andmonth25oftheproject(thelatterforafinalreviewofthe prototypeinthelightofwhatweobserveforVPT2).

Task3.2

VPT2 –TheMagicVirtualPuppetTheatre(for6 -8yearolds)

Task-Leader COGS,MikeScaife&YvonneRogers

Participants: COGS

Inputfrom: Task1.1,WP -2

Outputto: Milestone2.3

OBJECTIVES

To test the ability of these second VPTs to support make-believe play for children aged 6-8 playing alone, and to extend the capabilities of analogous forms of play in the real world.

DESCRIPTION

Perform field tests in schools on the prototype VPT2 and Interfaces, using the learning indices, to look for evidence of externalisation activities in virtual environments that afford interactive pretend play.

EXTERNAL DELIVERABLES

D2.W3-P Month24 Preliminary observations related to deliverable D2.W3.

D2.W3 Month30 Anevaluationoftheprototypeintermsoflearning,engagementand supportforcreativeplayrelativetothebenefitsof'pretend'play,in physicalenvironments.

PERIOD Months21 -30

Task3.3

VPT3 –TheCollaborativeMagicVirtualPuppetTheatre

Task-Leader COGS,MikeScaife&YvonneRogers

Participants: COGS

Inputfrom: Task1.1,WP -2

Outputto: Milestone3.3

OBJECTIVES

To test the ability of the third VPT to support collaborative make-believe play for pairs of children aged 6-8 in the same theatre space and to determine if it extends the capabilities of analogous forms of play in the real world.

DESCRIPTION

FieldtestsinschoolsofVPT -3prototypeandInterfacesusingindicesidentifiedin
WP1tolookforevidenceofeffectivecollaborationthatpromotesexternalisation.
Reviewtechnicaldevelopmentinthelightofempiricalevaluations.

EXTERNALDELIVERABLE

D3.W3 Month36 Anevaluation oftheprototypeintermsoflearning,engagementand
supportforcollaborativeplayrelativetothebenefitsof'pretend'play,
inphysicalenvironments.

PERIOD Months33 -36.

WP-4.ProjectCo -ordination

WP-Leader LIA,ErikGranum
Participants AllPartners:LIA,COGS,IDAU,DFKI

OBJECTIVES

To support project management and execution,
to facilitate the co-ordination of work and generation of deliverables, and
to monitor that all project commitments are met.

DESCRIPTION

Formal procedures for project management and distribution of deliverables are described in section 3.

This WP describes the actions and timing of project co-ordination.

MEETINGS

The project Managerial Board (MB, Section 3) will have at least 7 meetings:

A kick-off meeting in month 1, and regular meetings around months 6, 12, 18, 24, 30, and 36, where meetings at 12, 24, and 36 will be related reviews.

The kick-off meeting will address the following issues, further to the standard terms of reference (Section 3.4):

- 1) Standard procedures and formats for project documentation, distribution and filing system
- 2) Standard times schedule for production and submission of all external deliverables
- 3) Proposal for meeting and review calendar for the whole project period
- 4) Proposal for contributions and participation at international conferences and workshops
- 5) Evaluation of possibilities for collaboration with other projects and participation in i3net SIGs (Special Interest Groups), Working Group etc.
- 6) Evaluation of school partners

At all meetings the status, progress and interaction of interdependent project activities are carefully analysed, and detailed plans are made for all necessary interaction of the following half year.

DELIVERABLES, MANAGERIAL REPORTS

PPR-1	Month 12	Periodic Progress Report, Year 1
PPR-2	Month 24	Periodic Progress Report, Year 2
PPR-3	Month 36	Periodic Progress Report, Year 3
FR	Month 37	Final Report

Table2.1: Schedule of external deliverables

Project:EP29335

Acronym:PUPPET

Types of deliverables	Description of the deliverable (Title)	Availability C -R -P ⁽¹⁾	Workpackage reference	Responsible*/involved partner	Project month
VPT1/YEAR1					
Prototype	Interfaces and VPT1 Tools for EL	C	P1.W2	LIA*,DFKI,COGS	10
Report	Design basis and specs. for VPT1	R	D1.W1	COGS*,IDAU,DFKI	12
Report	Preliminary eval. of VPT1 for EL	R	D1.W3-P	COGS	12
Report	Periodic Progress Report, Year 1	P	PPR-1	LIA,All	12
Report	Final eval. of VPT1 Tools for EL	R	D1.W3	COGS	18
VPT2/YEAR2					
Prototype	Design basis and specs. For VPT2	C	P2.W2	LIA*,DFKI,COGS	22
Report	Interfaces and VPT2 Tools for EL	R	D2.W1	COGS*,IDAU,DFKI	24
Report	Preliminary eval. of VPT2 for EL	R	D2.W3-P	COGS	24
Report	Periodic Progress Report, Year 2	P	PPR-2	LIA,All	24
Report	Final eval. of VPT2 Tools for EL	R	D2.W3	COGS	30
VPT3/YEAR3					
Prototype	Interfaces and VPT3 Tools for EL	C	P3.W2	LIA*,DFKI,COGS	34
Report	Design basis and specs. For VPT3	R	D3.W1	COGS*,IDAU,DFKI	36
Report	Final eval. of VPT3 Tools for EL	R	D3.W3	COGS	36
Report	Periodic Progress Report, Year 3	P	PPR-3	LIA,All	36
Report	Final Report	P	FR	LIA,All	37

(5) Availability: C=confidential, R=restricted, P=public

Table2.2a: Schedule of internal reports and prototypes for VPT1/Year1

Types of deliverables	Description of the deliverable (Title)	Availability C -R -P	Workpackage reference	Responsible*/involved partner	Project month
Report	Summary of EL goals for VPT1	R	I1.W1.1.1a	COGS	2
Report	Behaviour specification for VPT1	R	I1.W1.2.3	DFKI	2
Report	Review of I/F for children	R	I1.W1.3.1a	DFKI	3
Report	Script language def. for VPT1	R	I1.W2.1	LIA	4
Report	Pedagogical specs. for VPT1	R	I1.W1.2.2	COGS	5
Report	Pedagogical and func. I/Freq	R	I1.W1.3.2	COGS	5
Report	Result of I/F design analysis	R	I1.W1.3.1b	DFKI	5
Report	Drama script, scenario for VPT1	R	I1.W1.2.1	IDAU	5
Report	Specs. of I/F functions for VPT1	R	I1.W1.3.1c	DFKI	6
Report	Review of behaviour based control	R	I1.W2.3	DFKI*,LIA	6
Prototype	Script Generator for VPT1	C	P1.W2.1	LIA	8
Report	Learning measures for VPT1	R	I1.W1.1.2	COGS	9
Prototype	HW/SW for VPT1 user interfaces	C	P1.W2.4	COGS*,LIA	10
Prototype	SW for basic aut. Puppet control	C	P1.W2.3	DFKI*,LIA	10
Prototype	Stage for VPT1	C	P1.W2.2	LIA	10
Report	Review into symbolic play	P	I1.W1.1.1b	COGS	12

Table2.2b: Schedule of internal reports and prototypes for VPT2/Year2

Types of deliverables	Description of the deliverable (Title)	Availability C –R –P	Workpackage reference	Responsible* /involved partner	Project month
Report	Summary of EL goals for VPT2	R	I2.W1.1.1a	COGS	10
Report	Result of I/F design analysis	R	I2.W1.3.1a	DFKI	13
Report	Pedagogical specs. for VPT2	R	I2.W1.2.2	COGS	14
Report	Pedagogical and func. I/Freq.	R	I2.W1.3.2	COGS	14
Report	Behaviour specification for VPT2	R	I2.W1.2.3	DFKI	14
Report	Drama script, scenario for VPT2	R	I2.W1.2.1	IDAU	14
Report	Specs. of I/F functions for VPT2	R	I2.W1.3.1b	DFKI	15
Report	Script language def. for VPT2	R	I2.W2.1	LIA	16
Report	Learning measures for VPT2	R	I2.W1.1.2	COGS	20
Prototype	HW/SW for VPT2 user interfaces	C	P2.W2.4	COGS*, LIA	20
Prototype	Updated SW for aut. Puppet control	C	P2.W2.3	DFKI*, LIA	20
Prototype	Script Generator for VPT2	C	P2.W2.1	LIA	20
Prototype	Stage for VPT2	C	P2.W2.2	LIA	22
Report	Update of review of symbolic play	P	I2.W1.1.1b	COGS	24

Table2.2c: Schedule of internal reports and prototypes for VPT3/Year3

Types of deliverables	Description of the deliverable (Title)	Availability C –R –P	Workpackage reference	Responsible* /involved partner	Project month
Report	Summary of EL goals for VPT3	R	I3.W1.1.1a	COGS	20
Report	Result of I/F design analysis	R	I3.W1.3.1a	DFKI	25
Report	Pedagogical specs. for VPT3	R	I3.W1.2.2	COGS	26
Report	Pedagogical and func. I/Freq.	R	I3.W1.3.2	COGS	26
Report	Behaviour specification for VPT3	R	I3.W1.2.3	DFKI	26
Report	Specs. of I/F functions for VPT3	R	I3.W1.3.1b	DFKI	26
Report	Drama script, scenario for VPT3	R	I3.W1.2.1	IDAU	26
Report	Script language def. for VPT3	R	I3.W2.1	LIA	28
Report	Learning measures for VPT3	R	I3.W1.1.2	COGS	32
Prototype	HW/SW for VPT3 user interfaces	C	P3.W2.4	COGS*, LIA	32
Prototype	Updated SW for aut. Puppet control	C	P3.W2.3	DFKI*, LIA	32
Prototype	Script Generator for VPT3	C	P3.W2.1	LIA	32
Report	Concluding report on Drama	R	I3.W1.2	IDAU	34
Prototype	Stage for VPT3	C	P3.W2.2	LIA	34
Report	Update of review of symbolic play	P	I3.W1.1.1b	COGS	36

Table2.3: ResourcesallocatedtoParticipantsperWorkpackageandperTask

Project:EP29335

Acronym:PUPPET

WP/Task	Participants				Effortperson-month
	LIA	COGS	IDAU	DFKI	
T1.1EarlyLearning	0	19*	0	0	19
T.1.2TheDramaturgyofVPT	0	9	15*	4	28
T1.3I/FDesign	0	7	0	10*	17
WP-1InformingDesign	0	35*	15	14	64
T2.1ScriptGenerator	10*	0	0	0	10
T2.2VPTStage	25*	15	0	0	40
T2.3AutonomousPuppets	8	0	0	8*	16
T2.4I/Ffunctions	9	15*	0	5	29
WP-2NewTools	52*	30	0	13	95
T3.1VPT1,Experiments	0	5*	0	0	5
T3.2VPT2,Experiments	0	5*	0	0	5
T3.3VPT3,Experiments	0	3*	0	0	3
WP-3Experimenta lEval.	0	13*	0	0	13
WP-4Management	6*	3	1	1	11
Total	58*	81	16	28	183

(1) Role:Workpackage/Taskco-ordinator= *

VPT3	3.M	Milest																	
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Table2.4b:TimeScheduleforWorkpackages1,2,and3.

Organisedin2monthblocksbyVPT -number,Task -numberandPartner.

Xinaslotequals2Personmonth,xequalsononePersonmonth.

Task*.MisamilestonemarkerforWorkpackage*.

ThisstableissortedbyPartner,VPT -numberandTask -number.

VPT#	Task	Partner	Year1						Year2						Year3					
			24681012						141618202224						262830323436					
VPT1	1.1.1	COGS	X																	
VPT1	1.1.2	COGS		x	x	X														
VPT1	1.2.2	COGS	x	x	x															
VPT1	1.3.2	COGS		x	x															
VPT1	2.2	COGS	X	X			x	x	x											
VPT1	2.4	COGS			X	X														
VPT1	3.1	COGS					x	x	x	x	x									x
VPT2	1.1.1	COGS				x	x													x
VPT2	1.1.2	COGS								x	x	X								
VPT2	1.2.2	COGS					x	x	x											
VPT2	1.3.2	COGS					x	x	x											
VPT2	2.2	COGS					x	x					x	x	x					
VPT2	2.4	COGS								X	X	X								
VPT2	3.2	COGS											x	x	x	x	x			
VPT3	1.1.1	COGS									x	x								
VPT3	1.1.2	COGS																		
VPT3	1.2.2	COGS																		
VPT3	1.3.2	COGS																		
VPT3	2.2	COGS																		X
VPT3	2.4	COGS																		x
VPT3	3.3	COGS																		X
VPT1	1.2.3	DFKI	x	x																
VPT1	1.3.1	DFKI		x	x															
VPT1	2.3	DFKI			x	x	x													
VPT1	2.4	DFKI				x	x													
VPT2	1.2.3	DFKI							x	x										
VPT2	1.3.1	DFKI							x	x	X									
VPT2	2.3	DFKI										x	X							
VPT2	2.4	DFKI											x							
VPT3	1.2.3	DFKI																		
VPT3	1.3.1	DFKI																		
VPT3	2.3	DFKI																		
VPT3	2.4	DFKI																		
VPT1	1.2.1	IDAU	X	X	x															
VPT2	1.2.1	IDAU					x	X	X											
VPT3	1.2.1	IDAU																		
VPT1	2.1	LIA	x	x	x	x														
VPT1	2.2	LIA	X	x	x	X	X													
VPT1	2.3	LIA		X			x													
VPT1	2.4	LIA			X	x	x													
VPT2	2.1	LIA							x	x	x									
VPT2	2.2	LIA							x	x	x	x	Xx							
VPT2	2.3	LIA							x			x	x							
VPT2	2.4	LIA											x	x						
VPT3	2.1	LIA																		
VPT3	2.2	LIA																		
VPT3	2.3	LIA																		
VPT3	2.4	LIA																		
VPT1	1.M	Milest				0														
VPT1	2.M	Milest																		
VPT1	3.M	Milest																		
VPT2	1.M	Milest								0										
VPT2	2.M	Milest											0							
VPT2	3.M	Milest												0						
VPT3	1.M	Milest													0					

3. Project Management

Project management responsibilities are assumed by a Managerial Board (MB) headed by the project co-ordinator (PCO). The MB comprises the Team Leaders (TL) of the research team of each of the participating partner. The TL of LIA is also project co-ordinator, PCO.

Technical management is also supported by Workpart Leaders, WPL, as assigned in the Workplan, Section 2, for the individual Workpackages, Tasks, and Subtasks, respectively.

3.1 Partners and Key Personnel

1. LIA (DK) (Co-ordinating Contractor)
 Institution Aalborg Universitet
 Team Laboratory of Image Analysis
 TL Prof. Erik Granum, Head of LIA (PUPPET Project Co -ordinator)
 Deputy Dr. Claus S. Andersen, Assistant Professor
 Dr. Claus B. Madsen, Associate Research Professor

2. COGS (UK)
 Institution University of Sussex,
 Team School of Cognitive and Computing Science
 TL Dr. Mike Scaife, Associate Professor
 Deputy Prof. Hilary Buxton, CSAI Subject Chair
 Dr. Yvonne Rogers, Associate Professor

3. IDAU (DK)
 Institution Århus University
 Team Institute of Dramaturgy
 TL Dr. Janek Szatkowski, Associate Professor
 Deputy Dr. Torunn Kjølner, Associate Professor
 Dr. Niels Lehmann, Associate Professor

4. DFKI (D)
 Institution Deutsches Forschungszentrum für Künstliche Intelligenz, Saarbrücken
 Team Intelligent User Interfaces
 TL Dr. Elizabeth Andre
 Deputy Dr. Thomas Rist

3.1.1 Partner Schools

It is mandatory for the success of the project to have a smooth and stable collaboration with schools, which are able to give explicit commitment to their participation in field studies of WP -1 and test of WP-3.

Partner COGS have a tradition for working with various schools of their local region, and they will be responsible for setting up operational arrangements with the necessary schools.

Within the first month of the project period these arrangements will be carefully planned and negotiated with the schools and mutual agreements between COGS and the schools will be formulated in writing.

3.2 Responsibilities of Workpart Leaders (WPL)

A Workpart may be a Workpackage, a Task, or a Sub-task, and the Workplan in Section 2 specifies a leader for each such Workpart of the Project Programme. The responsibilities of a WPL are:

- To monitor and coordinate efforts within the workpart. This requires continuous awareness of workpart activities and special attention if more than one partner is involved in the workpart.
- To monitor that necessary and timely input to the workpart is provided from other workparts and take actions if delays occur.
- To ensure that the workpart produces the necessary output to other workparts as specified in the Workplan. In particular, to be aware of which other workparts, that are dependent on this output, and plan works such as to provide stepwise output as required to maintain an operational status for dependable workparts. All internal and external reports are circulated to all partners.
- On request from TL and/or PCO, to produce brief status reports for the workpart, e.g. for MB meetings, and for the periodic progress reports.

3.3 Responsibilities of Team Leaders (TL)

The TL is responsible for all the partner's administration and technical matters in relation to the project. The TL has a Deputy to support in daily duties and as substitute, when unavoidable matters prohibit his/hers attention to the TL duties, The TL has the following responsibilities:

- To serve as a member of the MB, and participate in MB meetings called by the PCO. For such meetings the TL should prepare brief reports on partner status and plans. The TL should be able to negotiate matters concerning cost and allocation of resources involving the partner.
- To prepare partner contributions to the Periodic Progress Reports once a year, to be submitted to the coordinator no later than 4 weeks before the annual review.
- To monitor the use and accounting of all Partner resources and expenditures on the project.
- To plan and supervise all work and actions assigned to the partner.
- To ensure quality and timely submission of all internal and external deliverables assigned to the partner. Hence the TL is back-up for WPL tasks assigned to staff of the partner.
- To support and ensure smooth and effective collaboration and communication with all other partners of the project, and with Workpart Leaders, related to the work of the partner.

3.4 Management Board

The MB is responsible for project execution, the timely production of deliverables, monitoring of cost, timetables, progress etc, and it should take corrective action in case that delays and other unforeseen events occur. This includes facilitating collaboration as well as resolving conflicts among partners.

The PCO calls the MB meetings. Shortly after project start a Kick-off meeting is held to define managerial procedures, standards, and proforma in order to enable collaboration in a well defined and agreed way. MB meetings are then held regularly at about 6 months interval, and if possible in connection with other project meetings. Extraordinary MB meetings may be called on the request of any of the partners.

The terms of reference for MB meetings are:

- Compare progress with the project workplan.
- Decide on actions to be taken if delays occur.
- Discuss technical aspects of work and collaboration.
- Monitor and control project resources and expenditures.
- Review list of deliverables and reports.
- Prepare communication with the CEC.

The decision process of the MB normally assumes negotiation and agreement. However, if consensus is unachievable, the decision can be based on majority vote in respect of all four partners. In the case of a tie, the vote of the PCO determines the final decision.

In case of a conflict between two or more partners on matters within the project, the PCO is informed and initiates a one month negotiation phase. Partners not involved elect a convening negotiator to help resolve the conflict. If negotiations fail to produce a solution within the one month negotiation phase, the conflict is resolved through the decision process of the MB as defined above.

The governing law of the Project is the law of the co-ordinating contractor, i.e. the Danish Law.

3.5 Project Co-ordinator

The project co-ordinator, PCO, represents the co-ordinating contractor as well as the project, and is responsible for all communications with, and contact to the CEC. The PCO collects all deliverables and annual cost statements for submission, and he collects input for compilation of the Periodic Progress Reports and Final Report, respectively.

The PCO will prepare and circulate at times scheduled to guide partners on timely submission of the material required for the CEC and its services.

The PCO will file copies of all internal and external deliverables, and maintain a common computer database with all electronically available documents produced for the project. The database will be accessible by all partners. Also at the site of the PCO a WWW Home page with project information and selected public material will be set up and maintained.

The PCO shall call for, chair and arrange minutes of all MB meetings.

3.6 Relationships with other Projects and Programmes

“i3-ese” relations will be described in Section 4.

Partners LIA and IDAU participate in a Danish multipartner, 4 year research project “Staging of Inhabited, Virtual 3-D Spaces”, which is supported by the Danish Research Councils. It involves a range of different disciplines of humanities and of natural and engineering sciences at 5 Danish universities. STAGING aims to investigate and explore how the theatre metaphor and tradition may develop, when transferred to the virtual world and supported by virtual reality and other new technologies, as well as observed by the analytic eye of researchers in humanities. Actually, this STAGING-project inspired the PUPPET-proposal.

LIA and IDAU have similar roles in STAGING as they have in PUPPET. Hence LIA is responsible for design and implementation of the “Virtual Theatre Stage”, and has tasks on autonomous agents and visually mediated interfaces. PUPPET and STAGING are defined independent of one another, but it is expected that at the two partners sites they will benefit greatly from one another. When possible and appropriate even shareable software may be developed collaboratively.

Related projects at COGS are “Co-operative Technologies in Complex World Settings”, COTCOS, and “BEHAVIOUR”. COTCOS is an EUTMR Network exploring the use of external media inco-

operative work. Experiences from this project are expected to prove very useful within the PUPPET project, in particular for designing VPT3. BEHAVIOUR is an EPSRC project aimed at analysing and learning about dynamic patterns of visual behaviours, atopic relevant also in the PUPPET Theatre.

4. Dissemination and Take-up of Results

Strategy for communicating results to others.

4.1 Plans for Demonstration and Dissemination of Results

We see the publicity for PUPPET in terms of a number of linked levels of involvement.

**Community involvement.*

The PUPPET project is envisaged as a full community project. This means that we will actively involve teachers/tutors, parents and other members of the community in the development of the VPT. As such we will be encouraging the development of full IT strategies in our partner schools with communication via the Internet and video-conferencing between sites. In addition, the children can publish their plays and stories on the Internet in ways that are available to the wider community (e.g. <http://www.kidpub.org/kidpub>).

**National involvement.*

The use of the VPT in partner schools will, we believe, excite interest in the wider community. For example in the UK the 'National Grid in Education' policy, with its emphasis on the use of IT in schools, will act as an important context for the reception of the VPT as an example technology.

**Global involvement.*

We envisage that the project will be widely publicised on the WWW. To this end we shall build a PUPPET website which will contain updated results of our work, in the form of text, graphics and animations. For example we will be advertising the results of the children's activities and creative play through Shockwave movies on the internet. This site will also allow input from interested parties.

**Academic involvement.*

We will write theoretical and applied papers to be disseminated in quality journals (e.g. Instructional Science, Journal of Educational Technology) on the Internet (as technical reports and draft papers), at conferences (e.g. Doors of Perception, BPS, CHI, SIGCHI) and specialised workshops, spanning the different disciplines involved in PUPPET. We shall also be routinely involved in information exchange with other researchers, within I3 (see below) and outside, e.g. other work on virtual environments such as at MIT, North Carolina, Stanford.

**Commercial involvement*

See Subsection 4.3.

4.2 Plans for interacting with other I3 -ese Projects

The I3 -ese projects share problems and/or ideas regarding Early Learning paradigms, methods, and/or tools. Already at the proposal reviewing stage some detected commonalities gave rise to suggested clusters of

projects. The projects PUPPET, KIDSTORIES, and POGO forms such a cluster, and at the 3rd Kick-off Workshop in June 1998, the coordinator of these projects confirmed their interests in proposing and participating in a SIG, Special Interest Group, with preliminary working title "Learning through Narratives" under the 3rd -ese Net. Other projects like STORIES also expressed their interest, and the PCO of PUPPET undertook the responsibility of taking the necessary initiatives to establish this SIG, when first the projects have started their official existence.

The three 3rd -ese Working Groups are also expected to propose activities, which are relevant for the PUPPET project, and hence will call for PUPPET participation.

PUPPET will be an active member of the 3rd -ese community and expects to get collaborative relations also to various 3rd -projectssuch as RENA and SCAPE. PUPPET will contribute constructively with ideas and effort to promote and disseminate PUPPET results in a 3rd -ese context.

4.3 IPR Strategy

We envisage an open IPR policy where the academic community holds the right to exploitation of the software with many links to commercial parties such as Lego and Cyberlife who can develop their own markets in this area. That the proposed work indeed has a strong potential for being taken up also by European commercial companies is demonstrated by letters of support from Michael Thomsen, Director of Software R&D, LEGO A/S, Denmark and Anil Malhotra, Business Development Director of Cyberlife Technology Ltd., UK, which were enclosed in the annex of the proposal. The wider scope of the proposal was also emphasised by Stephen Furner, Head of Human Factors Unit, BT laboratories, UK, in a letter of support.

See also Section 6.

5. Reports and Reviews

The 3 year project has conveniently been broken down into 3 one year periods, each of which produces results for a review. Reviews are thus suggested shortly after the major Milestones at months 12, 24, and 36.

Specifically for reviewing purposes a series of deliverables in terms of External Reports and Demonstrators will be presented. Per year this amounts to:

- Technical report from WP -1: Design considerations and Specifications of the VPT.
- Demonstration of the VPT of the year (output of WP -2), with regard to technical performance, and to its use for Early Learning.
- Technical report from WP -3: (Preliminary) Results of School test.
- Periodic Progress Report (PPR), Managerial Report.

These Deliverables are listed in Table 2.1.

At the end of the project a Final Report will be prepared. It is expected, that the PPRs and the Final Report will be publicly available in their original form.

To provide live demonstrations with the VPT, the reviews must take place at either partner COGS or LIA.

6. Obligations and Rights of Partners

The project will generate new software and hardware. Such technology is owned and copyrighted by the partner that developed the item. A distribution will, however, be made available to all partners of the consortium. In case several partners contribute to an item, it belongs to each partner which developed it.

Private companies often require exclusive access to a technology, before they will invest in its use for development of products. Each partner maintains the right to enter into contracts with other parties in respect of their own developments. However, such contracts do not restrict the rights of the remaining partners.

In general the partners agree to freely circulate between themselves, the software and hardware developed within this project. None -the-less, a partner has the right to declare that a certain module may not be distributed outside the consortium. Each such module will carry the name of the authors and the holder of the copyright. Authorisation will be required from the copyright holder, before a partner may distribute a copy of such a module to a third party.